Abstract

Title of Dissertation: A Decade of Rossi X-ray Timing Explorer Seyfert Observations: An *RXTE* Seyfert Spectral Database

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With over forty years of X-ray observations, it seems that we should have a grasp on the X-ray nature of active galactic nuclei (AGN). The unification model proposed by Antonucci & Miller (1985) offered a context for understanding the observations by defining a "typical" AGN geometry, with a standard picture of the central AGN engine where differences in observed spectra are explained by line-of-sight effects. However, the picture that is emerging is that the central AGN region is more complex than unification alone can describe. What does the core of an active galactic nucleus truly look like? Do all Seyfert 2s have a Seyfert 1 geometry at their core? How does the environment of the AGN affect our view of the central engine? We explore these questions with a systematic X-ray spectral study of bright Seyfert galaxies observed by the Rossi X-Ray Timing Explorer (RXTE) over its first 10 years. We develop a database of spectral fits of 821 time-resolved spectra from 39 Seyfert galaxies fitted to a standard model including the effects of a power-law X-ray spectrum reprocessed and absorbed by material around the central supermassive black hole.

We observe a relationship between radio and X-ray properties for Seyfert 1 type AGN, with the basic spectral parameters differing between the radio-loud and radio-quiet Seyfert 1s. This can be explained if X-rays from the relativistic jet in radio-loud sources contribute significantly to the observed X-ray spectrum. We find a complex relationship between the Fe K equivalent width (EW) and the power-law photon index (Γ) for the Seyfert 1s, such that there is a correlation between these parameters for the radio-loud sources and an anti-correlation for the radio-quiet sources. This relationship can also be explained by jet-related phenomena, such that the flatter X-ray spectrum from the jet would contribute to the total observed X-ray spectrum and dilute the EW of Fe K. We observe a large amount of scatter in the EW-Γ relationship for the Seyfert 2s, which suggests that they contain environments that are more complex than can be explained by unification alone. We see a strong correlation between Γ and the reflection fraction (R) in both the Seyfert 1 and Seyfert 2 samples, but our modeling degeneracies between Γ and R are particularly strong in the *RXTE* bandpass, so this relationship cannot be trusted as instructive of the physics of the AGN. We find a general anticorrelation between EW and the 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample, which is also known as the X-ray Baldwin effect. This result may suggest that the higher luminosity sources have less material in their immediate environments or a time-lag between changes in the X-ray continuum and changes in the iron line. We do not observe a clear relationship between the photon index and the ratio of L_x to the Eddington luminosity (L_{EDD}), as has been previously reported. A Γ-L_x/L_{EDD} correlation would imply that the mass accretion directly feeds the central X-ray source, but the lower luminosities in our sources may not be capable of setting up the feedback mechanism between accretion rate and X-ray emission proposed for the more luminous sources upon which such an explanation has been based.

A Decade of Rossi X-ray Timing Explorer Seyfert Observations: An *RXTE* Seyfert Spectral Database

by

Barbara Jo Mattson

Dissertation submitted to the Faculty of the Graduate School of the University of Maryland at College Park in partial fulfillment of the requirements for the degree of Doctor of Philosophy
2008

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Preface

This thesis was written under the supervision of Dr. Kimberly Weaver of the Astrophysics Science Division (ASD) at Goddard Space Flight Center (GSFC), with additional support from Professor Christopher Reynolds of the University of Maryland, College Park. It is divided into six chapters and three appendices. Figures that are taken from the published literature are: Figure 1.1 from Osterbrock & Koski (1976), Figure 1.3 from Weaver & Reynolds (1998), Figure 1.6 from Reynolds et al. (1995a), Figure 2.1 from the *Rossi X-ray Timing Explorer* website, Figure 2.2 from Jahoda et al. (1996), Figure 2.3 from Rothschild et al. (1998), and Figure 4.7 from Ulrich et al. (1997). Parts of Chapter 3 were previously published as Mattson, Weaver & Reynolds (2007); the rest of the thesis is original work. Results based on this thesis were presented at the following conferences: the American Astronomical Society meeting (June 2005, January 2006, and January 2007), the Six Years of Science with Chandra meeting (November 2005), and the Eight Years of Science with Chandra meeting (October 2007). This thesis has also utilized a number of online resources, including data obtained from the High Energy Astrophysics Science Archive Research Center (HEASARC), the NASA/IPAC Extragalactic Database (NED), and NASA's Astrophysics Data System (ADS) Abstract Service.

To my husband, who tried valiantly to keep me sane through this whole process

Acknowledgements

I would like to thank my advisors, Kim Weaver and Chris Reynolds, for their advice, ideas, and patience. I'd also like to thank my thesis committee and all the people who read earlier versions of this thesis. In addition, I'd like to thank Richard Mushotzky for useful conversations and advice when I most needed it. I would also like to thank Keith Arnaud and the folks at the *RXTE* Guest Observer Facility, who were always quick with answers and support.

On a more personal level, I'd like to thank my husband, Andrew Kuchling, who supported me throughout this process. He always had advice on Python scripts, patiently read my chapters and stayed up late to help with last-minute formatting. He also took me to Starbucks for "thesis nights" to ensure I kept making progress, but also made me take sanity breaks at the movies or in front of Lego Star Wars on the PS2. I'd like to thank my parents and family, who never quite understood what I do, but were impressed that I was pursuing a PhD and encouraged me all the way. I'd like to thank "my girls", Diana Sekhon, Melissa Goldin, Suzanne Bergfalk, Kirsten Mitchell, and Stef McLaughlin, who always thought it was cool that I was doing astronomy, even when I was sick of it. Also, thanks to Laurie Myers, who was always ready for a scrapbooking break when I needed to release some creativity. I would also like to thank my friends in Trailer 6, especially Lorna Londot, JD Myers, Sandy Barnes, and Eric Winter, who listened to my trials and tribulations with great patience and understanding; also, thanks to my officemate, Don Horner, who seems to believe that I'm crazy, but it might take a crazy person to know one. And, finally, I need to thank Greg Greer, the community college physics instructor who got me into astronomy in the first place.

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Chapter 1

Introduction

1.1 What does an Active Galactic Nucleus Truly Look Like?

At their most basic, active galactic nuclei (AGN) are energetic phenomena found in the central regions of galaxies. AGN can be up to 10^4 times as luminous as a typical galaxy, and their radiation is observed over a broad range of the electromagnetic spectrum, from radio to gamma-ray energies. This radiation originates from a relatively small volume and cannot be explained by stellar activity. Yet, despite the fact that AGN have been a focus of extragalactic astronomy for several decades, we still cannot answer with confidence the big questions about these objects. What sparks AGN activity in a galaxy? What makes an AGN shine so brightly? What does an AGN "eat"? What does an AGN look like? How many AGN are really out there, hiding behind shrouds of obscuring matter? In fact, it seems that the current generation of multiwavelength observations has made us take a step back – we have more information, but the information does not always fit the picture of an AGN that we have painted.

Historically, our classification of galaxy nuclei as AGN has been based on a myriad of observational criteria, with different wavebands producing different views of an AGN and resulting in different AGN types. AGN sub-classifications, or the "AGN zoo", as it has been called, includes quasars, Seyfert galaxies, BL Lac objects and Low-Ionization Nuclear Emission Region galaxies (LINERs). These named types are based on a variety of observed phenomena, ranging from luminous nuclear point sources to strong, broad optical emission lines to rapid flux variability. The general consensus is that AGN are powered by accretion onto a central black hole (Section 1.2); i.e., accretion provides the primary source of the observed luminosity. Infalling matter forms a disk which is heated by viscous forces, and radiates in the optical and UV. One goal of AGN studies has been to seek out and define a simple unifying model that allows the observed AGN differences to be attributed solely to line-of-sight effects or the intrinsic luminosity of the source. Coincidentally, the AGN which was seminal in the formation of the current unification model, the Seyfert galaxy NGC 1068, is also the first AGN for which an optical spectrum was obtained.

Before we describe the unification model, we need to make a short digression into the history of AGN observations and subsequent recognition of the Seyfert class of AGN. The first optical spectrum of an AGN was taken of NGC 1068 in 1908 at Lick Observatory. A few years later, Vesto Slipher observed that NGC 1068 has unusually wide optical emission lines. However, it took another 35 years before the first group of AGN was recognized as a distinct class of galactic nuclei. In 1943, Carl Seyfert observed that several spiral galaxies showed bright stellar-like nuclei on short exposures, but their spectra did not appear to be typical of stars or a conglomeration of stars. Seyfert also noted that the spectra showed lines from high ionization states of several elements, which is atypical for galactic spectra. These first AGN, and others like them, have been named "Seyfert galaxies", a classification based on the presence of forbidden optical emission lines in the nuclear spectra which are broad (with widths of a few $\times 10^2$ km s^{-1}) compared to those in normal galaxies (with widths measured at full-width half maximum of a few 10s km s^{-1}). It should be noted that the so-called broad lines in Seyfert 1s (widths of a few $\times 10^2$ km s^{-1}) are not typical broad lines, which can have widths of a few $\times 10^3$ km s^{-1}; however, in comparison to Seyfert 2s, the lines are broadened.

Several decades later, Khachikian & Weedman (1974) classified Seyfert galaxies into two types, called "Seyfert 1" and "Seyfert 2". Both possess broad optical and UV emission lines covering a wide range of ionization states; however, Seyfert 1s also possess H I, He I, and He II emission lines with widths indicating emission from fast-moving material. Seyfert galaxies are further sub-classified as Seyfert 1.2, 1.5, or 1.9 based on the relative strengths of the broad and narrow H I components (e.g. Osterbrock (1977); Osterbrock & Koski (1976)). Figure 1.1 shows typical spectra from three classes of Seyfert galaxy: Seyfert 1, Seyfert 1.5 and Seyfert 2. The Seyfert 1.5 spectrum of Figure 1.1 shows an Hβ profile consisting of a narrow component superimposed on apparent broad wings.

We now return to the development of the unified model and come back to NGC 1068. NGC 1068 is classified as a Seyfert 2 galaxy, so its optical spectrum does not show broad H I, He I, and He II emission lines. However, the polarized optical spectrum of NGC 1068 showed these broad lines (Antonucci & Miller 1985), suggesting scattered light from the central AGN. In fact, the polarized spectrum was indistinguishable from a Seyfert 1, implying that NGC 1068 contained a Seyfert 1 nucleus with its broad lines obscured from view. This observation led to the unification model which proposes that Seyfert 1 and 2 nuclei are the same type of object with optical spectral differences caused by our line-of-sight (Antonucci 1993).

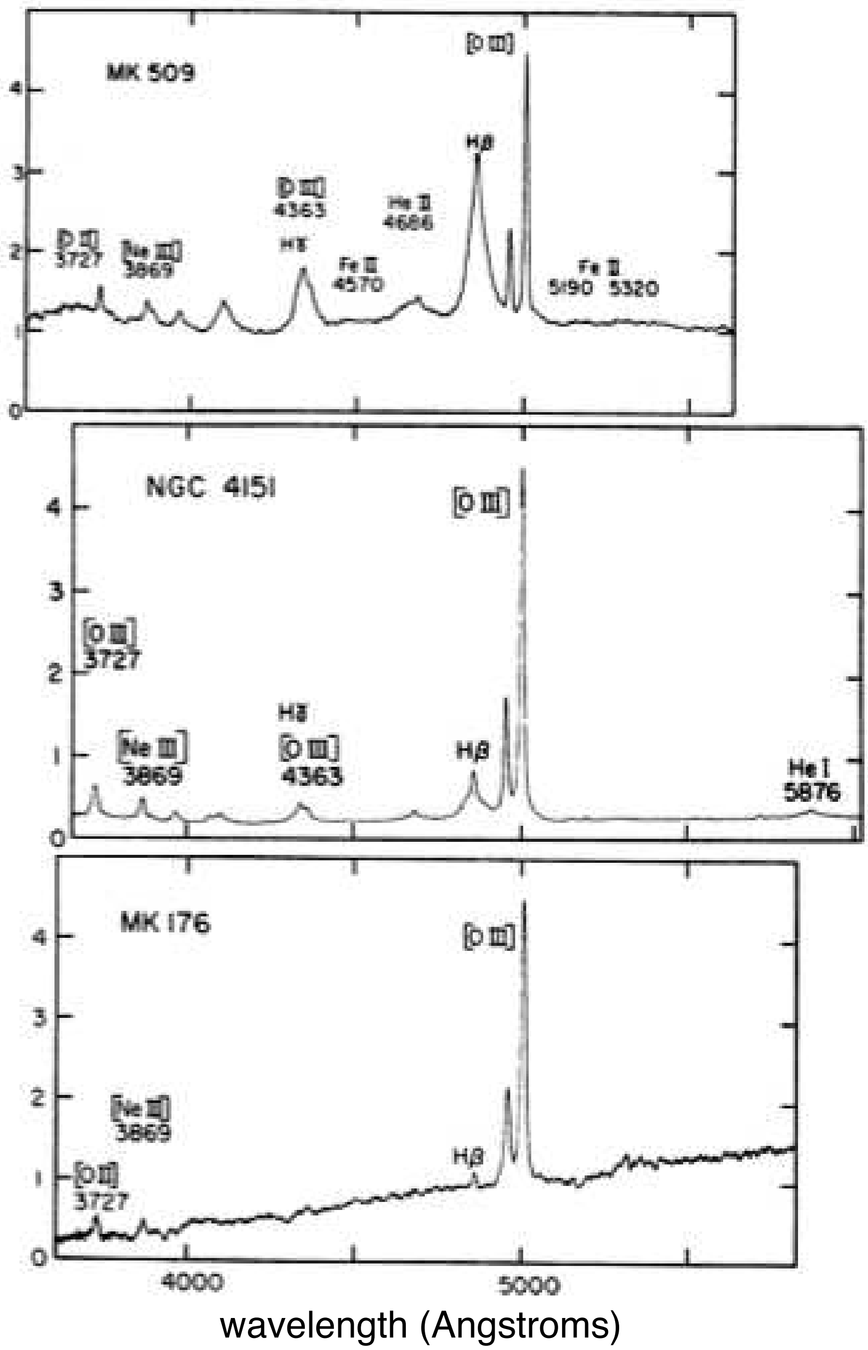


Figure 1.1: Three optical spectra from typical Seyfert nuclei. The top spectrum is from Mkn 509, a typical Seyfert 1 galaxy. The middle spectrum is from NGC 4151, showing a typical Seyfert 1.5 spectrum. The bottom spectrum is from Mkn 176, a typical Seyfert 2 galaxy. One defining difference in these optical classifications is the Hβ line profile. The Seyfert 1 shows a relatively broad profile, while the Seyfert 2 shows a narrow Hβ profile. The Seyfert 1.5 shows a narrow line with superimposed broad wings. (Figure from Osterbrock & Koski (1976).)

Figure 1.2 shows a cartoon cross-section of the proposed geometry of the unified model. A black hole lies at the center, surrounded by an accretion disk which reaches close to the black hole. Scattered around the outer reaches of the accretion disk is the broad line region (BLR) – clouds of material that are responsible for the broad emission lines directly observed in the Seyfert 1, and in polarized light in Seyfert 2s. The kinematics of the BLR are not well understood at this time. However, the distance of the BLR from the central source is estimated to be several light days to light months away based on time lags between changes in the continuum flux and the broad emission line fluxes (e.g., Peterson et al. (1998)). Surrounding the BLR lies the region of obscuring material, assumed to be a torus of matter that can be Compton thick, where Compton thick material has an optical depth of unity or larger for Compton scattering (or absorbing column density $\gtrsim 10^{24}$ atoms cm^{-2}). The material responsible for the narrow lines observed in both types of Seyferts extends in cones out of the plane of the accretion disk. This is the narrow line region (NLR), which can extend to a radius of several thousand light years and is one of the two components of the AGN that has been spatially resolved (e.g. NGC 4151, Ulrich (1973); the other feature that has been spatially resolved is the relativistic jet in radio-loud sources, described below). According to the unification model, Seyfert 1s are observed "face-on", or at an inclination angle of $i \sim 0°$, with a line-of-sight which does not pass through any of the obscuring torus. Seyfert 2s are observed "edge-on", or at an inclination angle of $i \sim 90°$, directly through the thickest part of the obscuring torus. The intermediate Seyfert types are viewed at intermediate angles, with lines-of-sight through increasing amounts of the torus from Seyfert 1.2s to Seyfert 1.9s. It is important to note that the disk of the central AGN is not always co-aligned with the disk of its host galaxy.

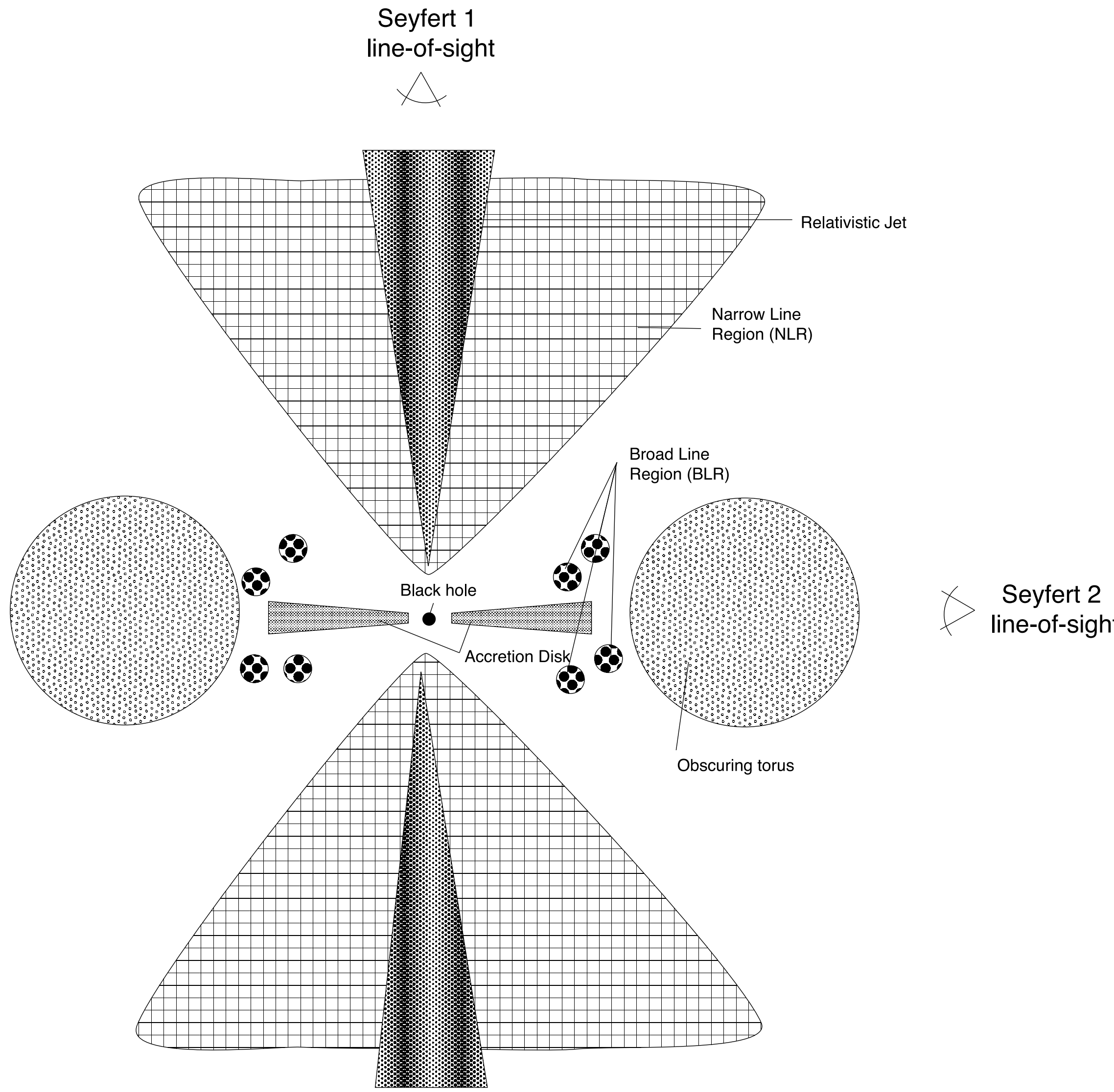


Figure 1.2: Cartoon of the proposed unified AGN geometry. A black hole lies at the center, surrounded by an accretion disk which reaches close to the black hole. Scattered around the outer reaches of the accretion disk is the broad line region (BLR), surrounded by an obscuring torus. The narrow-line regions (NLR) extend out of the plane of the accretion disk in cones. Finally, a relativistic jet is present in some sources. This cartoon is not drawn to scale, so is only instructive in identifying the components of the unified model and their relative positions.

Some sources also show relativistic jets, with the base of the jet lying relatively near the central black hole. The AGN with strong jets also have strong radio emission. In radio images, the jets appear to be one-sided, which is attributed to strong relativistic beaming that causes the receding jet to be too dim to observe. While jets are ubiquitous in astronomical sources, their formation is not yet well-modeled, in part because the base of the jet lies very near the central black hole, in a region too small to be imaged.

Strict unification can be briefly summed up with the following three points:

1. Quasars and Seyfert 1s are essentially the same type of object with quasars being more luminous. Radio-loud and radio-quiet Seyfert 1s are also essentially the same type of object, with the radio-loud objects showing a strong relativistic jet.

2. Seyfert 1 and 2 galaxies are the same object, with Seyfert 2s viewed through a region of obscuration, accounting for many of the spectral differences.

3. One class of AGN, blazars, appear to be radio-loud AGN that are viewed along the jet axis.

A significant portion of the energy output from AGN appears in the X-ray band, representing from 5 to 40% of the bolometric luminosity. Large amplitude variability on short timescales has been observed at X-ray energies, indicating emission from a very small physical region – the X-ray emission can be traced to the very heart of the central engine. Because of this, X-ray spectroscopy studies are critical to unlocking the geometry of the central AGN engine. With over forty years of X-ray observations (Section 1.3.1), it seems that we should have a good grasp of the X-ray nature of AGN. The unification model offers a context for understanding the observations with a "typical" AGN geometry. The X-ray emission originates either from the accretion disk or the relativistic jet seen in radio-loud sources. The X-ray spectra of AGN show signatures of reprocessing, which can occur in any of the configurations of matter proposed by unification: the accretion disk, BLR, NLR and obscuring region. Correlations between the spectral signatures of reprocessing can identify global properties of AGN or classes of AGN. Variability studies can begin to reveal the relative locations of matter in the central engine through light-crossing arguments and time-lag effects.

Early X-ray observations appear to support unification (by showing Seyfert 2 nuclei to be significantly absorbed compared with the Seyfert 1s); however, with more detailed spectra at higher sensitivity to the X-ray reprocessing features, we are finding that the picture may not be as clear it first appeared. The X-ray emitting source may not be as simplistic as originally thought. In addition, several unabsorbed Seyfert 2s and heavily absorbed Seyfert 1s (Matt 2002) have been observed, challenging the view that Seyfert 2s are merely absorbed Seyfert 1s. In the absorbed Seyfert 2s, even the nature of the absorber is in question – is all the absorption from an obscuring torus or could there be significant absorption from other regions, such as a star-forming region or the galaxy disk itself?

We are not poised to answer all of the overarching AGN questions; however, we can begin to answer some smaller-scale questions which will start to build the foundation for answering the big questions. Do all Seyfert 2s have a Seyfert 1 geometry at their core? Are the environments of the central regions all the same in nature? How does the environment around the AGN affect our view? How does the choice of X-ray bandpass affect conclusions that we make about these sources? In this thesis, we explore these questions through an X-ray spectral study of AGN observed by the *Rossi X-ray Timing Explorer* (*RXTE*). To facilitate this, we have analyzed observations of Seyfert galaxies by *RXTE*. Of all AGN, Seyfert galaxies are the most obvious choice for study because they are nearby and bright, thus offering high quality spectra and the chance to spatially resolve their host galaxies. Seyferts are the most common type of AGN, comprising a few percent of all galaxies. They also contain significant amounts of material in their central regions, and X-ray reprocessing by the abundant material is a particularly important physical process in Seyferts, offering an avenue to construct a picture of the immediate vicinity of the central black hole. Using the *RXTE*-observed Seyferts, we have developed a database of spectral parameters from fits to the time-resolved spectra, which we use to perform correlation studies to explore the geometry of the central engine and determine if these spectra support the unification model.

In this thesis, we use $H_0 = 70$ km s^{-1} Mpc^{-1} when needed (e.g. for luminosity measurements). In the text, the quoted errors are 90% ($\Delta\chi^2 = 2.706$) and in figures error bars are 1-σ errors ($\Delta\chi^2 = 1.000$), unless otherwise stated.

1.2 AGN Power Source

Every proposed model for AGN includes the assumption that they are powered by accretion onto a central supermassive black hole. The two factors that have contributed to these models are the high luminosities of AGN (bolometric luminosities up to $\sim 10^{47}$ erg s^{-1}) and the relatively small volumes in which the luminosity originates. These two characteristics can be used to estimate the mass of the central object and the efficiency of the mass-to-energy conversion rate needed to produce the observed luminosities.

We can estimate the mass of the central compact object in a rather simple manner by determining the maximum luminosity a source can emit isotopically before the outward radiation pressure exceeds the inward gravitational force. In other words, how luminous can we make a source before accretion becomes ineffective due to the radiation pressure? For simplicity, we will assume a fully ionized hydrogen gas. In this case, the radiation pressure is given by:

$$P_{rad} = \frac{F}{c} = \frac{L}{4\pi r^2 c} \tag{1.1}$$

where r is the radius from the center, F is the flux at the given r, L is the luminosity of the source, and c is the speed of light.

The outward radiation force on an ionized hydrogen atom is the radiation pressure multiplied by the photon interaction cross-section with these particles. While the radiation exerts a force on both the protons and the electrons, the force on the protons is lower by a factor of $(m_p/m_e)^2 \approx 3 \times 10^6$ (where m_p and m_e are the mass of the proton and electron, respectively), so the appropriate cross-section is the electron scattering cross-section, the Thomson cross-section (σ_T). The outward radiation force is:

$$F_{rad} = \frac{L\sigma_T}{4\pi r^2 c} \tag{1.2}$$

The gravitational force acting on an electron-proton pair is:

$$F_{grav} \approx -\frac{GMm_p}{r^2} \tag{1.3}$$

where M is the mass of the central object, and we have neglected the electron mass in comparison with the proton mass. For effective accretion, the inward force of gravity must meet or exceed the outward force of the radiation. So, $F_{rad} \leq F_{grav}$, which implies that:

$$L \leq \frac{4\pi G c m_p}{\sigma_T} M \tag{1.4}$$

$$\approx \; 6.31 \times 10^4 \left(\frac{M}{1\ \text{g}}\right) \ \text{ergs s}^{-1}$$

For the case of equality,

$$L_{EDD} = \frac{4\pi G c m_p}{\sigma_T} M = 1.26 \times 10^{38} \left(\frac{M}{M_\odot}\right) \ \text{erg s}^{-1} \tag{1.5}$$

where $M_\odot$ is the mass of the Sun ($M_\odot = 1.99 \times 10^{33}$ g). This luminosity is known as the Eddington luminosity and defines the maximum luminosity for a given mass powered by spherical accretion. Detailed models of accretion from disks show that they tend to obey approximately the same limit. Recall that we assumed hydrogen gas for this calculation; to model a different gas, the Eddington luminosity is scaled by μ_e, the mass per unit electron.

We can flip this equation to define a minimum mass, M_{EDD}, for a source emitting a given luminosity, L.

$$\begin{aligned} M_{EDD} &= \frac{\sigma_T}{4\pi G c m_p} L \qquad (1.6) \\ &\approx 8 \times 10^5 \left(\frac{L}{10^{44}\ \text{ergs s}^{-1}}\right) M_\odot \end{aligned}$$

A typical Seyfert galaxy with $L \approx 10^{44}$ ergs s^{-1} must have a mass of at least $M_{EDD} \approx 8 \times 10^5 M_\odot$.

Rapid flux variability in some AGN have shown that the central region is relatively small, based on light travel time arguments. X-ray observations have shown variability on timescales of hours and minutes, implying $R < 10^{-4}$ pc and $R < 10^{-6}$ pc, respectively. These high luminosities in such a small volume imply that the object must be compact (i.e., small M/R), and given the Eddington mass we find for a typical AGN, the most likely candidate is a supermassive black hole.

We can also consider the efficiency of the central AGN source by looking at the conversion of mass-to-energy. The available energy from a mass, M, is $E = \eta M c^2$, where η is the efficiency of the mass-to-energy conversion. The energy released over time, or the luminosity, is:

$$L = \eta \dot{M} c^2 \tag{1.7}$$

where $\dot{M}$ is the mass accretion rate. Scaling to units for a typical AGN,

$$\begin{aligned} \dot{M} &= \frac{L}{\eta c^2} \\ &\approx 5.6 \times 10^{-11} \frac{L/(10^{44} \text{ erg s}^{-1})}{\eta} M_\odot \text{ s}^{-1} \\ &\approx 1.8 \times 10^{-3} \frac{L/(10^{44} \text{ erg s}^{-1})}{\eta} M_\odot \text{ yr}^{-1} \end{aligned} \tag{1.8}$$

So, the higher the efficiency can be made, the lower the required mass conversion rate.

Spherical accretion is not efficient enough for powering AGN, because the gas tends to carry its energy across the event horizon where it is lost to the black hole. The more realistic candidate is accretion from a disk. Infalling matter will form a disk to shed angular momentum before falling into the black hole. If we consider that each differential element of the accretion disk has an approximately circular orbit, then the specific angular momentum of each element scales with radius, r, as $\propto r^{1/2}$. The net effect is a shearing flow, causing angular momentum to be transferred outward as the mass flows inward.

A simplistic calculation of the efficiency of such a disk can be made by assuming an approximately circular orbit, so that the inward gravitational acceleration balances the centripetal acceleration of each parcel of the accreting material, or $v^2/r = GM/r^2$. The energy per unit mass is then $E = v^2/2 - GM/r = -GM/2r$, and the luminosity of the disk is:

$$L_{disk} = \frac{GM}{2r_{ISCO}}\dot{M} \tag{1.9}$$

where r_{ISCO} is the innermost stable circular orbit of the black hole, and is assumed to be the inner edge of the accretion disk. A general relativistic treatment of orbits around black holes shows that circular orbits are only stable down to a certain radius. The location of this radius is r_{ISCO}, and depends on the black hole mass (M_{bh}) and the black hole angular momentum. For a non-rotating black hole, $r_{ISCO} = 6GM_{bh}/c^2$; whereas, for a maximally rotating black hole (i.e. one with as much angular momentum as general relativity will allow), rotating in the same direction as the accretion disk, $r_{ISCO} = GM_{bh}/c^2$ (for a maximally rotating black hole spinning against the disk rotation, $r_{ISCO} = 9GM_{bh}/c^2$). The luminosity, then, is approximately given by:

$$L_{disk} \approx \begin{cases} \frac{1}{12}c^2\,\dot{M} & \text{for non}-\text{rotating black hole} \\ \frac{1}{2}c^2\,\dot{M} & \text{for a maximally rotating black hole,} \\ & \text{spinning in the direction of the accretion disk} \end{cases} \tag{1.10}$$

Comparing this with Equation 1.7 gives an efficiency of $\eta = 1/12 = 8\%$ for the non-rotating black hole and $\eta = 1/2 = 50\%$ for a maximally spinning black hole. Using these efficiencies, we find that for a $10^6 M_\odot$ black hole radiating $L = 10^{44}$ erg s^{-1}, the accretion rate could be as much as $\dot{M} \approx 0.02 M_\odot$ yr^{-1} for a non-rotating black hole or as little as $\dot{M} \approx 0.004 M_\odot$ yr^{-1}. A full relativistic treatment gives efficiencies of $\sim 6\%$ and $\sim 40\%$ for the non-rotating and maximally rotating cases, respectively, but these simplified calculations give a good approximation.

In summary, through simple modelling, we have shown that a typical AGN must have a central mass of at least $10^5 M_\odot$ in a region the size of our Solar System or smaller ($R < 10^{-4}$ pc). The high efficiency required to produce the observed luminosities in the small region is well-modeled by accretion onto a central black hole.

1.3 X-ray Observations of AGN

Now that we've established that AGN are powered by accretion onto a central black hole, we discuss the X-ray observations, which can be traced to very near the black hole. We start with a brief history of X-ray observations of AGN (Section 1.3.1), then describe the observed AGN spectrum in detail with speculation on how the features fit into the unified model (Section 1.3.3).

1.3.1 Brief History of X-ray Observations of AGN

The first X-ray detection of an AGN was in the late 1960s when rocket and balloon-borne instruments observed the quasar, 3C 273 (Bowyer et al. 1970). The 1970s saw an explosion of X-ray missions: *Uhuru*, the first satellite dedicated to X-ray astronomy, was launched in 1970, followed by *Ariel-V* in 1974, *High Energy Astronomy Observatory 1* (*HEAO-1*) in 1977, and *High Energy Astronomy Observatory 2* (*HEAO-2* or *Einstein Observatory*) in 1978. In addition, two solar observatories, *Orbiting Solar Observatory 7* and *8* (*OSO-7* and *OSO-8*, launched in 1971 and 1975, respectively), also carried instruments dedicated to extra-solar cosmic X-ray observations. *Uhuru* performed the first all-sky X-ray survey, and returned the first X-ray spectrum of an AGN (Tucker et al. 1973). The third *Uhuru* catalog listed observations of the three brightest AGN (Giacconi et al. 1974). This was followed by the identification of another 11 Seyferts in the *Ariel-V* catalog (Cooke et al. 1978). The fourth, and final, *Uhuru* catalog listed 5 additional Seyfert identifications (Forman et al. 1978). Data from *OSO-8* and *Ariel-V* were able to show that the X-ray spectrum showed a power-law shape with the signature of absorption at low energies (Ives et al. 1976; Mushotzky et al. 1978).

By 1980, it was clear that X-ray emission from Seyfert galaxies, at least Seyfert 1s, is common (Elvis et al. 1978). The *Ariel-V* data also established that variability in the X-ray flux is common in AGN. *HEAO-1* observations provided the first studies of a large sample of X-ray spectra of AGN, which demonstrated that the spectra are well-modeled by a power-law with photon index of $\Gamma \approx 1.7$ and absorption of cold material (Mushotzky 1984; Mushotzky et al. 1980). Later studies by *HEAO-2* confirmed this photon index but found that some of the lower luminosity sources required various types of absorption from a uniform absorber to a patchy absorber to a weak absorber (Reichert et al. 1985).

In the 1980s, two new missions contributed significantly to the study of the X-ray emission of AGN: *EXOSAT* launched in 1983 and *Ginga* in 1987. Temporal studies with *EXOSAT* data reinforced the earlier results that large scale variability is common in Seyfert 1s (Turner 1988). In addition, it showed that the "canonical" power-law index of $\Gamma \approx 1.7$ still held (Turner & Pounds 1989). While iron K line features had previously been observed in the bright radio galaxy Cen A (*OSO-8*, *HEAO-1*, and *EXOSAT*, Mushotzky et al. (1978)) and at low significance in a handful of other galaxies (e.g., Morini et al. (1987); Mushotzky (1982)), *Ginga* observations demonstrated that iron lines are common in AGN (Nandra et al. 1989; Pounds et al. 1989). The iron line showed a mean energy of $E \sim 6.4$ keV, consistent with fluorescence from neutral material close to the central source (Nandra & Pounds 1994). Several spectra also showed a "hard tail", with the spectrum hardening for energies > 10 keV (Nandra & Pounds 1994). The source of this tail was proposed to be "Compton reflection". Nandra & Pounds (1994) find that the addition of the Compton reflection component gives a new "canonical" power-law index of $\Gamma \approx 1.9$ to 2.0.

Our X-ray view of AGN expanded again with the slew of X-ray-dedicated observatories launched in the 1990s, including the *Röntgen Satellite* (*ROSAT*) in June 1990, the *Advanced Satellite for Cosmology and Astrophysics* (*ASCA*) in February 1993, the *Rossi X-ray Timing Explorer* (*RXTE*) in December 1995, *BeppoSAX* (*BeppoSAX*) in April 1996, the *Chandra X-ray Observatory* (*Chandra*) in July 1999, and the *X-ray Multi-Mirror Mission* (*XMM*) in December 1999. Each new mission brought higher signal-to-noise observations of AGN allowing for more detailed studies of their X-ray spectra. *ASCA* studies showed relativistic effects in the iron line emission of some AGN. The line profiles appeared asymmetric with a broad redshifted wing, which would be expected from emission distorted by relativistic motions near a black hole (Nandra et al. 1997; Tanaka et al. 1995). Other AGN, though, showed strong narrow lines (e.g., NGC 2992, Weaver et al. (1996)), consistent with emission in the other regions of the unification model – the BLR, NLR, obscuring torus or outer accretion disk. In fact, it was predicted that the iron lines should show a complex profile with both narrow and broad contributions (Weaver & Reynolds (1998), Figure 1.3). Early reports of *XMM* observations showed evidence for a narrow iron line, with few relativistically-broadened lines as had been seen by *ASCA* (Reeves 2003). However, careful analysis of a sample of *XMM*-observed Seyferts showed that about 75% of the galaxies had complex iron structures which were well-modeled by emission from an accretion disk (Nandra et al. 2006).

By 2000, the number of operating X-ray satellites coupled with the historic observations, allowed long-term studies of large spectral samples. Currently there is evidence for variability of the iron line (Weaver et al. 2001) and absorbing column density (Risaliti et al. 2002). This variability of X-ray spectral features has allowed limits to be established for the relative geometry of the different configurations of

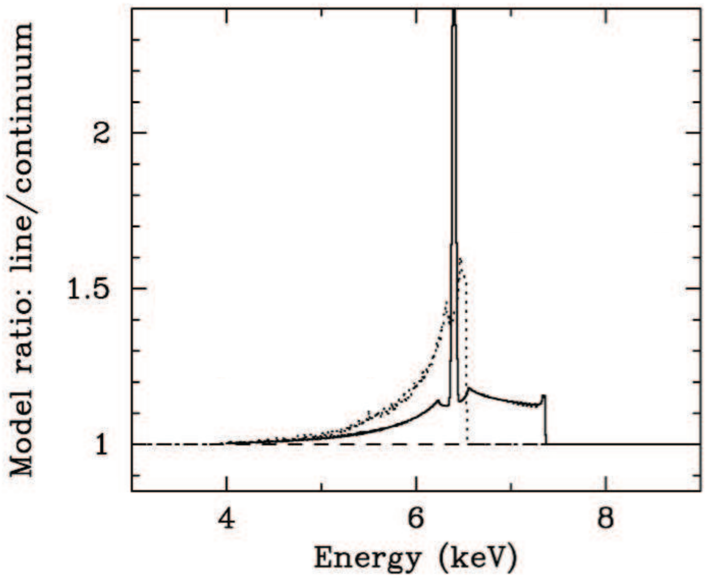


Figure 1.3: Theoretical line profiles showing a narrow and broad component. The solid line shows an unresolved line plus a line from an accretion disk at an inclination of 48°. The dotted line shows a line from an accretion disk at an inclination of 20°. The profile is shown without the direct power-law continuum. (Figure from Weaver & Reynolds (1998))

matter in the central regions of AGN. For example, Risaliti et al. (2002) find evidence for absorption at a distance of $\lesssim$ 0.03 pc based on variability in the absorbing column of 25 Seyfert 2s. In addition, they propose a second absorber at a distance $\lesssim$ 3 pc.

Our understanding of X-ray spectra from Seyferts has transformed from an uncomplicated absorbed source showing a simple power-law to a messy source with complex absorption and emission features.

1.3.2 X-ray Interactions with Matter

Before moving on to discuss the general X-ray spectra of Seyfert galaxies, it is instructive to review two basic processes by which X-rays interact with matter: photoelectric absorption and Compton scattering.

Photoelectric absorption occurs when a photon interacts with an atom, freeing an electron. A free electron cannot conserve both energy and momentum when it absorbs a photon; an electron absorbing a photon in an atom can conserve energy and momentum by exchanging a virtual photon with the nucleus. Such an exchange is easier for inner-shell electrons than outer-shell electrons, so high-energy photons tend to interact with inner-shell electrons. After an inner-shell electron is liberated, the resulting ion is in an unstable configuration. Two processes can occur to fill the vacancy – either an electron falls into the vacant slot, radiating a characteristic photon in the process (X-ray fluorescence), or an Auger electron is ejected. In the Auger process, an electron falls from a nearby shell, say the L-shell, and the liberated energy is transferred to another L-shell electron, which is ejected from the ion. The process of interest for this thesis is X-ray fluorescence, which is illustrated in Figure 1.4.

The incoming photon must have an energy higher than the binding energy of the electron in the atom, E_B. The binding energies for each level (X), $E_{B,X}$, are also called absorption edges, because they define a boundary in photon energy for photons capable of ejecting an electron. Any excess energy above $E_{B,X}$ will be transferred to the electron as kinetic energy. A full quantum treatment shows that the cross-section for interaction with the K-shell electrons for a photon with energy, E greater than the binding energy of the K-shell electron ($E_{B,K}$) can be approximated by:

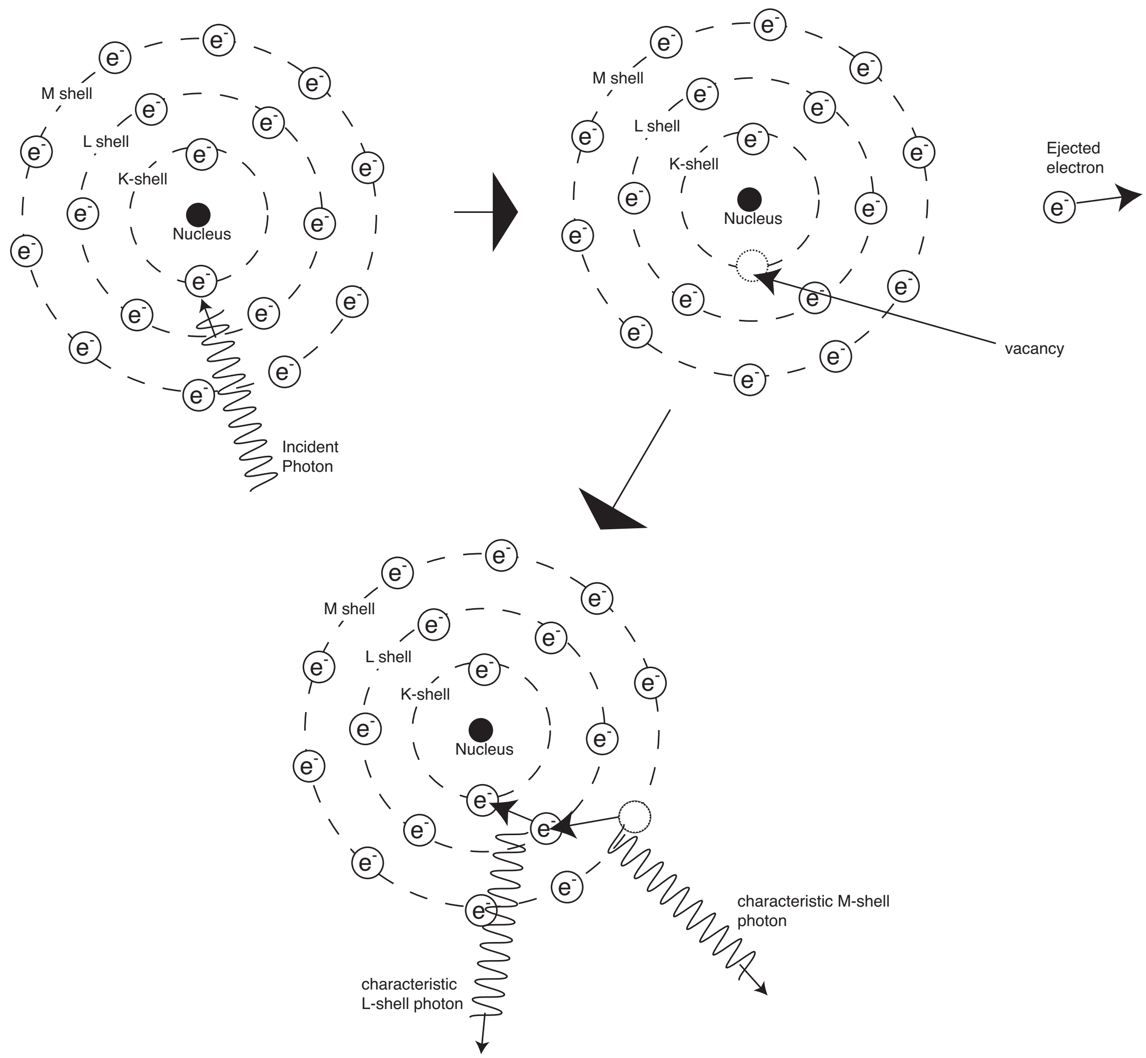


Figure 1.4: Cartoon showing the process of photoelectric absorption and X-ray fluorescence. An incoming photon with energy higher than the K-shell binding energy frees an electron from the K-shell orbital, transferring any extra energy into kinetic energy of the freed electron. The resulting ion is in an unstable configuration, prompting an L-shell electron (usually) to fall into the vacancy in the K-shell, producing a characteristic photon.

$$\sigma_K = 4\sqrt{2}\sigma_T \alpha^4 Z^5 \left(\frac{m_e c^2}{E}\right)^{7/2} \tag{1.11}$$

where, σ_T is the Thomson cross-section, α is the fine structure constant, Z is the atomic number of the element, m_e is the electron mass, and c is the speed of light (Equation 4.1 in Longair (1992)). The $\sim E^{-3}$ dependence results in a rapid decrease, so photons with energies close to $E_{B,K}$ are more likely to interact with an atom than those with much higher energies.

Compton scattering is the process by which a photon collides with an electron at rest, transferring some of its energy and momentum to the electron. Since the photon loses energy, it emerges from the interaction with an increased wavelength. This process is illustrated in Figure 1.5.

The change in the photon wavelength in a Compton scattering event is given by:

$$\lambda_f - \lambda_i = \Delta\lambda = \frac{h}{m_e c}(1 - \cos\theta) \tag{1.12}$$

or

$$\lambda_f \approx \lambda_i + 0.0024(1 - \cos\theta) \text{ nm} \tag{1.13}$$

where λ_f and λ_i are the initial and final wavelengths of the photons, and h is Planck's constant.

The cross-section for Compton scattering with full quantum effects is given by the Klein-Nishina formula:

$$\sigma_{K-N} = \pi r_e^2 \frac{1}{\epsilon}\left[\left(1 - \frac{2\epsilon+1}{\epsilon^2}\right)\ln(2\epsilon+1) + \frac{1}{2} + \frac{4}{\epsilon} - \frac{1}{2(2\epsilon+1)^2}\right] \tag{1.14}$$

where $\epsilon = E_0/(m_e c^2)$, the ratio of the initial photon energy to the electron rest energy, and r_e is the classical electron radius. In the non-relativistic regime, $E_0 \ll$

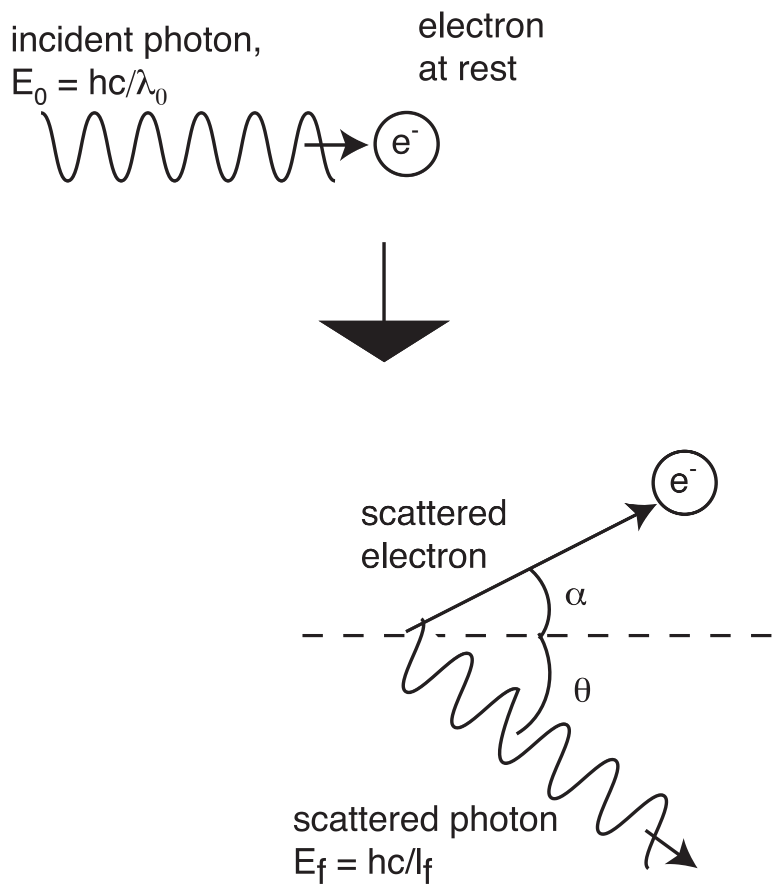


Figure 1.5: Cartoon showing the process of Compton scattering. An incident photon collides with an electron at rest, transferring some of its energy to the electron. In the process, the photon loses energy, so the scattered photon has a higher wavelength than the incident photon.

$m_e c^2$ or $\epsilon \ll 1$, and this expression reduces to the Thomson cross-section:

$$\begin{aligned} \sigma_{\mathrm{non-rel}} &\approx \frac{8\pi r_e^2}{3}(1-2\epsilon) \\ &\approx \frac{8\pi r_e^2}{3} = \sigma_T \end{aligned} \tag{1.15}$$

For the analysis presented here, the non-relativistic cross-section is sufficient, since we consider only the 3 to 25 keV X-ray band. For our maximum photon energy, $\epsilon_{max} = E_{max}/m_e c^2 = 25 \text{ keV}/511 \text{ keV} \sim 0.049 \ll 1.0$.

Inverse Compton scattering is essentially the same process as Compton scattering, but for the case in which the kinetic energy of the electron exceeds that of the average photon. If the electron is energetic enough, it will transfer energy to the photon instead of vice versa. In fact, the energy of a photon interacting with electrons with a relativistic gamma, γ (where $\gamma = \{1 - (v/c)^2\}^{-\frac{1}{2}}$), can be boosted by as much as γ^2. For low energy optical and UV photons passing through a hot gas, inverse Compton scattering can produce emission in the high-energy X-ray band.

1.3.3 X-ray Spectra of Seyfert Galaxies

Typical X-ray spectra of AGN possess an underlying power-law continuum produced near the central black hole. Signatures of reprocessed photons are often present and show up as an Fe Kα line at ~6.4 keV and a "Compton reflection hump" which starts to dominate near 10 keV. In addition, the X-ray spectra often show absorption at low energies. Figure 1.6 shows a model of an AGN spectrum including the directly viewed continuum and the reflected spectrum. Each spectral component is discussed in more detail below.

Continuum Source

The source of the X-ray continuum emission is not well-understood. The emission is observed to be a power-law with a photon index of ~ 1.9; however, there is a scatter in the observed photon indices, which tells us that the emitter is not perfectly consistent in every source. Physically, the scatter in the photon indices could indicate sources with different rates of accretion. Several studies have found that the slope of the intrinsic, direct X-ray continuum is slightly harder in Seyfert 2s than in Seyfert 1s (Beckmann et al. 2006; Malizia et al. 2003; Zdziarski et al. 1995), which cannot be accounted for with simple inclination-angle arguments. Middleton et al. (2008)

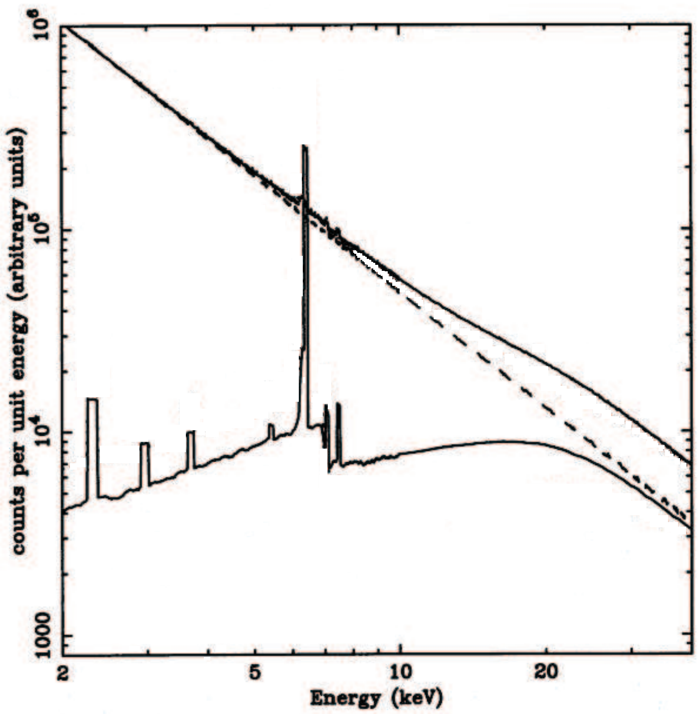


Figure 1.6: Modeled reflected spectrum from a primary power-law X-ray source radiating isotopically above a semi-infinite, plane-parallel slab of neutral matter (except for hydrogen and helium) with solar abundance observed at an inclination of 20°. The dashed line shows the incident X-ray emission, a power-law with photon index $\Gamma = 1.9$. The lower solid line shows expected reflected spectrum, and the upper solid line shows the composite spectrum (direct plus reflected spectrum). (Figure from Reynolds et al. (1995a).)

find that the ratio of L/L_{EDD}, which is a tracer of the accretion rate, shows a higher mean value for Seyfert 1s than Seyfert 2s. So, it may be the case that inclination effects are not enough to account for the differences seen between Seyfert types, and accretion rates may need to be considered as well. These results do not fit in the context of strict unification.

The obvious candidate for the X-ray emission is the accretion disk itself. Accretion disk models require some form of viscosity; however, the earliest accretion disk models were unable to account for this viscosity. Shakura & Syunyaev (1973) made major advances in accretion disk models by supposing some type of turbulence is acting in the disk. This unspecified process enhances the viscosity enough that the disk should produce thermal-like (black body-like) radiation in the UV band. In some forms, this model is still used today. However, the disk is unable to produce X-rays. Balbus & Hawley (1991) found that by adding a magnetic field to the system, instabilities would form due to the differential rotation of the magnetic field lines, which would generate the turbulence introduced by Shakura & Syunyaev (1973). It is possible that these instabilities could make it out of the disk, setting up an environment similar to the X-ray emitting corona seen in the Sun. Magnetic loops and flares could transport accretion energy from the disk into a corona of hot electrons. However, this model is still speculative and unproven.

In the end, we know that X-rays are produced somehow from the Compton upscattering of optical and UV photons from the accretion disk in a hot corona of electrons. However, the processes that form this corona, the distribution of electrons in the corona, and the location of the corona are still unknown.

Iron Line

In general, the Fe Kα fluorescence line is the most prominent discrete X-ray spectral feature in AGN. The observed line at $E_{FeK\alpha} \sim 6.4$ keV is associated with the characteristic photons of electrons filling the K-shell (1s) of iron from either the L_I ($2p_{1/2}$) or L_{II} ($2p_{3/2}$) orbital (the $L_I \rightarrow K$ transition photon has energy $E \sim 7.112 - 0.707$ keV $= 6.41$ keV and the $L_I \rightarrow K$ transition photon has energy $E \sim 7.112 - 0.720$ keV $= 6.39$ keV)[1]. In the reflected spectrum depicted in Figure 1.6, the Fe Kα line is the strongest line, and the sharp drop in the reflected spectrum at $E \sim 7.1$ keV is due to the Fe K-edge.

[1]Binding energies from Chemistry: WebElements website, `http://www.webelements.com/`.

The Fe Kα line has been observed in both Seyfert 1s and Seyfert 2s. According to the unification model, it could arise in the broad line region, the accretion disk, the obscuring torus, or some combination of these. In fact, a variety of line profiles have been observed, requiring iron lines to be formed in several different regions of the central AGN engine. In several sources, researchers have found that the iron line has been found to remain constant over short timescales while the continuum flux varies (e.g., NGC 5506 Lamer et al. (2000), Mkn 3 (Georgantopoulos et al. 1999), IC 5063, NGC 4507, and NGC 7172 (Georgantopoulos & Papadakis 2001)). These results imply that the iron line arises at a large distance from the central X-ray source, perhaps in the obscuring torus, which is also confirmed by the presence of narrow lines. High-resolution spectroscopy, such as that afforded by *XMM*, *Suzaku*, and *Chandra*, has confirmed that narrow lines are ubiquitous in both types of Seyferts (Nandra et al. 2007; Reeves et al. 2006). In addition, broad lines appear to be very common (Nandra et al. 2007; Reeves et al. 2006), and are likely to arise from the relativistic effects of emission produced close to the central black hole (Reynolds & Wilms 2000; Turner et al. 2002). This is strong evidence for (at least) two reprocessors in these sources – one lying close to the primary X-ray source (producing the varying reflection feature) and one lying at a large distance from the primary X-ray source (producing the unvarying Fe Kα feature).

Compton Reflection Hump

The other reflection feature in the X-ray AGN spectrum is the so-called "Compton reflection hump." Photons encountering a neutral slab can either be photoelectrically absorbed or electron scattered. In an accretion disk with cosmic abundances, the absorption optical depth is greater than unity for energies $\lesssim$ 10 keV. The optical depth for photoelectric absorption falls off quickly for energies above 7.1 keV due to the dependence of the absorption cross-section on $\sim E^{-3}$ (Section 1.3.2). Photon energies of > 10 keV will be Compton scattered by the material in the accretion disk. The overall effect of these two interactions is a reflection hump peaking at ~ 20 to 30 keV (Krolik 1999; Lightman & White 1988), as shown in the reflected and combined spectra in Figure 1.6. The observed reflection is not a perfect mirror, because photons lose energy in Compton scattering interactions. For observations at high enough energies, a cut-off in the spectrum is observed where the direct power-law continuum again dominates the observed spectrum (e.g., observations by *BeppoSAX* (Deluit & Courvoisier 2003) and *Swift*'s Burst Alert Telescope (Ajello et al. 2008)). Many of the currently-available data archives are from missions whose sensitivities cut off around 10 keV. Since the reflection feature just starts to dominate the observed spectrum at energies ~ 10 keV, these missions cannot reliably characterize reflection. Further investigation into the reflection fraction is needed, especially with broad-band studies to get a better handle on this feature.

Absorbing Column

The X-ray spectrum also shows a cut-off at low energies characteristic of absorption by neutral or ionized material. This cut-off is due to the combined effect of the photoelectric edges for elements in the absorbing material, which could be the host galaxy, the torus, or perhaps something else. Observations of the nucleus of a spiral galaxy will show drastically different absorbing columns depending on whether we have a face-on or edge-on view of the host. In addition, the absorbing column will be affected by the degree to which our line-of-sight passes through the plane of our galaxy. Typical absorbing columns for our galaxy can range from $N_H \sim$ few $\times 10^{20}$ cm^{-2}, for a line-of-sight out of the plane of our galaxy, to $N_H \sim 10^{22}$ cm^{-2}, for a line-of-sight along the plane of the galaxy. Some of the observed column densities of

Seyferts of $\gtrsim 10^{22}$ cm^{-2} could be explained by absorption in the interstellar medium of our Galaxy or the AGN host galaxy. Higher column densities (up to $\sim$ few $\times$ 10^{23} cm^{-2}) may also be explained by dust lanes in either galaxy. However, column densities $> 10^{23}$ cm^{-2} require the torus of the unified model or a very compact starburst. In addition, the absorption column density has been seen to vary on timescales of less than a year, indicating that at least part of the absorber must lie within a parsec of the central source in some AGN (Risaliti et al. 2002; Weaver et al. 1996).

In the unified model, the standard absorber is a uniform torus of material. One problem for the unification model is the existence of Seyfert 2s that show little or no absorption, such as the 18 Seyfert 2s studied by Panessa & Bassani (2002) which have absorbing column densities $N_H < 10^{22}$ cm^{-2}. In addition, evidence has been mounting that the absorbing material is fairly complex in Seyfert 2s, with variation in the absorbing column found to be common (e.g. Risaliti et al. (2002)). Georgantopoulos & Papadakis (2001) find that changes in the absorbing column density in two Seyferts are correlated to changes in their continuum flux, which can be explained either by absorbing clouds of material orbiting relatively far from the nucleus or by partially ionized obscuring material close to the central X-ray source. These results suggest that the absorbing material is not the same in all Seyfert 2 galaxies.

1.4 Present Work

The picture that is emerging is that strict unification models are insufficient to account for the complex differences seen between the Seyfert populations and even within individual Seyfert populations. We test this idea further using X-ray spectra as a tool to explore the geometry of the central AGN engine in Seyfert galaxies. The Seyferts we study here are the "classic Seyferts", whose classification is based on optical properties, as described above (Section 1.1). Before moving on to our data analysis, it is helpful to discuss the types of studies that can be done with the large database of spectra that we have developed and lay out the predicted results of unification theory to give a context to our results.

1.4.1 Correlation and Variability Studies

Two broad types of observational studies can be conducted for Seyfert galaxies – studies of individual sources and studies of large samples of sources, both over a variety of timescales. Studies of individual sources often concentrate on what the fitted spectral parameters tell us about the history of the observed photons. Both the shape and variability of spectral features give clues as to where the photons were formed or reprocessed. For example, variability of the iron line over short timescales tells how close to the black hole these interactions are occurring, especially when combined with a detailed line profile, which may show a broad line or a narrow line, or both. In addition, observed time lags between changes in the intrinsic continuum and the reflection features may put limits on the distance between the X-ray source and the reflecting matter.

Larger studies of Seyferts have the potential to tell a broader story by defining characteristics that are intrinsic to the entire population or sub-populations of Seyferts. Examining the distribution of the bulk properties of the sample, such as photon index or iron line strength, can be instructive to determining which parameters are universal for all types of Seyferts and consequently identifying physical processes that are similar in each class. Studies of the correlation between spectral features can identify emission or reprocessing processes common to a sample.

Both types of study are critical to testing the unified model and ultimately unlocking the geometry of the inner regions of the AGN engine. Here we concentrate on the larger study, exploring correlations and bulk properties from a large number of spectra from several sources in the context of unification.

1.4.2 Predicted Results

If we assume that the unification model is correct, we can define a few simple predictions. As we have discussed already, the basic premise of the unification model is that the central regions of all Seyferts are the same, with observed spectral differences attributed to line-of-sight effects. In addition, radio-loud sources are Seyferts with a relativistic jet. If unification is correct, then we would expect several results to follow.

- The distribution of photon indices of the intrinsic X-ray source should be similar for Seyfert 1s and 2s.

- Seyfert 2s should show stronger absorption than Seyfert 1s, since we are observing them through an obscuration region. Intermediate Seyfert classes should show absorption values between that of the Seyfert 1 and Seyfert 2 populations.

- X-ray reprocessing should occur in the same regions in all Seyfert types. We expect broad lines to be produced in the accretion disk near the black hole and narrow lines in the other configurations of matter, such as the outer regions of the accretion disk or the obscuring region, away from the strong gravitational and rotational effects of the central accretion disk. *RXTE* is not sensitive enough to the detailed spectrum of the iron line, however, so we cannot distinguish broad and narrow lines directly. We expect to observe an iron line in both types of Seyferts. In addition, because the obscuring region may diminish the continuum emission, sources observed through large amounts of material may possess large equivalent widths (EW). Therefore, we expect that Seyfert 2s will show a larger EW than Seyfert 1s.

- The other primary signature of reprocessing, Compton reflection, should be present in both types of Seyferts. As with the iron line, we expect that both the disk and the obscuring region will show signs of Compton reflection. Simulations of reflection show that the observed composite (reflection plus direct) spectrum of reflection purely from a disk looks nearly identical to that of reflection purely from an obscuring torus (Krolik et al. 1994). In both cases, the strength of the reflection feature will decrease with inclination angle. However, as with the iron line, the obscuring material may diminish the observed continuum emission, which could cause the reflection feature to be more prominent in these sources. However, the degree to which the continuum emission is diminished and the relative amount of reflection from disk versus the absorbing region is not currently known, so it is difficult to predict trends in the reflection feature between Seyfert 1s and Seyfert 2s.

- If a jet exists in a source, it is unlikely to show signatures of reprocessing, because there is very little material along the axis perpendicular to the plane of the accretion disk.

Armed with a set of predictions of the unification model, we are now poised to examine our spectral database in the context of unification. However, if recent studies are an indication, the unified model is too simple, and the central geometry of Seyfert galaxies is more complex than we once thought.

Chapter 2

The Rossi X-ray Timing Explorer

2.1 *RXTE* Satellite

The data that are used in this investigation are from the *Rossi X-ray Timing Explorer* (*RXTE*, shown in Figure 2.1). *RXTE* was launched on a Delta II rocket in December 1995. *RXTE* has been one of the longest lived X-ray satellites, and despite a few instrument failures (Section 2.2) and the advent of newer satellites (e.g., *Chandra* and *XMM*), *RXTE* continues to provide a strong astronomical resource to the scientific community. *RXTE*'s primary original science driver was detailed timing analysis of X-ray sources; however, it also has strong spectral capabilities. With an energy resolution ($\Delta E/E$) of $< 18\%$ at 6 keV and 15% at 60 keV and a broad bandpass of 2 to 250 keV, many classes of objects can be studied, from Galactic X-ray binaries to AGN.

The *RXTE* satellite travels in a low-Earth orbit, with an altitude of approximately 600 km and an orbital inclination of 23°. The satellite carries three instruments: the Proportional Counter Array (PCA), the High Energy X-ray Timing Experiment (HEXTE), and the All-Sky Monitor (ASM)[1].

[1]The ASM was constructed at the Center for Space Research at the Massachusetts Institute of

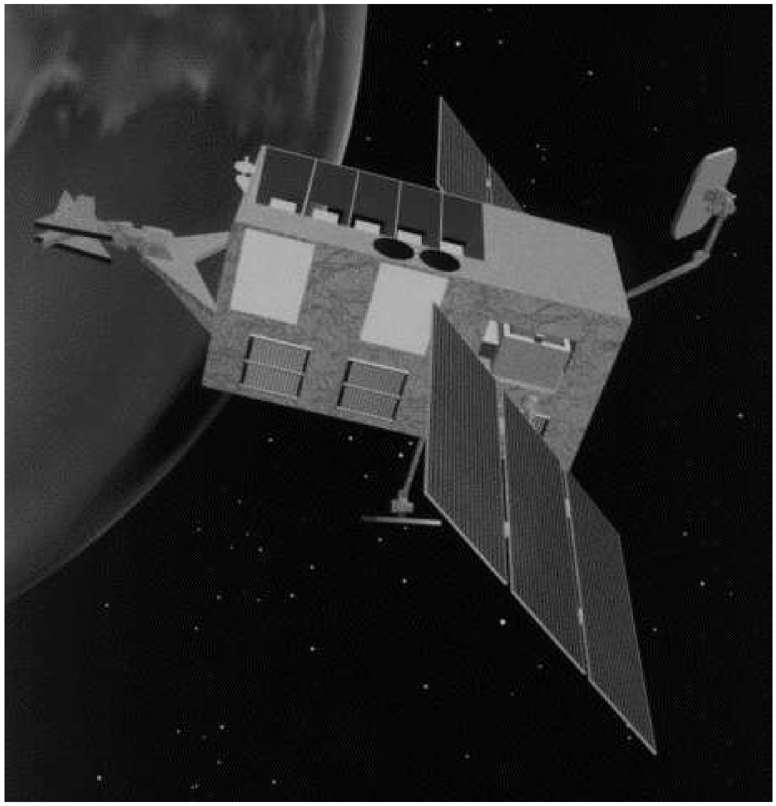


Figure 2.1: An artist's impression of the *RXTE* spacecraft in space. Image from NASA.

The PCA was built at NASA's Goddard Space Flight Center (GSFC) under the leadership of principal investigator Dr. Jean Swank[2]. The PCA consists of five nominally identical proportional counter units (PCUs; shown in Figure 2.2). Each PCU covers the 2 to 60 keV energy band and contains 5 layers of Xenon gas and a propane veto layer. The effective collecting area of the instrument is shown in Figure 2.2. The basic characteristics of the PCA are listed in Table 2.1. The operation and calibration of the PCA is discussed in more depth in Section 2.2.

The second instrument, the HEXTE, was constructed at the University of California, San Diego's Center for Astrophysics and Space Sciences, under the leadership

Technology (Levine et al. 1996). The ASM collects lightcurves and "colors" for about 350 sources. However, since the interest of this thesis is spectral studies, data from the ASM will not be discussed further.

[2]`http://astrophysics.gsfc.nasa.gov/xrays/programs/rxte/pca`

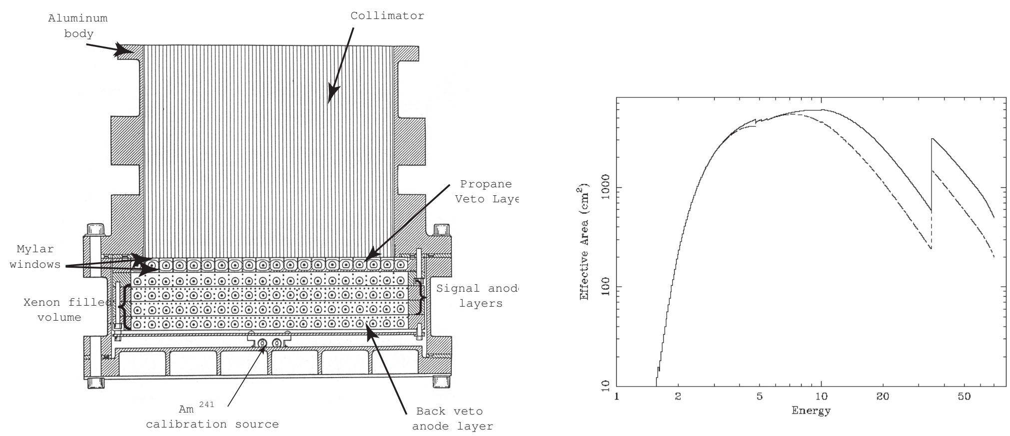
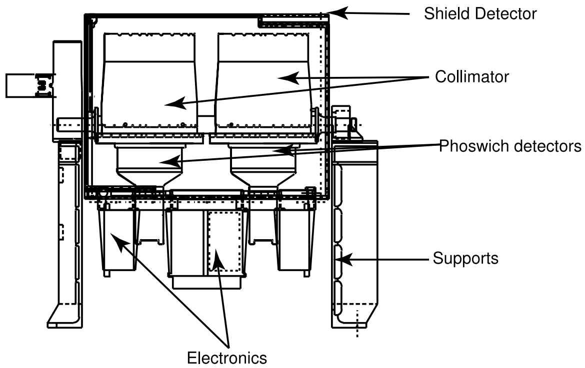


Figure 2.2: Left: Diagram of a single proportional counter unit (PCU). The hatched areas show the aluminum unit housing. On top is the collimator which determines the unit's field of view. Below the collimator is a propane-filled veto layer surrounded on the top and bottom by mylar windows. Below the propane layer is the xenon-filled volume of the detector. Below the xenon-filled volume is a Am^{241} calibration source and detection anodes, image is from Jahoda et al. (2006). Right: The effective area as a function of energy for the PCA instrument, summed over the five detectors. The solid line shows the effective area for the instrument as a whole, while the dashed line shows the effective area for the first xenon layer only. (Figure from Jahoda et al. (1996).)

of principal investigator Dr. Richard Rothschild (Gruber et al. 1996). HEXTE consists of two clusters of four phoswich scintillation detectors which are sensitive to X-ray energies of 15 to 250 keV. One cluster is shown side-on in Figure 2.3. Each cluster can rock up to 1.5° or 3° away from the celestial source of interest to provide off-source background measurements. The two clusters are also mounted such that they rock in mutually orthogonal directions. The effective area of the HEXTE is shown in the right panel of Figure 2.3. Some of the basic characteristics of the HEXTE are shown in Table 2.1. In addition, each HEXTE cluster has a particle detector to measure the ambient particle flux. The particle detectors consist of a plastic scintillator tied to a photomultiplier tube. When the particle detector registers a large particle flux, such as when the spacecraft passes through the South Atlantic Anomaly (SAA), the HEXTE reduces the high voltage in its two detector



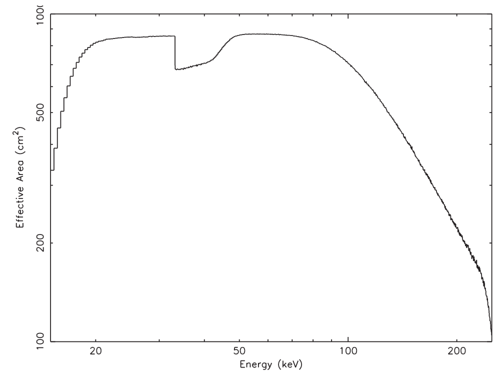


Figure 2.3: Left: Side view of one HEXTE cluster. Shown are the shield detector, collimators and detectors for two of the four detectors in the cluster, structure support and electronics. (Image from Blanco et al. (1997).) Right: The effective area as a function of energy for one HEXTE cluster. (Image from Rothschild et al. (1998).)

clusters. The measured HEXTE particle detector flux is used to help characterize the PCA background (Section 2.2.3).

The addition of the HEXTE data would extend our analysis of AGN out to 200 keV, possibly offering a glance at the high-energy cut-off in their continuum spectra, as well as better characterizing X-ray reflection (Section 3.3.2). However, the HEXTE does not have good enough sensitivity to detect a significant number of counts in the relatively faint AGN (compared to galactic binaries) studied in this thesis. Therefore, this study will focus on data exclusively from the PCA.

Table 2.1: *RXTE* instrument characteristics

	PCA	HEXTE
Energy range	2 - 60 keV	15 - 250 keV
Energy resolution	$<$ 18% at 6 keV	15% at 60 keV
Spatial resolution	collimator with 1 degree FWHM	1 degree FWHM
Detectors	5 proportional counters	2 clusters of 4 NaI/CsI scintillation counters
Collecting area	6500 cm^2	1600 cm^2
Sensitivity	0.1 mCrab	10^{-6} ph. cm^{-2} s^{-1} keV^{-1} at 100 keV
Background	2 mCrab	$\sim$ 140 mCrab per cluster

2.1.1 Why Use RXTE for AGN Studies?

The full *RXTE* PCA bandpass allows observations of both the absorption and iron line properties of AGN spectra, as well as affording a glimpse of the Compton reflection hump out to typical energies of 25 keV.

RXTE has collected an impressive archive of AGN X-ray observations. While the archive does not contain a dedicated campaign of AGN observations, there have been pointed observations of nearly 150 AGN to date (December 1995 through October 2007). These observations comprise an inhomogeneous data set, originating from a variety of proposals and observers, with separate observing goals that do not possess a uniform observing history. However, *RXTE* observations do provide data in two standard formats, so these observations can be studied in a uniform manner. The goal of this thesis is to take the extensive and diverse observations from the *RXTE* public archive and, for the first time, apply a uniform set of data reduction techniques to compile a database of the various spectral properties of these AGN that is as complete as possible .

Other archives of AGN X-ray spectra from missions such as *BeppoSAX*, *ASCA*, *Chandra*, and *XMM* are not chosen as the focus of this study for various reasons. *BeppoSAX* has a bandpass similar to *RXTE* but the X-ray sensitivity is lower than expected at high energies due to an increased background level, so errors on spectral parameters are large and the data are less sensitive to detection of and constraints on Compton reflection. *ASCA* and *Chandra* do not cover the necessary bandpass above 10 keV and the data are thus of relatively low sensitivity to reflection. The bandpass of *XMM* reaches only $\sim$ 10 keV; though, its data can still be used to study reflection from the subtle effects of reflection on the iron edge absorption. Coordinated studies of *RXTE* data with both *Chandra* and *XMM* have been performed for some of the AGN studied in this thesis (e.g. Lee et al. (2000), Edelson et al. (2000), McHardy et al. (2004)); however, extending the work presented here to such studies is left for future work. There are not enough joint observations of *Chandra*, *XMM*, and *RXTE* to make this type of analysis useful for the *RXTE* archival study presented here.

2.2 *RXTE* Proportional Counter Array

This section describes the basic function and construction of the *RXTE* Proportional Counter Array (PCA) instrument, and presents a discussion of the PCA background model, including a brief history of the (still) evolving background model.

2.2.1 Technical Instrument Description

The Proportional Counter Array (PCA) on *RXTE* is comprised of five identical Proportional Counter Units (PCUs)[3]. Each PCU consists of several components: a collimator, mylar windows protecting a propane veto layer, and the main, xenon-filled, detector volume (Figure 2.2). The xenon-filled chamber is divided into three layers of signal anodes and a back layer of veto anodes. In addition, each PCU carries an Am^{241} calibration source. A full description of the PCA can be found in Jahoda et al. (1996).

When an X-ray enters the detector, it must first pass through a collimator, as illustrated in Figure 2.4. The collimator is a series of honeycomb-shaped tubes which act to limit the field-of-view of the detector. On the PCA, the collimators are made from beryllium copper sheets formed into a honeycomb structure, with each

[3]The PCUs are often numbered either 1-5 or 0-4; this paper will use the 0-4 numbering scheme, translating from other resources as necessary.

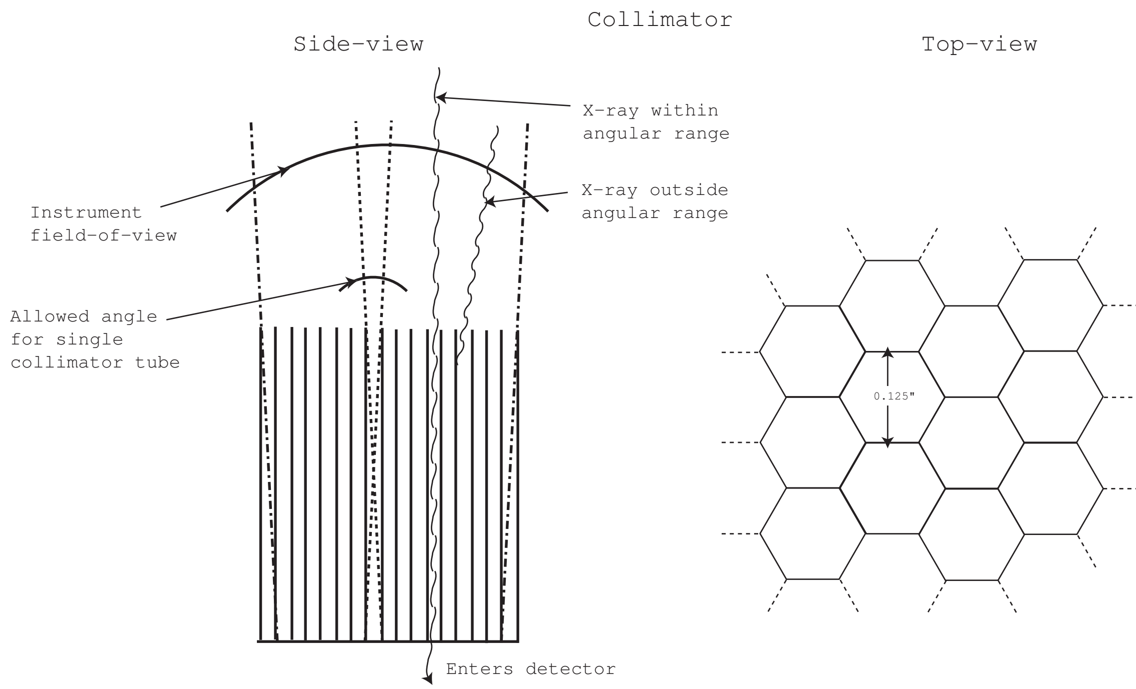


Figure 2.4: Configuration of the PCA collimator. Left: Side-view of the collimator (not to scale) showing the angle of entry for an incoming X-ray along with the field-of-view for the instrument. Also shown are two X-ray photons entering the collimator, one with such a high angle that it is absorbed by the collimator, and one with an acceptable angle that allows it to pass through into the detector. Right: Top-view of the collimator. The PCA collimator is made in a honeycomb shape, with a 0.125-inch (0.3175-cm opening (flat-to-flat) in each of the hexagons.

hexagonal opening measuring 0.125-inches from flat side to flat side (Jahoda et al. 2006). Off-axis X-rays will be absorbed by the collimator, rather than reaching the detector plane. The length of the collimator tubes coupled with the size of the opening at the ends defines the spatial resolution of the detector.

X-rays that pass through the collimators will next pass through a thin mylar window into a layer filled with propane gas. The mylar window is thin enough to allow X-rays to enter, but strong enough to keep the propane gas from escaping the detector. The propane gas has a low absorption efficiency for photons with energies > 3 keV, so will allow most X-ray photons to pass directly through. However, the propane layer acts as an anti-coincidence layer in conjunction with the detection layers, with charged particles ionizing the propane gas, and thus registering a signal when they pass through. Events which are simultaneously triggered in both this propane "veto" layer and one or more detector layers are identified as background events. In addition, electrons with energies < 70 to 100 keV will be absorbed by the propane (Jahoda, private communication). These 70 to 100 keV particles would be likely to be absorbed by the top xenon detection layer, so stopping them in the propane helps to reduce the background in the top xenon layer. The rate of detection in the propane layer is also used, in conjunction with the signal in the top xenon layer, to estimate the "electron rate" through the detector. This number is used in data analysis to reject data with an electron rate that is too high, which would imply a background event.

After an X-ray passes through the propane layer, it will pass through a second mylar window into the xenon-filled detector volume. The X-ray has a high probability of ionizing the xenon gas, producing a number of electrons and positively charged xenon atoms. A high voltage is maintained across the detector volume, so that the free electrons accelerate through the xenon gas toward the positive electrode, or the anode. The accelerated electrons gain enough energy that they will ionize other atoms when they collide with them on their way to the anode. This "avalanche" of electrons is detected as a "pulse" of electrons through the anode. The height of this pulse, or the number of detected electrons, characterizes the energy of the incoming X-ray photon. The voltage across the detector is tuned in such a way that the number of electrons produced is proportional to the energy of the original ionizing photon. If the voltage is kept too high, the number of electrons produced is saturated, so that each photon produces the same number of electrons regardless of its energy. If the voltage is kept too low, the electrons produced by the initial ionization from the incoming photon do not gain enough energy on their way to the anode to ionize more atoms, and the signal is too low to detect.

The energy resolution of the instrument is determined by the properties of the xenon gas. The distribution of secondary electrons is approximately Gaussian with a variance of $\sigma = F <N>$, where F is called the Fano factor and $<N>$ is the average number of electrons in the initial ionization cloud (Fraser 1989). The variance turns out to be less than that expected by random variations because the secondary ionizations are not truly independent events. Values of F for gasses typically used in proportional counters runs from 0.05 to 0.20 (Knoll 2000); for the gas in the PCA, $F \sim 0.2$. A monochromatic beam of photons interacting with the detector, then, would produce a signal with a Gaussian distribution with a width set by F of the gas and $<N>$ for the photon energy. The energy resolution is set by the width of the Gaussian distribution ($\Delta E = FWHM \approx (2\sqrt{2\ln 2})\, F <N>$).

Charged particles that pass through the detector generally cause ionizations in all layers of the detector, without being absorbed by the gas. This causes nearly simultaneous signals in all of the detector layers, including the propane veto layer. Incoming events that show signals in more than one anode are likely background events, and are discarded in the data analysis. In addition to the three signal layers, there is a fourth layer of anodes in the xenon volume of the detector. The outermost anodes in each of the three detection layers are used as veto anodes rather than detection anodes. These veto anodes act as anti-coincidence anodes, and will catch charged particles which enter the detector from the sides and bottom, thus avoiding the propane layer.

The xenon gas volume also contains 10% methane gas, which acts as a "quench gas" (Zhang et al. 1993). During the formation of the avalanche of electrons, some of the xenon atoms are merely excited to a higher state rather than ionized by the electrons speeding toward the anode. These excited atoms will emit visible or UV photons when they are de-excited. The UV photons have enough energy to create a signal at the cathode through the photoelectric effect, which would cause the observed signal to no longer be proportional to the energy of the incoming X-ray photon. The methane quench gas helps to alleviate this problem by preferentially absorbing the UV photons without ionizing.

An X-ray event that is detected at only one anode is considered a "good event", and its pulse-height information can be unambiguously determined. The data are compressed onboard using two standard compressions labeled Standard 1 and Standard 2. The Standard 1 data include 0.125-second resolution lightcurves and calibration spectra, but no energy information. The Standard 2 data provide pulse heights for the detector layers at a resolution of 16 seconds (Jahoda et al. 2006) for each of 129 energy channels. Since this study concentrates on spectral analysis, rather than timing, the Standard 2 data are used for all data reduction.

The PCA contains three layers of signal anodes. Most incoming X-rays will ionize gas in the top layer of the detector. Fewer will interact with the second and even fewer in the third, thus the top layer contains the largest source signal of the three layers. The noise in each of the three layers is similar, so the top layer has the largest signal-to-noise ratio of the three layers. Since the sources studied in this thesis have fairly low count rates, only data from the top layer are used here.

2.2.2 Instrument Operation History

RXTE has been in operation for over a decade. In that time it has experienced two types of instrument glitches: periodic "discharge" in some of the PCUs and the loss of the propane layer in two of the PCUs. The PCA instrument team has attempted to minimize the effects of these glitches, both with satellite-level fixes and with work-arounds for researchers.

In March 1996, early in the mission, PCUs 3 and 4 started to show periodic "discharge", and PCU 1 started to show similar behavior in March 1999. The discharge is a periodic breakdown of the PCU (Keith Jahoda, private communication). The PCA team believes that these breakdowns are caused by imperfections on the PCU anodes. Those imperfections could be due to the gold coating peeling off of the anodes or to an aging product of the gas. It is possible that after a number of electron avalanches, some of the methane gas breaks down and forms a polymer. A sharp point, or whisker, on the anode wire, either due to the polymer or a peeling gold coating, would create a strong field, which could then cause a temporary breakdown. The PCA team has found that three operational steps mitigate the problems (Jahoda et al. 2006): (1) The mission operations team can turn off the affected PCUs and only use them when an observation requires a large instantaneous collecting area; (2) They can reduce the high voltage; and (3) They can change the roll angle of the spacecraft to increase solar heating which causes the PCA to operate at a slightly higher temperature. According to Jahoda (2007, private communication), the fact that the problem is minimized by resting the PCUs favors the polymer model. By resting the PCU, the charge that had come to rest on the polymer will dissipate.

As of October 2007, two PCUs have lost their propane layers: PCU 0 lost its propane layer in May 2000, and PCU 1 lost pressure in its propane layer in December 2006. These propane losses are thought to be due to cracks in the mylar window which formed as a result of micrometeor strikes. The effect of the propane layer loss increases the background of a given PCU. New background models and response matrices were developed for PCU 0 (see Section 2.2.3); however, as of October 2007, the *RXTE* Guest Observer Facility[4] recommended excluding PCU 1 from analysis.

[4] `http://heasarc.gsfc.nasa.gov/docs/xte/xtegof.html`

Both PCUs now have such a high background, that neither is recommended for faint sources, such as the AGN in this study, even with the updated models, so we exclude any AGN data obtained after PCUs lost their propane layers.

2.2.3 Background and Calibration

Within the PCA bandpass of 2 to 60 keV, Seyfert galaxies are relatively faint sources for *RXTE*, with count rates < 40 counts s^{-1} PCU^{-1}. Since the typical PCA background count rate is ~ 20 counts s^{-1} PCU^{-1}(Jahoda et al. 1996), the robustness of the current study necessarily depends on the quality of the PCA background estimation and calibration. As with any space-based instrument, instrumental effects, cosmic background components and the orbital environment of the spacecraft all contribute to the total background. The PCA team has continued to monitor and update the PCA background and calibration models throughout the *RXTE* mission.

The PCA detector is held fixed along the observation axis, which prevents blank-sky observations from being taken during science observations. Instead, the total PCA background is modeled by parameterizing the components from the local space environment, the PCA's status, and the intrinsic cosmic particle background. The parameterizations are calibrated to match dedicated blank-sky observations. This section summarizes the state of the background estimation and energy calibration; a more detailed discussion of these issues can be found in Jahoda et al. (2006) and on the PCA Digest website[5].

[5] `http://heasarc.gsfc.nasa.gov/docs/xte/pca_news.html`

PCA Data Epochs

Because the detector characteristics have changed over time, the PCA team has divided the lifetime of the PCA into separate data epochs (Table 2.2). The primary epoch boundaries represent discontinuities of the instrument response due either to changes in the high voltage across the detector (or "gain changes") or a catastrophic failure of one of the PCUs. The high voltage was reduced during the first year of the mission twice in response to periodic "discharge" in PCUs 3 and 4 (discussed in Section 2.2.2), and these changes in voltage correspond to the boundaries between Epochs 1 and 2 and Epochs 2 and 3. The high voltage was again lowered in March 1999 in response to PCU 1 starting to show the periodic discharge, prompting the beginning of Epoch 4. Epoch 4 ended and Epoch 5 began when PCU 1 lost its propane layer in May 2000. In this case, it was not a change in the instrument's high voltage which prompted the new data epoch, but rather a severe change in the instrument. For all but the very brightest sources, PCU 1 cannot be used for observations in Epoch 5 (and later).

The primary data epochs have also been further divided into sub-epochs when necessary. Within the epochs (or sub-epochs), the response and background models change only gradually. Epoch 3 was broken up into Epoch 3a and Epoch 3b when the spacecraft began to lose altitude at an appreciable rate (discussed below). Epoch 5 was divided into three sub-epochs (5a, 5b, and 5c) not for any change in the instrument or spacecraft, but because Epoch 5 was so long that the initial conditions input into the background and response models were drifting noticeably from reality.

Epoch boundaries define times when the PCA experiences a change of some sort. This means that the number of useable PCUs for data analysis may change from epoch to epoch. In order to maximize the number of simultaneously observing PCUs, while also maximizing the total "on" time of those PCUs, some PCUs are eliminated from study, depending on the data epoch. Since PCUs 3 and 4 were cycled on and off after they exhibited periodic discharge, they have been excluded from analysis for all PCA data epochs. PCU 1 started to show the same behavior in March 1999, so those data are excluded after Epoch 3b. PCU 0 lost its propane layer in Spring of 2000, so those data are excluded for Epochs 5 and later. The PCUs used for data collected from each data epoch are listed in Table 2.2.

Background Estimation

The current detector plus sky background for faint sources is calculated using the "L7/240" model, a two-component model. The "L7" component is a background rate based on satellite housekeeping parameters which have been well-correlated to variations in the blank-sky observations. The "240" background is based on the radioactive decay timescale (240 minutes) from the combined effects of several radioactive elements interacting with the instrument during passages through the South Atlantic Anomaly (SAA) (Jahoda et al. 2006).

Table 2.2: *RXTE* proportional counter array (PCA) data epochs.

Epoch	**Dates**[a]		**PCUs used**
	Start	**End**	
1	Launch	1996-03-21 18:33	0,1,2
2	1996-03-21 18:34	1996-04-15 23:05	0,1,2
3a	1996-04-15 23:06	1998-02-09 00:00	0,1,2
3b	1998-02-09 00:00	1999-03-22 17:38	0,1,2
4	1999-03-22 17:39	2000-05-13 00:00	0,2
5a	2000-05-13 00:00	2002-01-01 00:00	2
5b	2002-01-01 00:00	2004-01-01 00:00	2
5c	2004-01-01 00:00s	Present	2

[a]From the PCA Digest web site: `http://heasarc.gsfc.nasa.gov/docs/xte/pca_news.html`

The background model also includes a time drift of ~ 0.07 counts s^{-1} PCU^{-1} yr^{-1} since Epoch 3b. This change in the background is correlated with the spacecraft altitude and became significant when the *RXTE* orbit began to decay (from an altitude of ~ 580 km at the beginning of Epoch 3b in February 1998 to an altitude of ~ 500 km in the fall of 2003). This orbital decay is believed to be caused by the increased drag of the Earth's atmosphere due to its expansion in response to the Sun's increased activity as it approached the peak in its solar cycle in mid-2000 (Jahoda et al. 2006).

The perigee of the *RXTE* orbit precesses with a period of about 30 days, so to sample the background over this period, the PCA team takes short background observations twice daily. The perigee and apogee of the *RXTE* orbit differ by 20 km, and the SAA particle flux varies with altitude, so the background particle flux varies with the perigee precession (Jahoda et al. 2006). The PCA team combines the background observations with the increased particle flux due to passages through the SAA (measured by HEXTE). In addition, the background model is stretched or compressed to reflect changes in the energy-response of the instrument. The response has been observed to drift slowly over time, and while the exact cause of this drift is not known, it is characterized in the background model by observing the peak shifts of the onboard Am^{241} calibration source. The published background models are weighted averages of the various inputs, and in that way represent an average of the blank sky. For illustration, Figure 2.5 shows the modeled 2 to 10 keV background counts for observations of MCG -6-30-15 over short and long timescales.

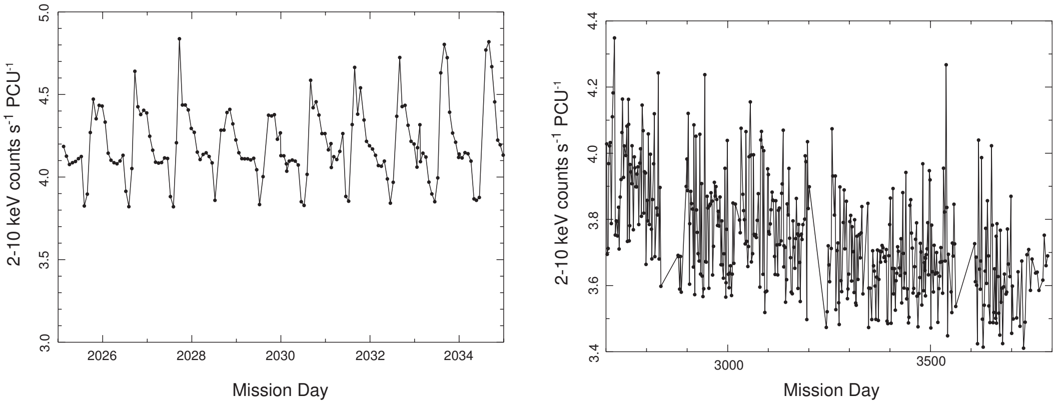


Figure 2.5: Left: Short-term 2 to 10 keV background count rate as a function of time. The count rates are from the modeled background for observations of MCG −6-30-15 binned to 5760 seconds (or approximately one satellite orbital period). Right: Long-term 2 to 10 keV background count rate as a function of time. The count rates are from the modeled background for observations of MCG −6-30-15 binned to 55,000 seconds.)

Response Matrix

A response matrix estimates the probability that an incoming photon of a given energy will be observed in a certain channel of the instrument. The PCA calibration team has developed a response matrix that takes into consideration the energy-to-channel relationship, quantum efficiency, and spectral redistribution within the detector. The response matrix is calibrated using observations of the internal Am^{241} calibration source, the iron line in Cassiopeia A, leaks of xenon into the propane layer (giving a residual xenon L line), and observations of the Crab nebula and pulsar. Jahoda et al. (2006) provides a detailed description of how the PCA response matrix is constructed.

Background Estimation History

Over the *RXTE* mission lifetime, the background and response models have changed several times. When the mission was originally launched, the PCA team assumed that the instrument could be characterized by satellite housekeeping parameters alone. However, it became apparent within the first year that observers of faint sources could not use the PCA data reliably. In November 1996, the PCA team initiated blank-sky observations to characterize the instrument background. This section presents a short history of the PCA background as it has evolved due both to the PCA team's understanding of the instrumental background and to the changing instrument, as gathered from the PCA instrument team archives[6]. A brief timeline of the background models is shown in Table 2.3.

The earliest PCA background model was the "Q6" model which was based on measuring the rate of events triggering exactly six of the lower level discriminators in each PCU. This background model essentially measured the instantaneous particle rate through the detector. It was clear early in the mission that the satellite's passages through the SAA were causing induced radioactivity in the satellite (Jahoda et al. 1996). Parameterization of the background model based on these passages through the SAA was introduced in late 1996[7].

Early on, observers of faint sources, such as AGN, had trouble using *RXTE* data because the background model was not sufficient for their background-dominated data. In response, the *RXTE* users committee pushed the PCA team to re-tool the PCA background models. In November 1996, dedicated background observations were initiated for the PCA. At first, these observations occurred for one day every three to four weeks; however, due to the precession of the orbit perigee, the back-

[6] `http://astrophysics.gsfc.nasa.gov/xrays/programs/rxte/pca/`

[7] `http://astrophysics.gsfc.nasa.gov/xrays/programs/rxte/pca/matrix_history/`

ground shows a variation on $\sim$ 30-day timescales, so more frequent dedicated blank-sky observations were needed to better characterize the background. In September 1997, short twice-daily blank-sky observations were added to the blank-sky observation campaign.

Table 2.3: Timeline of the development of *RXTE* background and response models

Year	**Background model update**
Launch	Q6 model in use; characterizes background by instantaneous particle rate through detector
Late 1996	Activation added to Q6 model; activation model was based on the passages through the SAA
1999	L7-240 model replaces Q6; background characterized by particle rate through detector correlated with blank-sky observations and including activation on a 240-minute timescale
Late 1999/Early 2000	New models released in response to PCU 1 starting to show periodic discharge
2002	New models released to model PCU 0, which lost its propane layer in mid-2000; Epoch 3 separated into 3a and 3b in response to changes in the *RXTE* orbit; new models include all data epochs
2003	Epoch 5 models were refined with more data
2004	New models corrected the 2003 models, which did not include a time-dependent drift in the background rate
2006	Epoch 5 is broken up into three sub-epochs, correcting for long-term drifts in the background and gain changes
2007	Errors in the FTOOL `PCABACKEST` and SAA file are announced; fixes are available for both problems, but the SAA problem could affect data analysis back to the beginning of the mission

In 1999, the L7-240 model replaced the Q6 model as the preferred background model. As discussed in early in this section, the L7-240 model correlates the dedicated blank-sky observations with instrument housekeeping parameters. In addition, a 240-minute decay time was introduced to account for the combination of radioactive substances that contaminate the PCA after each SAA passage. All subsequent background models for the PCA have been based on the L7-240 models. In addition, in late 1999/early 2000, the first Epoch 4 models were introduced[8].

Another set of background models was released in 2002. These models included a model for intermediate to bright sources observed with PCU 0, which had lost its propane layer in mid-2000. In addition, the 2002 models separated Epoch 3 into two sub-Epochs, denoted 3a and 3b (Markwardt et al. 2002). These sub-Epochs were introduced in response to changes in the *RXTE* orbit. In addition, the 2002 models were the first to combine all background models for all data epochs into two files – one for faint sources and one for bright/intermediate sources. Prior to that, researchers were required to determine the epoch of their data and download the correct background model.

Models released in March 2003 refined the Epoch 5 background characterization by including more data in the modeling. Unfortunately, the 2003 faint-source models did not correctly incorporate a time-dependent drift in the background rate. This error was corrected with an April 2004 release of the models (Markwardt 2004).

By 2006, Epoch 5 had become the longest data epoch, spanning nearly 6 years. New background models were released in August 2006 to break up Epoch 5 into three sub-Epochs (5a, 5b, and 5c). The new sub-epochs and their associated models better modeled the particle background and corrected the extrapolations of the time-dependent drifts in the background rate (Markwardt et al. 2006).

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[8] `http://astrophysics.gsfc.nasa.gov/xrays/programs/rxte/pca/bkgd_21jul00/`

A problem with the models was discovered in September 2007, detailed by Markwardt et al. (2007). The PCA team discovered that the file containing the history of *RXTE* passages through the SAA was showing data gaps and missing data. The missing data was a mission-long problem which affected about half of the observations that occurred during the first three hours of a UTC day. These SAA problems could cause an underestimation of the background and potentially affected data from the entire mission.

In the course of fixing the problems with the SAA file, the PCA team also discovered a bug in the PCA FTOOL `PCABACKEST`. The script reads in the models for each background component for each PCU. When the script was originally written, one of the script parameters limited the number of input models to 600. However, the number of input models grew to be larger than 600 in the mission-long combined background model at the beginning of Epoch 5c (Markwardt et al. 2007). This problem only affected data reduced from Epoch 5c.

As of October 2007, the latest SAA files were corrected for the discovered errors and there was an easy work-around for the `PCABACKEST` problem, with plans for a new release of the script (Markwardt et al. 2007).

The data and analysis presented here correct for the problems with Epoch 5c announced in September 2007; however, the SAA problems are not accounted for. Table B.2 lists the spectra that have one or more SAA passages that occur during the first three hours of the day. This problem theoretically affects $\sim 40\%$ of the spectra (327 out of 821 spectra), however, a re-analysis of the five spectra showing the highest number of SAA passages during the first three hours of the day shows that the effect on the spectral fitting is extremely small compared to the spectral modeling uncertainties and does not adversely affect the results presented here.

2.3 PCA Data Archive

The *RXTE* data archive is stored and maintained by the High Energy Astrophysics Science Archive Research Center (HEASARC) at NASA's Goddard Space Flight Center (GSFC). The data are organized such that each approved proposal is given a unique 5-digit identifier. All targets for a single proposal are assigned a two-digit code.

The PCA data come from the HEASARC archive with unique "ObsIDs" of the form: NNNNN-TT-VV-SS. These data chunks correspond to collections of time-connected data from a single pointing. The first five digits (NNNNN) correspond to the unique abstract identifier, mentioned above. The second two digits (TT) indicates the source/target code. The third set of digits (VV) indicates different viewings of the same target, either different epochs or different instrument configurations. The last set of digits (SS) indicates different pointings during the same viewing.

For this thesis, a reference to an *RXTE* "Observation" will refer to all pointings for a given proposal. In this sense, two Observations of the same source could overlap, if two proposers won time for that source in the same proposal year. An "ObsID" will refer to a single pointing within an Observation.

Chapter 3

Data Selection, Processing and Analysis

3.1 Data Sample Selection

The source sample for this thesis was compiled using data from the public *RXTE* archive, which is available through the High Energy Astrophysics Science and Research Center (HEASARC) at Goddard Space Flight Center (GSFC). The HEASARC archive is available via the Internet[1], through the Browse interface[2], their web-based search tool. This interface allows customized searches through the HEASARC archive based on combinations of observing satellite, target name and/or coordinates, data type, observation dates, archived dates, and even the Principal Investigator of accepted proposals.

The initial data sample consists of sources with *RXTE* data archived prior to November 1, 2006, and meeting the following criteria: classified as Seyfert galaxy

[1] `http://heasarc.gsfc.nasa.gov`

[2] `http://heasarc.gsfc.nasa.gov/cgi-bin/W3Browse/w3browse.pl`

by the NASA Extragalactic Database (NED), having a minimum observation length of 40 ks, and having at least two pointed observations spanning at least two weeks. The two-week time span provides the criterion for examining relevant variability timescales, preserving variability signatures on timescales associated with the broad line region. The 40-ks minimum observation time criterion is based on our experience analyzing MCG −5-23-16 (Mattson & Weaver 2004), and provides a good probability of producing at least two good-quality spectra for a source (2 spectra with 20 ks each). Some lower-flux sources will require more observing time, but experimentation shows that the 40 ks cutoff is a good initial criterion which eliminates sources that provide little chance of producing at least two good-quality spectra. The lower-flux sources that cannot produce at least two such spectra are caught and eliminated from the sample after their data are run through the data pipeline (Section 3.2).

The first step in compiling the list of AGN was to use the Browse interface "subject category" search to find all sources observed by *RXTE* that were categorized as such. This resulted in an initial sample of 149 unique sources. (The full details of the sample selection process are detailed in Appendix A.)

3.1.1 First Cut of Data: Seyfert Galaxies

We chose to focus the study on Seyfert galaxies because they are the most common type of AGN, comprising a few percent of all galaxies. They are luminous, nearby, and contain significant amounts of material in their central regions. X-ray reprocessing is an important process in Seyferts since it can occur in any of the regions of matter proposed by unification. The spectral signatures of the reprocessed X-rays can help us to determine the geometry of the central engine.

The sample first consisted of 149 sources representing all types of AGN, such as quasars and BL Lacterate objects, in addition to Seyfert galaxies. To eliminate non-Seyferts, we used the NED website[3]. Ninety-nine were classified as Seyfert galaxies, with the remaining 50 galaxies cut from the sample.

3.1.2 Second Cut of Data: 40-ks Minimum Observing Time

We next eliminated sources having observation times totaling less than 40 ks. We used the HEASARC's Browse interface to list the observed time for each accepted proposal for the 99 remaining Seyfert galaxies in the sample. Unfortunately, the HEASARC archive does not consistently report the observed time, and in many cases, this field was either left blank or listed as "0 seconds" when an observation had clearly taken place. To supplement this search, we produced a list of the time awarded for each proposal, but the reported awarded time is equally inconsistent.

Sources for which all of the observed times are reported and the total is < 40 ks are trivially eliminated. Likewise, sources for which all awarded times are reported and the total is < 40 ks are eliminated. Sources with unreported observed and awarded times are not eliminated by hand. Any that do not have enough observation time to produce at least two good quality spectra are eliminated after their data are run through the data pipeline (Section 3.2).

Using the criterion of a 40 ks minimum observation time, 29 galaxies are eliminated, with 70 galaxies left in the sample.

[3]`http://nedwww.ipac.caltech.edu/`

3.1.3 Third Cut of Data: Observations Spanning at Least Two Weeks

The final criterion used to define our data sample was that the first and last observations of the source be separated by at least two weeks. This requirement preserves variability on timescales associated with the broad line region (with a distance of $\sim 10^{17}$ cm from the central black hole). We consulted the Browse interface to produce a detailed observation log for each of the remaining 70 galaxies. Fourteen sources were eliminated with this requirement, leaving 56 galaxies in the culled sample.

A brief summary of the data selection process is shown in Table 3.1. Data for the remaining 56 sources remaining after the selection process were run through the data pipeline discussed in Section 3.2. They represent all Seyfert galaxies in the *RXTE* public archive with a strong probability of having at least two good-quality spectra, separated in time by a minimum of two weeks. A few more sources are eliminated by the data pipeline process itself.

Table 3.1: Summary of the data selection process

Reqirement	**Galaxies eliminated**	**Galaxies left**
Categorized as an AGN in *RXTE* archive and available on or before November 1, 2006	···	149
Categorized as a Seyfert galaxy	50	99
Minimum 40 ks observed time	29	70
Observations span at least two weeks	15	55

3.2 Data Pipeline

We wrote a data pipeline to systematically and consistently process the large number of observations in the *RXTE* sample. The data pipeline performs the initial data reduction and data analysis steps that are required to be the same from source to source. By creating an automated process, we could reduce the time necessary to handle such a large data set, while ensuring that all data are analyzed in a uniform manner.

The pipeline was written using a combination of the Python® scripting language[4] and FTOOLS[5]. The pipeline takes the data that are downloaded from the HEASARC archive and processes them from there. The pipeline starts by preparing a directory structure for the data products, then performs initial data reduction, extracts lightcurves, determines divisions for a series of time-resolved spectra, and finally extracts the spectral products. Once the spectra are produced, the automated pipeline shuts down to await the results of fitting those spectra in `XSPEC` (Arnaud (1996); described further in Section 3.3.1). When the spectra have been fitted and errors for all free model parameters determined, a second Python script compiles the results into tables, plots, and a database. This section describes the reduction and analysis steps that the pipeline performs. The steps are summarized in Table 3.2.

[4] `http://www.python.org`

[5] `http://heasarc.gsfc.nasa.gov/docs/software/ftools/ftools_menu.html`

3.2.1 Reduction of Data

Using the HEASARC's Browse interface, we downloaded the raw *RXTE* data for all observations of a source. The pipeline starts with this raw data and uses it to complete a series of initial reductions, ending with a sample of time-resolved spectra, each with a minimum of 125,000 net photons.

Table 3.2: Overview of the steps involved in the data pipeline.

Step	Section in Text	Action
Prepare Data and Directories	§ 3.2.1	Untar data and prepare the data structure for the pipeline
Run REX script	§ 3.2.1	Run REX on each observation to find good data and model background
Make Time-Resolved Spectra	§ 3.2.1	Extract lightcurves for each observation, binned to 5760 s; determine temporal divisions; extract spectra and backgrounds, and make response matrices
Data Fitting	§ 3.2.2	Add 1% systematic errors to each spectrum; fit time-resolved spectra to selected models
Data Products	§ 3.2.3	Compile results of spectral fits into tables and plots

Prepare Data and Directories

The first pipeline step is to unzip and untar the data archive from the HEASARC. Prior to reducing the data, the data pipeline creates a directory structure to organize the data products. A directory is made for each observation of a given source and an "`aux`" directory is installed. The `aux` directory, or auxiliary directory, is used by the

FTOOLs spectral reduction script, `Rex`, and contains several files that are used to reduce data from each observation. These files include the background model files, a file containing the history of the *RXTE* satellite's passages through the South Atlantic Anomaly (SAA), and a file containing the selection criteria to determine which data are considered "good". The `aux` directory also serves as a repository for some of the products of the `Rex` script.

Running REX

The *RXTE* Guest Observer Facility[6] has developed a script called `Rex`[7] to perform common data reduction steps necessary for most analysis of *RXTE* data. The `Rex` script uses a user-defined expression to select the "good data". We use the standard expression suggested in the `Rex` manual to produce the highest signal-to-noise data with the best background subtraction. The typical expression is:

ELV > 10.0 && OFFSET < 0.02 && PCUX_ON == 1 &&
(TIME_SINCE_SAA < 0 || TIME_SINCE_SAA > 30) &&
ELECTRONX < 0.1

In this expression, "&&" indicates a logical AND while "||" indicates a logical OR. The criteria are:

- ELV > 10.0: choose times when the Earth elevation angle is greater than 10°. This criterion prevents contamination from a bright Earth from interfering with the data.
- OFFSET < 0.02: the telescope pointing offset from the target must be less than 0.02°

[6] `http://heasarc.gsfc.nasa.gov/docs/xte/xte_1st.html`

[7] `http://heasarc.gsfc.nasa.gov/docs/xte/recipes/rex.html`

- PCUX_ON == 1: require that PCU X be on for this observation. This criterion changes depending on the number of PCUs required to be on for a given observation, as listed in Table 2.2. For example, for Epoch 3 observations, this criterion would be:

  PCU0_ON == 1 && PCU1_ON == 1 && PCU2_ON == 1

- TIME_SINCE_SAA < 0 || TIME_SINCE_SAA > 30: require that the time since the last passage through the SAA be more than 30 minutes

- ELECTRONX < 0.1: times when the electron contamination in PCU X is less than 0.1. This rate is determined by the signal in the propane veto layer of the PCU in conjunction with the signal in the top xenon layer, as discussed in Section 2.2.1.

Another `Rex` default criteria is to use data from only the first xenon layer of the detector. As discussed in Section 2.2.1, layer 1 has the highest signal-to-noise of all the detector layers.

With the above selection criteria, the `Rex` script performs the following steps for each ObsID in a given Observation:

- Determine whether or not the ObsID represents a spacecraft slew. Spacecraft slews are ignored.

- Update the filter file based on the state of the telemetry sources for the Observation. An *RXTE* filter file contains the housekeeping parameters used in filtering out the "bad" data. This step uses the FTOOL script `xtefilt`.

- Make a directory for the ObsID in the Observation and `aux` directories.

- Make modeled background data for each Standard 2 file. This step uses the FTOOL script `pcabackest` on each Standard 2 file, using models and SAA history files which were installed with the `aux` directory (see Section 2.2.3 for more on the background modeling). The resulting background files are placed in the ObsID directories in the `aux` directory.

- Produce a list of Good Time Intervals (GTI) for extracting spectra and light curves. This step uses the FTOOL script `maketime` using the filter file and criteria specified by the selection criteria. If no good times are present for this ObsID, `rex` moves on to the next.

- Produce spectra and lightcurves binned to 16 seconds. This step uses the FTOOLS script `saextrct` to extract the lightcurves and spectra for both the source files and the backgrounds.

- Deal with backgrounds for light curves and spectra. In this step, the background light curve is subtracted from the source light curve using the FTOOLS script `lcmath`. In addition, the background spectrum file name is written to the BACKFILE keyword of the spectrum file, in preparation for inputting the spectrum to `XSPEC`.

When `REX` finishes these steps for each ObsID for a given Observation, it creates a lightcurve binned to 16-seconds and a spectrum for the entire Observation.

Make Time-Resolved Spectra

When `REX` finishes, all control returns to the data pipeline. At this point, the data pipeline extracts another set of lightcurves for each Observation, binned to 5760 seconds. This time bin is approximately the time for one orbit of the *RXTE* satellite, and is often used as a characteristic timescale for *RXTE* lightcurves. Using these lightcurves, the pipeline determines temporal boundaries for extracting time-resolved spectra. These boundaries are chosen such that each spectrum will have a minimum of 125,000 net photons (source photons, after the background is subtracted) in the 2 to 10 keV energy band.

The background-subtracted lightcurve files include the net count rate in photons per second for each time bin and the fraction of time the telescope observed during that time bin. The data pipeline determines the total number of photons for each time bin by multiplying the count rate by the size of the time bin (5760 seconds) then multiplying by the fraction of time observed. The total net photons observed in each lightcurve time bin are summed until there are at least 125,000 net photons. At the end of a lightcurve file there are often bins remaining that do not sum to at least 125,000 net photons. In these cases, the pipeline determines how many photons are available in those last bins. If there are at least 75% of 125,000 photons (or $\geq$ 93,750 photons), a final time-resolved spectrum is made from these remaining photons; otherwise, those remaining time bins are ignored.

The 125,000 net photon criterion is a compromise between the desire for a good-quality spectrum and the maximum number of spectra that can be obtained from each source. For lower-flux sources, requiring more net photons would result in only one spectrum, thus eliminating the source from study based on our variability criterion. On the other hand, requiring fewer photons decreases the quality of the spectra, and larger error bars would erase the benefits from having multiple spectra.

Using these temporal boundaries, the data pipeline then extracts spectra and corresponding backgrounds. The data pipeline also makes a response matrix for each time-resolved spectrum using the FTOOLS script `pcarsp`. Spectra are named by the date that the observation starts. For multiple spectra starting on the same date, a letter is appended to the name. For example, MCG −5-23-16 has three spectra that start on April 24, 1996, so those spectra are named 1996-04-24a, 1996-04-24b, and 1996-04-24c.

Before stopping work, the pipeline produces a text file detailing the temporal cuts for each observation of a given source and another text file detailing each of the time-resolved spectra, including the temporal boundaries and the PCUs used. In addition, the pipeline outputs a series of model files that are later fed into `XSPEC` plus a series of text scripts that can be called by `XSPEC` to automatically fit all source spectra to a given model.

3.2.2 Data Fitting

Prior to modelling the data, we added 1% systematic errors to each energy bin for each of the time-resolved spectra using the `grppha` FTOOL script. The choice of 1% is common for *RXTE*, based on the systematic errors for fits to the Crab nebula being as high as 1%[8]. Each Seyfert galaxy spectrum was fitted to the models described in Section 3.3.2 using `XSPEC`, an X-ray spectral fitting software package from the HEASARC[9] (Arnaud 1996).

[8] From the *RXTE* FAQ (`http://heasarc.gsfc.nasa.gov/docs/xte/ftools/xtefaq_answers.html`)

[9] Available at `http://heasarc.gsfc.nasa.gov/docs/xanadu/xspec/`

To determine the best fit for each model, we used the `smart_fit` scripts, written by Andy Ptak and available in the XAssist package[10]. The `smart_fit` script measures errors for each model parameter and restarts the fitting process if a value for a parameter gives a lower χ^2. The script outputs a "csv" file (or Comma Separated Variable file) for each fitted spectrum. This csv file contains values of χ^2 and the number of degrees of freedom for the final fit, along with all of the model parameters and their error limits. The `smart_fit` script takes as input the desired $\delta\chi^2$ for the error limits. We find the 90% errors (for one parameter of interest, $\delta\chi^2 = 2.706$) and the 1-sigma error bars (for one parameter of interest, $\delta\chi^2 = 1.000$) for each fitted spectrum.

3.2.3 Data Products

Once all of the spectra for an individual AGN are fitted to the desired models, the second phase of the data pipeline compiles the results. For each model that is fitted, a LaTeX table is produced showing parameters with their errors and the value of χ^2. In addition, the pipeline produces a series of plots showing the fitted parameters as a function of time and pairs of parameters plotted against each other. These plots are written to data and header files which were processed using `pgplot`, a standard graphics subroutine library callable by C-routines (and ported to Python as `ppgplot`). Finally, the plots are inserted in a summary PDF file.

[10]`http://xassist.pha.jhu.edu/xassist/index.jsp`

3.2.4 Source Sample After Pipeline

After running the data pipeline, a few sources were eliminated for not having at least two time-resolved spectra. In addition, we have eliminated a few extracted spectra from the sample because they span the PCA data epochs. Eliminating these specific spectra created a situation that caused some sources to drop below the two-spectrum minimum, which subsequently led us to eliminate these sources from the sample. The eliminations are detailed below.

Table 3.3: Spectra eliminated from sample for spanning epoch boundaries.

Galaxy	Spectra spanning epoch boundaries
3C 120	2003-11-28
3C 273	1996-02-09, 2001-12-23, 2003-12-07
3C 390.3	1999-01-08, 2000-05-05
Akn 120	1999-03-17
Akn 564	1999-05-30, 2000-03-03
Cen A	2003-03-11
Cyg A	1996-04-10c
Fairall 9	1999-01-02
IC 4329A	2003-12-11
IRAS 18325-5926	1996-01-31
MCG-6-30-15	1996-03-17, 1998-01-03, 1999-02-15,
	2000-05-04, 2001-11-25, 2003-12-30
Mkn 509	2003-11-14
NGC 2110	1998-02-08b
NGC 3227	1999-01-02, 2000-04-15, 2001-10-06,
	2003-11-12
NGC3783	1999-03-15, 2000-03-08, 2001-10-01
NGC 4051	2000-03-04, 2001-10-16
NGC 4151	1999-03-14, 2000-04-23
NGC 4258	1997-04-11, 1997-12-27, 1999-01-02
NGC 4388	1996-03-06b
NGC 5506	1996-03-17, 1998-01-03, 1999-02-15
	2000-05-12
NGC 5548	1998-01-03, 1999-03-14, 2000-03-03
NGC 7314	1999-01-01, 1999-09-17
NGC 7469	1996-04-13, 2003-04-08
PG 0804+761	2000-03-07
PKS B1510-089	2001-03-02, 2002-03-25

Several sources were eliminated after being processed by the data pipeline for not having two time-resolved spectra with at least 125,000 net photons. The following sources did not even allow a single spectrum based on our criteria: Mkn 335, Mkn 590, NGC 6240, NGC 6251, PG 0052+251, and Ton S180. The following sources produced only one time-resolved spectrum: Circinus, IC 5063, Mkn 3, NGC 2992, NGC 4945, NGC 7582, and PG 1211+143. We also eliminated NGC 4507, which had two time-resolved spectra, but they were separated by less than 2 weeks.

The data pipeline was not programmed to be aware of the PCA epoch boundaries for the purpose of the temporal boundaries for time-resolved spectra. Thus several time-resolved spectra span epoch boundaries, and are eliminated because their background models and response matrices have unmodeled discontinuities at the epoch boundary. Table 3.3 lists all spectra eliminated for spanning boundaries. PG 0804+761 and PKS B1510-089 are subsequently eliminated because only one spectrum remains after eliminating spectra that spanned epoch boundaries. The final sample of the 39 galaxies studied in this thesis that meet all of our criteria are listed in Table 3.4.

Table 3.4: Final sample of galaxy for this thesis, after running data pipeline.

Galaxy	**Sy Type**	**Other Names**	**# of Specs**[a]	**Exposure**[b] **(ks)**	**RA hh mm ss.s**	**Dec dd mm ss.s**	**z**[c]	**Dist. (Mpc)**
3C 111	1	PG 1226+023	9	194	04 18 21.3	+38 01 35.8	0.049	210
3C 120	1	Mkn 1506, Mkn 9014	59	1161	04 33 11.1	+05 21 15.6	0.033	141
3C 273	1		81	960	12 29 06.7	+02 03 08.6	0.158	677
3C 382	1		7	110	18 35 02.2	+32 41 50.2	0.058	249
3C 390.3	1		18	483	18 42 09.0	+79 46 17.1	0.056	240
4U 0241+61	1		2	29	02 44 57.7	+62 28 06.5	0.044	189
Akn 120	1	Mkn 1095	14	246	05 16 11.4	−00 08 59.4	0.032	137
Akn 564	1.8		4	344	22 42 39.4	+29 43 31.3	0.025	107
Cen A	2	NGC 5128	39	200	13 25 27.6	−43 01 08.8	0.001	4
Cyg A	2		11	81	19 59 28.4	+40 44 02.1	0.056	240
ESO 103-G35	2		6	122	18 38 20.3	−65 25 39.2	0.013	56
Fairall 9	1		12	425	01 23 45.8	−58 48 20.5	0.047	201
IC 4329A	1.2		45	386	13 49 19.3	−30 18 34.0	0.016	69
IRAS 04575-7537	2		2	41	04 55 59.0	−75 32 28.2	0.018	77
IRAS 18325-5926	2	F 49	9	248	18 36 58.3	−59 24 08.6	0.020	86
MCG−2-58-22	1.5	Mkn 0926	7	175	23 04 43.5	−08 41 08.6	0.047	201
MCG−5-23-16	2		17	102	09 47 40.2	−30 56 55.9	0.008	34
MGC−6-30-15	1.2		70	1167	13 35 53.8	−34 17 44.1	0.008	34
Mkn 79	1.2		5	230	07 42 32.8	+49 48 34.8	0.022	94
Mkn 110	1		2	73	09 25 12.9	+52 17 10.5	0.035	150
Mkn 279	1.5		4	126	13 53 03.5	+69 18 29.6	0.030	129
Mkn 348	2	NGC 262	5	174	00 48 47.1	+31 57 25.1	0.015	64
Mkn 509	1.2		25	450	20 44 09.7	−10 43 24.5	0.034	146
Mkn 766	1.5	NGC 4253	4	156	12 18 26.5	+29 48 46.3	0.013	56
MR 2251-178	1		8	140	22 54 05.8	−17 34 55.0	0.064	274
NGC 2110	2		10	135	05 52 11.4	−07 27 22.4	0.008	34

Galaxy	Sy Type	Other Names	# of Specs[a]	Exposure[b] (ks)	RA hh mm ss.s	Dec dd mm ss.s	z[c]	Dist. (Mpc)
NGC 3227	1.5		29	709	10 23 30.6	+19 51 54.2	0.004	17
NGC 3516	1.5		51	709	11 06 47.5	+72 34 06.9	0.009	39
NGC 3783	1		29	481	11 39 01.7	−37 44 18.9	0.010	43
NGC 4051	1.5		7	646	12 03 09.6	+44 31 52.8	0.002	9
NGC 4151	1.5		65	397	12 10 32.6	+39 24 20.6	0.003	13
NGC 4258	1.9	M 106	11	631	12 18 57.5	+47 18 14.3	0.001	4
NGC 4388	2		5	63	12 25 46.8	+12 39 43.5	0.008	34
NGC 4593	1	Mkn 1330	11	338	12 39 39.4	−05 20 39.3	0.009	39
NGC 5506	1.9	Mkn 1376	53	515	14 13 14.9	−03 12 27.0	0.006	26
NGC 5548	1.5	Mkn 1509, Mkn 9027	41	594	14 17 59.5	+25 08 12.4	0.017	73
NGC 7314	1.9		4	205	22 35 46.2	−26 03 00.9	0.005	21
NGC 7469	1.2	Mkn 1514, Mkn 9003	37	630	23 03 15.6	+08 52 26.4	0.016	69
PKS 0558-504	1		2	109	05 59 47.5	−50 26 51.8	0.137	587

[a]These are time-resolved spectra with a minimum of 125,000 net photons, after eliminating spectra which cross epoch boundaries, as described in Section 3.2

[b]This is the total exposure in the time-resolved spectra from the data pipeline, and may not contain the entire exposure of this source as downloaded from the *RXTE* public archive.

[c]From the NASA Extragalactic Database (`http://nedwww.ipac.caltech.edu/`).

3.3 Data Analysis

After running the data pipeline and eliminating spectra which spanned data epochs, there are 39 galaxies remaining and a total of 821 time-resolved spectra. A complete log of spectra can be found in Appendix B. All spectra are fitted to standard models using the XSPEC X-ray spectral fitting program. In this section we first discuss X-ray spectral fitting and XSPEC, then we discuss the models used to fit the data.

3.3.1 X-ray Spectral Fitting and XSPEC

The relative dearth of X-ray photons from astronomical sources, compared to visible and UV observations, often makes traditional line diagnostics impractical for X-ray spectral analysis. In addition, the continuum emission encodes important information about the X-ray emitting region. The general method for X-ray spectral fitting is to first define a model, then fold that model through the instrument's response to the incoming X-rays, and finally to statistically compare the folded model with the data.

Early X-ray spectral fitting programs were instrument-specific, but in the mid-1980s, an X-ray spectral fitting program, now called XSPEC, was created to be flexible enough to be used with any future X-ray missions as long as the data and instrument response files were produced in a standard FITS format (Arnaud 1996). Since then, XSPEC has been used to fit spectral data from all major X-ray missions. The XSPEC program comes with over 50 built-in models, but can also accept user-defined models (Arnaud 1996). All of the data-fitting for this thesis was performed with XSPEC version 11.3. We used the χ^2 fitting statistic to determine a goodness-of-fit criterion.

Figures 3.1 and 3.2 show sample spectra and best-fit models for two spectra in our sample. Figure 3.1 is from a high-flux source, IC 4329A (spectrum 2003-04-08), and Figure 3.2 is from a low-flux source, NGC 4051 (spectrum 2002-03-01). The spectrum from the low-flux source demonstrates that by choosing 25 keV as our cut-off energy, we have ensured that the errors at even the highest energy bins do not typically fall to zero.

3.3.2 Model

Each of the *RXTE* spectra was fitted from 3 to 25 keV with an absorbed spectrum consisting of a direct power-law component, a Compton reflection continuum and an iron K fluorescence line at ~ 6.4 keV. This is a typical model used to characterize the X-ray emission from Seyfert galaxies, as described in Section 1.3.3. In `XSPEC`, this model comprises three components: a Compton reflection model which includes the power-law and reflection (`pexrav`; Magdziarz & Zdziarski (1995)), a Gaussian iron line (`gaussian`), and low-energy absorption (`wabs` in `XSPEC`) that multiplies the two other model components. The `pexrav` model simulates the effects of an exponentially cut-off power-law reflected by neutral matter (Magdziarz & Zdziarski 1995) and was developed using Monte Carlo methods to obtain the Green's Functions to simulate the angle-dependent effects of Compton reflection on a neutral slab.

These AGN model components are discussed in more detail below and Table 3.5 lists all of the fit parameters for the model components. Table 3.5 also lists values used to create a representative spectrum used here to illustrate how altering the input parameters alters the model (Figures 3.3 through 3.6). Our choice of model represents the complete model needed to encompass all of the spectra; however, not all of the galaxies required all of these components.

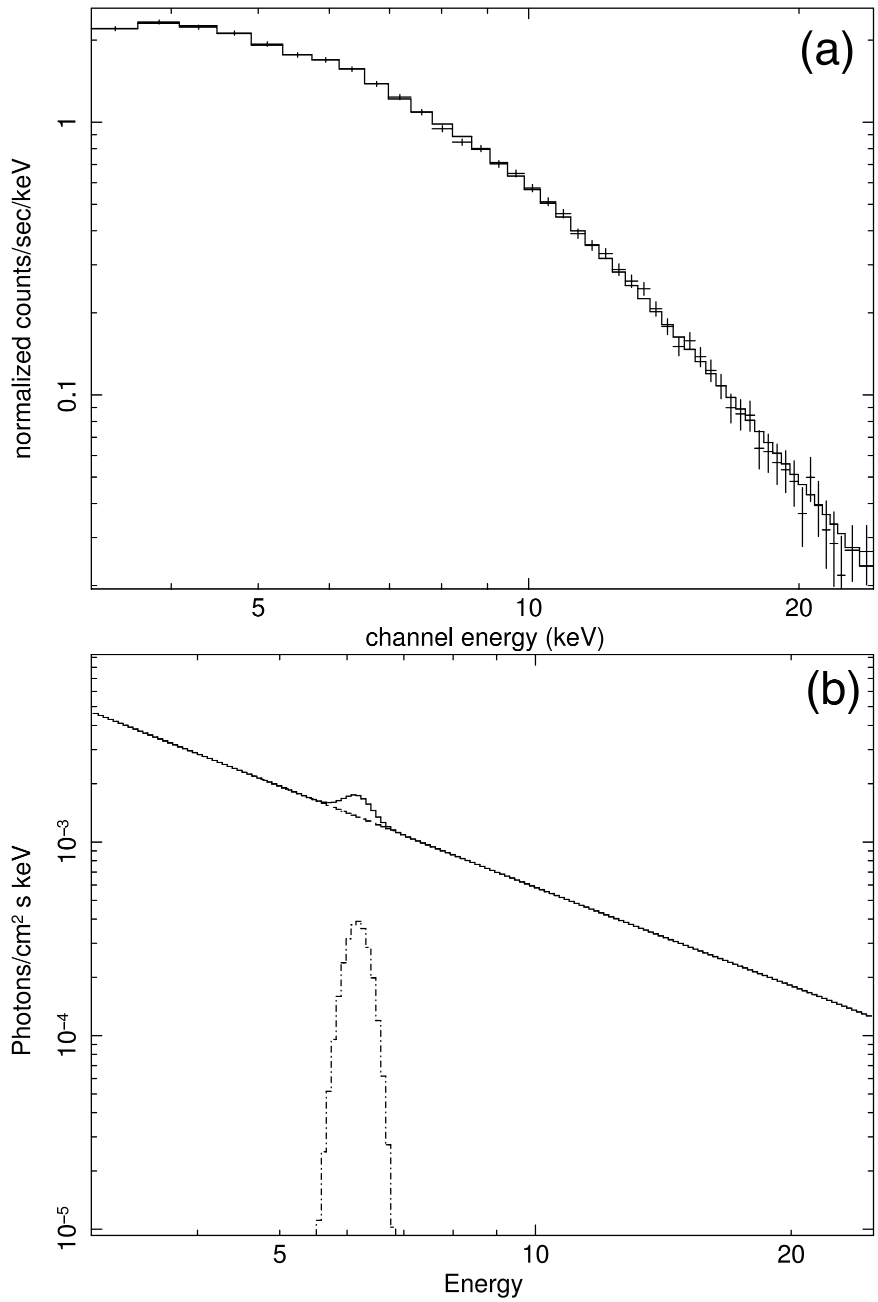

Figure 3.1: A sample spectrum and model for a high-flux source. (a) shows the 2003-04-08 spectrum for IC 4329A with the folded model. (b) shows the best-fit model.

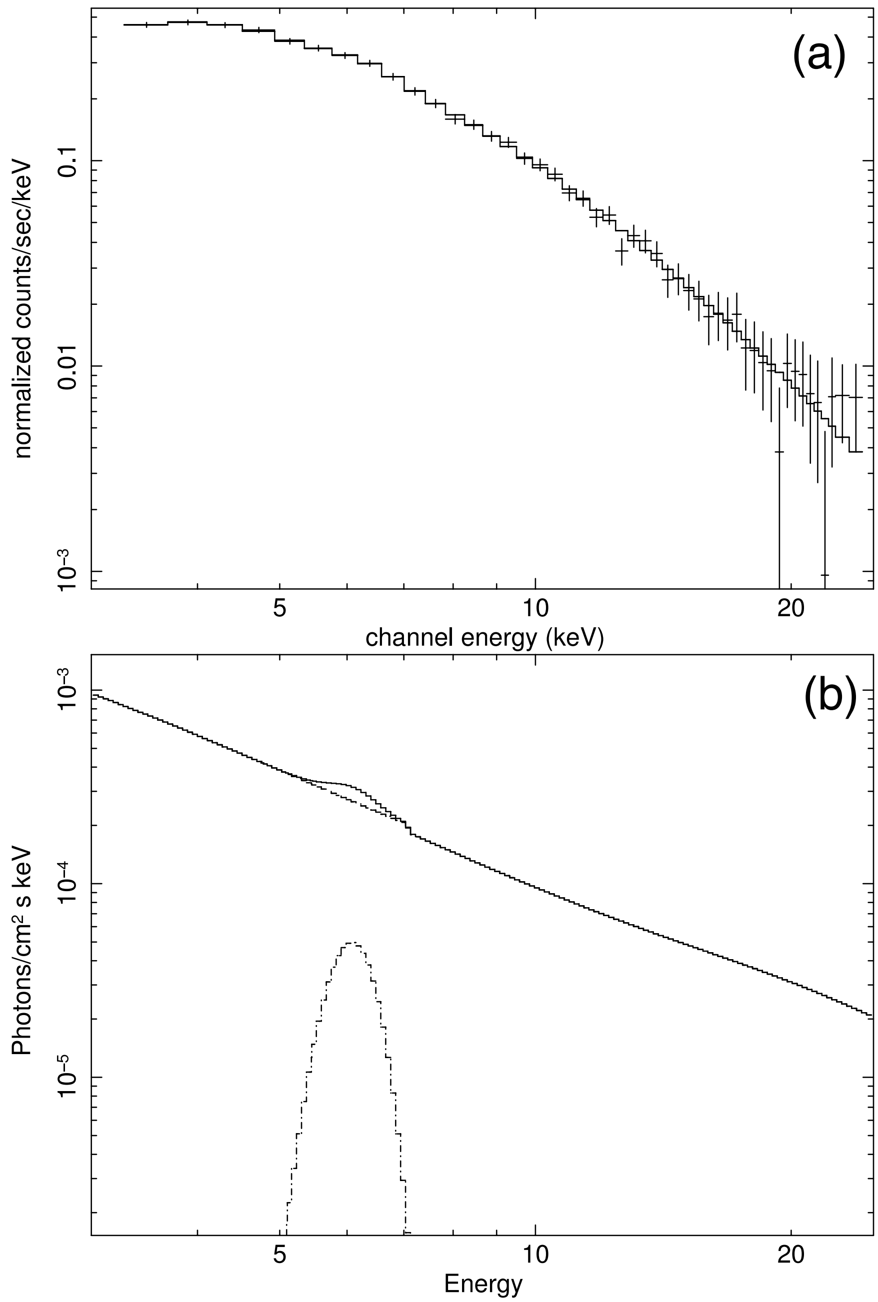

Figure 3.2: A sample spectrum and model for a high-flux source. (a) shows the 2002-02-01 spectrum for NGC 4051 with the folded model. (b) shows the best-fit model.

Table 3.5: Overview of the parameters for the standard AGN model.

XSPEC Model	Abbr.	Description	Fixed or Free?	Limits or Value[a]	Rep. spec. value[b]	Units[c]
pexrav	Γ	photon index	Free	[0, 5]	1.7	···
	E_c	continuum cut-off energy	Fixed	500	500	KeV
	R	reflection fraction	Free	[0,5]	0.5	···
	z	redshift	Fixed	NED value[d]	0.05	···
	Z	abund. of elements heavier than He	Fixed	solar	solar	
	Z_{Fe}	iron abund.	Fixed	solar	solar	
	cos(i)	cosine(inclination) of the reflecting material	Fixed	0.95	0.95	
	A	photon flux at 1 keV	Free	···	0.0127	ph/keV/cm^2/s
gaussian	E_{Fe}	line energy	Free	[5.5,7.5]	6.4	keV
	σ_{Fe}	line width	Both[e]	[0,1.5]	0.2	keV
	A_{Fe}	photon flux in line	Free	···	3.2	$\times 10^{-5}$ ph/cm^2/s^1
wabs	n_H	absorbing column density	Free	···	5	$\times 10^{22}$ atom/cm^2

[a]A range in this column represents the limits imposed on that parameter. When a single value is listed, it is the value we chose to hold fixed.

[b]Values for a representative spectrum used in Figures 3.3 through 3.6. The parameters in this column are held constant in these figures, except for the parameter of interest in each plot and the normalization parameters, A and A_{Fe}.

[c]Units and scaling factor for the parameter

[d]Each galaxy in the source has the redshift fixed to the appropriate value, as listed in the NASA Extragalactic Database (NED; http://nedwww.ipac.caltech.edu/).

[e]Each spectrum is first fitted with σ_{Fe} as a free parameter, with fixed hard limits on the parameter of [0,1.5] keV. The final fit of each spectrum is done with the σ_{Fe} fixed to the mean value for that galaxy.

The `pexrav` model simulates the effects of an exponentially cut-off power-law reflected by neutral matter, except for H and He, which are assumed to be fully ionized (Magdziarz & Zdziarski 1995). There are seven model parameters for the `pexrav` model.

The model parameters are:

- The photon index of the intrinsic, underlying power-law (Γ), where the number of photons emitted as a function of energy (E) is given by:

$$N_{\mathrm{power-law}}(E) = N_{1\ keV} \left(\frac{E}{1keV} \right)^{-\Gamma} \tag{3.1}$$

  Our fits restrict Γ to lie between 0 and 5, to prevent `XSPEC` from pursuing non-physical values. The effect of changing Γ is illustrated in Figure 3.3. A larger photon index increases the number of low-energy photons in the overall spectrum and decreases the number of high-energy photons, so raising the photon index is often called "softening" the spectrum. Conversely, a smaller photon index decreases the number of low-energy photons in the overall spectrum and increases the number of high-energy photons, so is often called "hardening" the spectrum.

- The exponential cutoff energy of the power-law in keV (E_c). The power-law equation written above is modified to account for diminishing high-energy photons in the power-law:

$$N_{\mathrm{cut-off\ power-law}}(E) = N_{1\ keV} \left(\frac{E}{1keV} \right)^{-\Gamma} e^{-\frac{E}{E_c}} \tag{3.2}$$

  We fix this parameter to $E_c = 500$ keV for all spectral fits, because the PCA spectra, in the absence of the HEXTE data, do not reach large enough energies

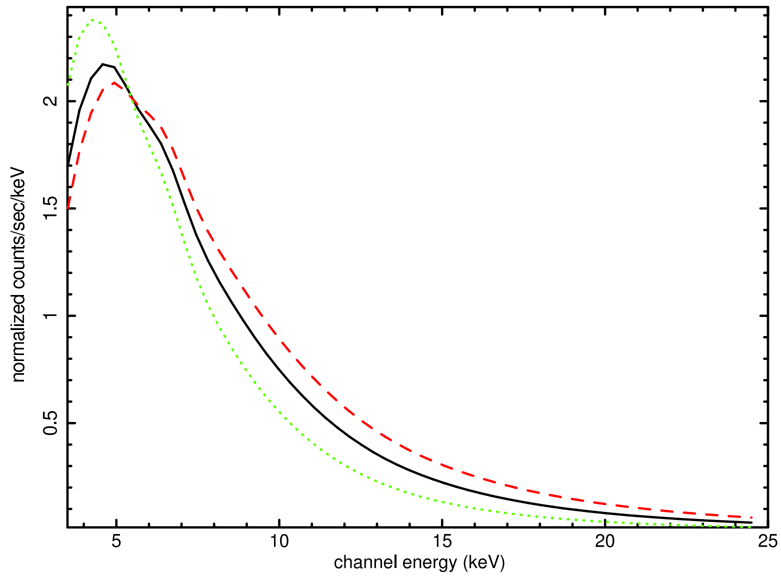

Figure 3.3: This plot shows the effect of varying the photon index, Γ, in the **pexrav** model, while holding the 2 to 10 keV flux constant. The solid black line is the representative spectrum having the parameters in Table 3.5, with $\Gamma = 1.7$. The dashed red line is $\Gamma = 1.4$, and the dotted green line is $\Gamma = 2.2$, illustrating how a hypothetical source would look with these different spectral slopes.

to determine strong constraints on E_c. Reducing the cutoff energy from 500 keV to 100 keV has little effect on the 3 to 25 keV spectrum. At the high-energy end of the spectrum ($E > 6$ keV) there is no appreciable difference between the two values of E_c. At lower energies ($E < 5$ keV), the spectrum from a hypothetical source with these two values of E_c do start to separate, but the difference is small. `XSPEC` may compensate for differences in E_c from our fixed value by tiny variations in the absorbing column (N_H).

- The reflection fraction (R). The reflection fraction is defined as the solid angle subtended by the reflector ($R = \Omega/2\pi$). This value is normalized to 1 for the case of an isotropic source radiating above a semi-infinite slab of neutral material. It is possible for the reflection fraction be greater than 2 ($R > 2$ or $\Omega > 4\pi$) in the case that either the AGN continuum source is blocked from our line-of-sight or the continuum is strongly beamed toward the reflector. We restrict R to lie between 0 and 5, to prevent `XSPEC` from pursuing unphysical values. Figure 3.4 shows the effect of varying the reflection fraction while keeping the 2 to 10 keV flux, constant. A higher reflection fraction increases the number of higher-energy photons ($E > 10$ keV). The total spectrum would include the signal from the primary (power-law) X-ray source along with the reflected spectrum. With increased reflection, more of the high-energy photons are being downscattered into the Compton reflection hump (Section 1.3.3).

- The redshift (z). We fix this value to the redshift listed in the NED for each galaxy. The effect on the 3 to 25 keV spectrum from changing the redshift to encompass the full range of galaxy distances in our sample is not detectable within the error bars.

- The abundance of elements heavier than He in solar units (Z). This parameter is fixed in all fits to the solar abundance value from Anders & Grevesse (1989). The effect of changing Z from solar to twice solar is $< 1\%$ for 3 to 5 keV and 7 to 25 keV. Even in the 5 to 7 keV band, the effect is $< 5\%$, and so the effects of changing this value are small.

- The abundance of iron in solar units (Z_{Fe}). This value is fixed in all fits to the solar abundance value, based on Anders & Grevesse (1989), of 5.63×10^{-8} times the Hydrogen abundance. Changing this value from solar to twice solar does not change the spectrum within the errors for energies > 7 keV, and changes the spectrum by 5% or less for energies between 3 and 7 keV.

- The disk inclination angle (i). The inclination defines at what angle we are observing the reflecting disk of material. In `pexrav`, the inclination is defined in such a way that a face-on disk has $i = 0°$, while a disk viewed edge-on has

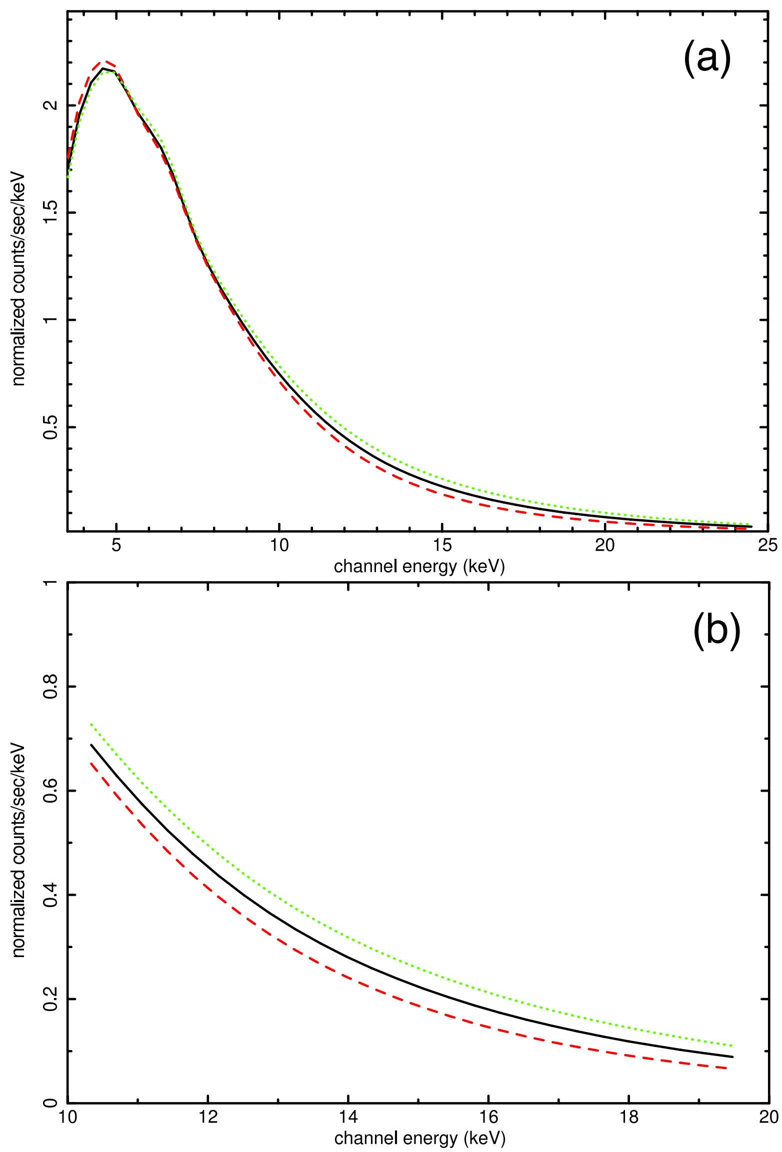

Figure 3.4: These plots show the effect of varying the reflection fraction, R, in the `pexrav` model, while holding the 2 to 10 keV flux constant. In both plots, the solid black line represents the representative spectrum having parameters in Table 3.5, including $R = 0.5$. The dashed red line is $R = 0$, and the dotted green line is $R = 1.0$, illustrating how a hypothetical source would look with these different reflection fractions. (a) Shows the complete 3 to 25 keV spectrum. (b) Shows a detail of the 8 to 25 keV spectrum.

$i = 90°$. We fix this value in all fits such that $\cos i = 0.95$, or $i \sim 0.32$ radian $\sim 18°$. This is the smallest value for i that the model will allow and represents a nearly face-on disk. The effect of increasing inclination (i.e., decreasing $\cos i$) alone will decrease the observed (reflection plus direct) spectrum from the source for energies ($E \gtrsim 10$ keV). Coupled with a strong absorber, however, the reflected spectrum may increase over the AGN continuum emission.

- The photon flux of the power law at 1 keV in the observer's frame (A). The other spectral parameters define the shape of the fitted spectrum, while this parameter gives the spectrum a normalization.

The `pexrav` model does not include an iron line K feature, so we added a `Gaussian` to represent the iron line. The `Gaussian` model simulates the iron line using the following equation:

$$A_{Gaussian}(E) = \frac{A_{Fe}}{\sqrt{2\pi\sigma_{Fe}^2}} e^{-\left(\frac{(E-E_{Fe})^2}{2\sigma_{Fe}^2}\right)} \tag{3.3}$$

Where,

- E_{Fe} is the line energy in keV. The energy defines the location of the peak of the spectral line. Figure 3.5a shows the effect of changing this parameter. We restrict the value of E_{Fe} to lie between 5.5 and 7.5 keV, which keeps the iron line within physically reasonable limits for our purposes.

- σ_{Fe} is the physical width of the Gaussian line in keV. Figure 3.5b shows the effect of changing the physical width to larger and smaller values. We restrict σ_{Fe} to lie between 0 and 1.5 keV. A physical iron line is unlikely to have σ_{Fe} greater than 1.5 keV, but if permitted, `XSPEC` will often fit a wider line to mimic other features of the continuum shape. Gaussian fits to iron lines in sources with well-known broad iron lines show $\sigma_{Fe} < 1.5$ (e.g., MCG −6-30-15, Reynolds et al. (1995b), NGC 3516 Nandra et al. (1999)). In any of our fits where σ_{Fe} remained free, 97% of the spectra showed $\sigma_{Fe} < 1.0$.

- A_{Fe} is the line normalization in units of photons cm^{-2} s^{-1}.

We fitted each spectrum twice, with σ_{Fe} left as a free parameter in the first fit. From this first fit, we determined a mean σ_{Fe} for a given source, then held it fixed to the mean value for the second fit.

As discussed in Section 1.3.3, iron lines in AGN have very complex structures, including narrow and broad features in many cases. However, the energy resolution of the PCA does not allow for such detailed characterization of the iron line, so a single Gaussian iron line is sufficient for the model. Figure 3.5 shows the unfolded model based on the representative spectrum parameters listed in Table 3.5.

The `wabs` model simulates absorption and uses the photoelectric absorption cross-sections published in Morrison & McCammon (1983). The `wabs` model has one free parameter, N_H, the equivalent hydrogen column in units of 10^{22} atoms cm^{-2}. The absorption, as a function of energy, is calculated using the following equation:

$$A_{wabs}(E) = e^{(-N_H \, \sigma_E)} \tag{3.4}$$

where σ_E is the photon electric cross-section of the absorbing material. Figure 3.6 shows the effects of changing the absorbing column. The effect of a higher column density is most pronounced for $E \lesssim 5.5$ keV. At higher energies, the spectra from diverse absorptions are nearly indistinguishable.

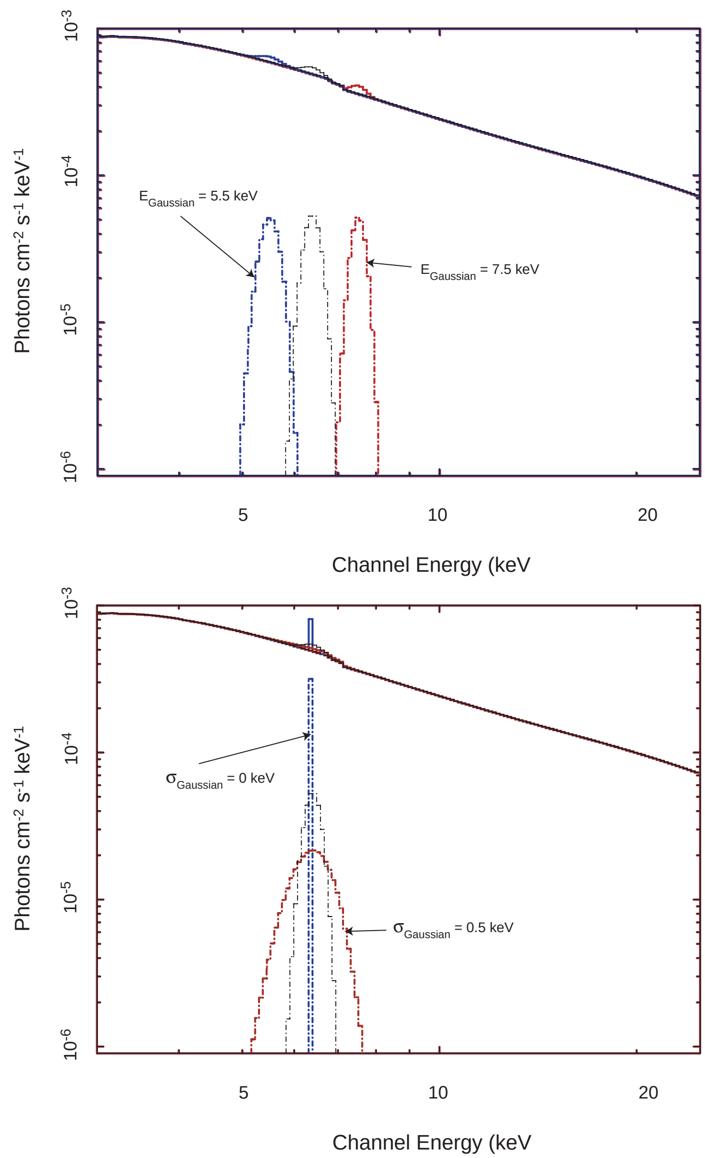

Figure 3.5: These plots show the effect of varying the `Gaussian` iron line parameters. Both plots show the unfolded spectral model. The comparison model is from a representative spectrum having parameters listed in Table 3.5. (a) Shows the effect of changing the `Gaussian` line energy (E_{Fe}). (b) Shows the effect of changing the `Gaussian` physical width (σ_{Fe}).

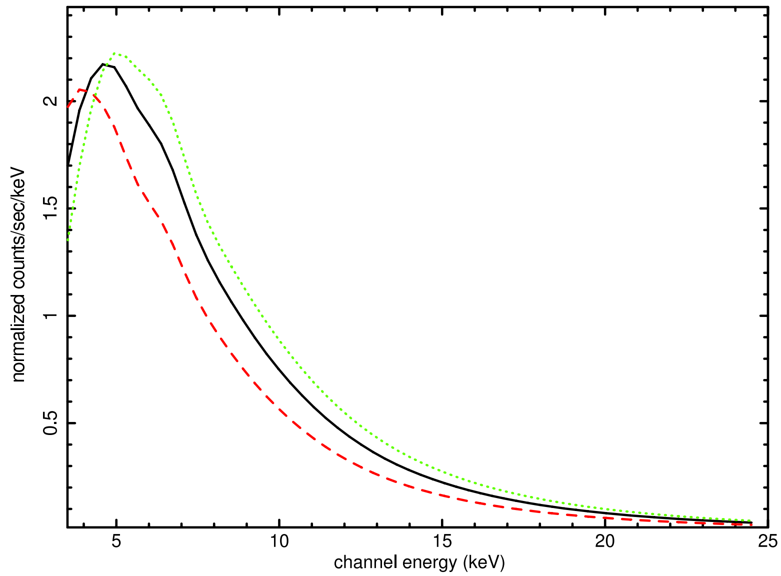

Figure 3.6: This plot shows the effect of varying the effective absorbing column (N_H) in the `wabs` model, while holding the 2 to 10 keV flux constant. The solid black line is the representative spectrum having the parameters listed in Table 3.5, with 5×10^{22} atoms cm^{-2}. The dashed red line has $N_H = 0$, and the dotted green line has 10^{23} atoms cm^{-2}, illustrating how a hypothetical source would look viewed through these different absorbing column densities.

3.4 Results

The best-fit parameters are listed in Appendix C for all of the AGN spectra in the sample for both the fixed-σ fits. Error bars quoted in the text are 90% errors (or $\Delta\chi^2 = 2.71$ for one interesting parameter) and errors shown in plots are 1σ errors (or $\Delta\chi^2 = 1.00$ for one interesting parameter), unless otherwise stated.

In addition to reporting the values and error bars for each of the fitted parameters, we report the derived 2 to 10 keV flux ($F_{2-10keV}$), 2 to 10 keV luminosity (L_x) and the iron line equivalent width (EW). For each source we calculate a few simple statistics for each parameter, such as the mean value and standard deviation, which are listed in Appendix C.2.

Using the data reduction pipeline described in this chapter, we have developed a database of results for over 800 individual spectra. These spectra represent all types of Seyfert galaxies from Seyfert 1s to Seyfert 2s and from radio-loud sources to radio-quiet. We dedicate the next two chapters to exploring some of the sample properties and correlations that can be gained from the information contained in this database.

Chapter 4

Seyfert 1 Results: A Possible X-ray Diagnostic for Jet Dominance

In this chapter, we present results for the Seyfert 1 and 1.2 galaxies listed in Table 4.1, which we will collectively refer to as the "Seyfert 1 sample". This sub-sample consists of 18 galaxies and 437 time-resolved spectra fitted as described in Chapter 3. The Seyfert 1 galaxies are listed in Table 4.1 by their sub-types: quasar, radio-loud Seyfert 1, radio-quiet Seyfert 1, or Seyfert 1.2.

We first review the basic properties of these AGN and place these properties in context with other AGN studies in Section 4.1. We examine correlations between spectral parameters to identify any key relationships and explore the origins of these relationships in Section 4.2. The results are specifically discussed within the context of the unification model in Section 4.3.

Table 4.1: Seyfert 1 sample listed by sub-classification and including the number of time-resolved spectra for each source and best-fit power-law model for the EW-L_x relationship for each source.

Galaxy			EW/L_x **correlation**[b]	
	# of Specs.	$\overline{\sigma_{FeK\alpha}}$ [a]	α	$WV/Num.$[c]
All	···	···	−0.18	676.9/437
Quasar	···	···	−0.06	45.42/80
3C 273	81	0.10	−0.06[d]	45.42/80
Radio-Loud Seyfert 1	···	···	−0.25	62.67/96
3C 111	9	0.27	+0.17	6.146/8
3C 120	59	0.26	−0.49[e]	27.76/58
3C 382	7	0.32	−0.74	2.665/7
3C 390.3	18	0.17	−0.48	4.335/18
4U 0241+61	2	0.12	−8.47	2.5e-13/2
PKS 0558-504	2	0.81	+0.87	1.5e-14/2
Radio-Quiet Seyfert 1	···	···	−0.11	186.1/76
Akn 120	14	0.26	−0.57	7.918/14
Fairall 9	12	0.15	+0.03	6.952/12
Mkn 110	2	0.43	+3.64	0.023/2
MR 2251-178	8	0.17	+0.44	3.024/8
NGC 3783	29	0.28	−1.16	9.763/29
NGC 4593	11	0.33	−0.64	2.981/11
Seyfert 1.2	···	···	−0.09	164.7/182
IC 4329A	45	0.23	−0.27	40.29/45
MGC −6-30-15	70	0.30	+0.25	48.79/70
Mkn 79	5	0.25	−1.01	0.5933/5
Mkn 509	25	0.13	−0.59	7.282/25
NGC 7469	37	0.17	−0.37	16.92/37

[a]The average physical width of the Fe Kα line for all spectra from a source when fitted to the absorbed power-law model with Compton reflection and Gaussian iron line in units of keV.

[b]Results of fitting the X-ray luminosity (2 to 10 keV) over EW plot to a power-law model; e.g. $EW \propto L_x^{\alpha}$, where L_x is the 2-10 keV X-ray luminosity in ergs s^{-1} and EW is the iron line equivalent width in eV.

[c]Weighted variance divided by the number of points in the fit.

[d]One 3C 273 spectrum shows a flare, where L_x jumps to $\sim 7\times$ its mean L_x. The number quoted in the table excludes this point from the sample.

[e]One 3C 120 spectrum shows a flare, where L_x jumps to $\sim 4.5\times$ its mean L_x. The number quoted in the table excludes this point from the sample.

4.1 Basic Sample Properties

We begin our discussion of the Seyfert 1 galaxies with a look at their basic spectral parameters. Of primary interest are those parameters characterizing the underlying X-ray emission, the amount of X-ray absorption, and the reflection environment. We examine the photon index (Γ), the absorbing column density (N_H), the reflection fraction (R) and the iron line equivalent width (EW) in detail. For each parameter, we calculate mean values for both the sample as a whole and the sample sub-classes. In addition, we perform t-tests to determine whether or not the distributions of parameters are consistent for each sub-class. For a t-test on two samples, the null hypothesis (H_0, not to be confused with the Hubble constant) is that the samples have the same mean value. The criterion for rejecting H_0 at a given significance level, α, depends on the t-value and the number of degrees of freedom (dof) of the test. The significance level is defined as the probability of rejecting the H_0 erroneously, and we use $\alpha = 0.02$ as the cutoff for determining whether or not two samples show the same mean values. The results for t-tests comparing the distributions of each parameter of interest for each pair of Seyfert 1 subclasses is listed in Tables 4.2 through 4.5. In the tables, we list the t-value, the number of degrees of freedom, and whether or not we reject H_0 at $\alpha = 0.02$. If we reject H_0 (a "Y" in the appropriate table column), then the sample means are statistically different.

We also plot weighted histograms in Figures 4.1 through 4.4. The histograms are weighted in such a way that each galaxy is given a total value of 1 on the "number" axis (y-axis). Each individual spectrum for a given source is assigned a value of $y = 1/N$, where N is the total number of spectra for that galaxy. Errors on the values reported in this section are the calculated standard errors of the mean.

4.1.1 Absorbing Column

The measured absorbing column densities range from 0 to 4.78×10^{22} cm^{-2} with a mean of $\overline{N_H} = (0.88 \pm 0.04) \times 10^{22}$ cm^{-2}. Figure 4.1a shows a histogram of N_H for the Seyfert 1 sample. Table 4.2 lists the mean values of N_H for each sub-class, along with t-test values comparing the mean value and standard deviation of N_H for each sub-class. Our results are in line with that found by Cappi et al. (2006), who find $N_H < 10^{22}$ cm^{-2} for 7 out of their 9 Seyfert 1 galaxies observed by *XMM*. Our mean is smaller than that found by Dadina (2008) of $\overline{N_H} = (3.66 \pm 2.34) \times 10^{22}$ cm^{-2} for an average spectrum of 43 Seyfert 1 galaxies observed by *BeppoSAX*. The fact that Dadina (2008) finds a higher $\overline{N_H}$ should not be surprising, however, given that their Seyfert 1 sample includes several Seyfert 1.5s, which we consider in the analysis of our Seyfert 2 sample, discussed in Chapter 5.

If the Seyfert unification model is correct, we would expect to see minimal absorption in excess of the Galactic value ($\sim 10^{20}$ to $\sim 10^{22}$ cm^{-2}), due to the idea that these AGN are being viewed face-on (Figure 1.2). Our mean N_H is about in line with a line-of-sight straight into the plane of our galaxy, but most of these sources lie along a line-of-sight outside of the plane of our galaxy. It may, then, seem that our mean N_H is rather high for a Seyfert 1. However, the low-energy cut-off in sources with N_H lower than $\sim 10^{21}$ would fall below the 3 keV limit of the *RXTE* spectra, so we are not sensitive to small values of N_H.

According to unification, we expect Seyfert 1.2s to be more absorbed than Seyfert 1s, since our line-of-sight should cross through some of the intrinsic obscuring region for the X-rays. However, the Seyfert 1s have $\overline{N_H} = (1.09 \pm 0.12) \times 10^{22}$ cm^{-2} and the Seyfert 1.2s have $\overline{N_H} = (1.15 \pm 0.08) \times 10^{22}$ cm^{-2}, and they are not statistically different, as shown in Figure 4.1b and confirmed by our t-tests with a t-value of 0.43

and 258 dof (Table 4.2). This may be explained by our line-of-sight crossing only enough of the obscuring material to obscure the optical spectrum in the Seyfert 1.2s but not enough to absorb the X-ray continuum.

Table 4.2: Seyfert 1 N_H statistics and the results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. Each row lists the mean value, the standard error on the mean, and the t-test values comparing the row's sub-class with the corresponding column's sub-class. A "Y" indicates that the hypothesis is rejected and the means are not statistically the same; an "N" indicates that the possibility that the means are the same cannot be ruled out.

Type	Mean ($\times 10^{22}$) (cm^{-2})	σ_M [a] ($\times 10^{22}$) (cm^{-2})	QSO t-value (dof)[b]	QSO Reject H_0?[c]	RL Sy 1 t-value (dof)[b]	RL Sy 1 Reject H_0?[c]	RQ Sy 1 t-value (dof)[b]	RQ Sy 1 Reject H_0?[c]	Sy 1.2 t-value (dof)[b]	Sy 1.2 Reject H_0?[c]
Sy1 Sample	0.88	0.04	2.49 (516)	N	4.71 (531)	Y	1.80 (513)	N	3.14 (617)	N
QSO	0.61	0.04			2.85 (175)	N	3.83 (157)	Y	4.29 (261)	Y
RL Sy1	0.41	0.05					5.59 (172)	Y	6.26 (276)	Y
RQ Sy1	1.09	0.12							0.43 (258)	N
Sy1.2s	1.15	0.08								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the null hypothesis, H_0, that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

Interestingly, the radio-loud (RL) Seyfert 1s have less absorption ($\overline{N_H} = (0.41 \pm 0.05) \times 10^{22}$ cm^{-2}) than the radio-quiet (RQ) Seyfert 1s ($\overline{N_H} = (1.09 \pm 0.12) \times 10^{22}$ cm^{-2}), with a t-value of 5.59 and 172 dof (Table 4.3). The RL and RQ Seyfert 1 N_H distributions are shown in Figure 4.1c. According to unification theory, RL galaxies are basically RQ galaxies with relativistic jets, so the fact that the RL sources show less absorption indicates that there may be more at work in these sources than just inclination effects. If some of the observed X-rays come from the jet, then they would be coming from a place well above the disk and may avoid some of the absorbing material. In addition, it is possible that the environment that is responsible for strong radio emission is related to the amount of absorbing material in the central engine region – either the higher luminosity may "clear out" this region or a lack of material could itself be conducive to setting up conditions for the radio emission.

4.1.2 Photon Index

The photon indices range from 1.52 to 2.70 with a mean of $\overline{\Gamma} = 1.86 \pm 0.01$. The histogram of photon indices for the Seyfert 1 sample in Figure 4.2a shows a sharp peak between 1.7 and 1.9, with a rapid drop-off outside this range. Our mean value is similar to that found by Malizia et al. (2003) from an average spectrum of 9 Seyfert 1s observed by *BeppoSAX* ($\overline{\Gamma} = 1.88^{+0.04}_{-0.03}$) in the 2 to 100 keV band. A different *BeppoSAX* study using an average spectrum of 43 Seyfert 1s found $\overline{\Gamma} = 1.89 \pm 0.03$ (Dadina 2008). On the other hand, Cappi et al. (2006) find a relatively shallower power-law $\overline{\Gamma} = 1.56 \pm 0.04$ for a sample of 9 Seyfert 1s observed by *XMM* in the 0.5 to 10 keV band; however, they attribute the relatively flat spectrum to the presence of an unmodeled absorption feature at low energies in 4 of the sources. The energy bands of the instruments in the *BeppoSAX* and *XMM* studies differ from the *RXTE* band, which may contribute to the differences in $\overline{\Gamma}$ that we find. It is noteworthy that our *RXTE* results are not far from the "canonical" photon indices of $\Gamma = 1.7$ to 1.9 that have been seen since the earliest X-ray observations of AGN (Section 1.3).

Breaking the sample into RL and RQ Seyfert 1s, we find that the RL sources show a flatter spectrum than the RQ sources, with $\overline{\Gamma}_{\rm RL} = 1.77 \pm 0.01$ and $\overline{\Gamma}_{\rm RQ} = 1.88 \pm 0.01$. The difference in their distributions is confirmed by our t-test results, with a t-value of 7.48 and 172 dof (Table 4.3) and is shown in Figure 4.2b. The difference in Γ between RL and RQ sources does not necessarily contradict unification, since the strong jet in the RL sources may contribute to the observed X-ray spectrum. The jet emission would tend to flatten the observed spectrum.

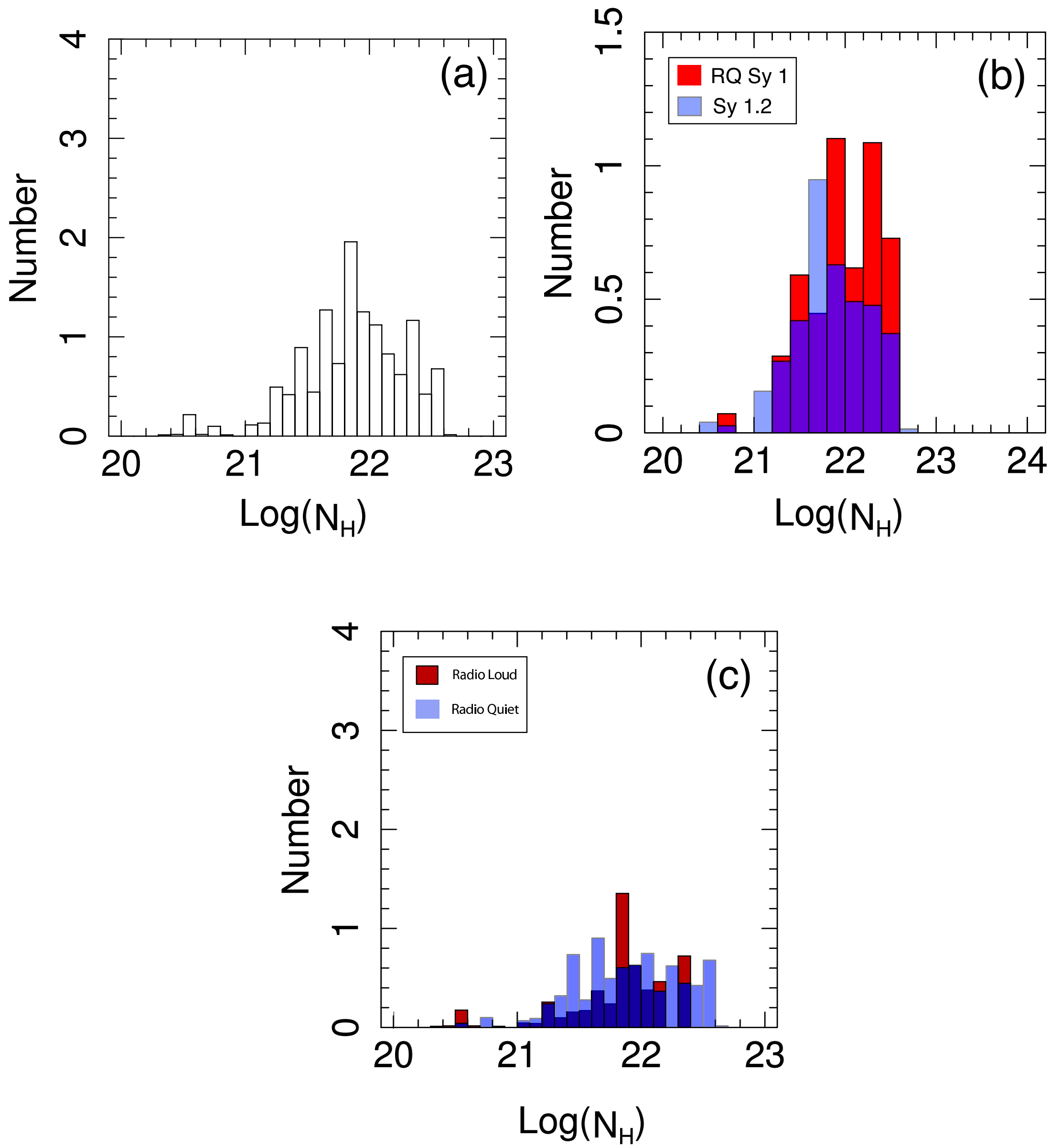

Figure 4.1: Weighted histograms for the Seyfert 1 sample N_H: (a) histogram for the full Seyfert 1 sample. (b) histogram for the radio-quiet Seyfert 1s (red) and Seyfert 1.2s (blue), (c) histogram for the radio-quiet Seyfert 1s (blue) and radio-loud Seyfert 1s (red). Places where the distributions in red and blue overlap are shown in purple. The histograms are weighted in such a way that each galaxy is given a total value of 1 on the "number" axis (y-axis), so each individual spectrum for a source is given a value of $y = \frac{1}{N}$, where N is the total number of spectra for that galaxy.

In addition, for each Seyfert 1 sub-class, Γ appears to increase across the sample, from $\overline{\Gamma}_{\rm quasar} = 1.69 \pm 0.01$, $\overline{\Gamma}_{\rm RLSy1} = 1.77 \pm 0.01$, $\overline{\Gamma}_{\rm RQ\,Sy1} = 1.88 \pm 0.01$, and $\overline{\Gamma}_{\rm Sy1.2} = 1.98 \pm 0.02$, which is also confirmed by our t-tests (Table 4.3). This change in Γ between the RQ Seyfert 1 and Seyfert 1.2 sub-classes contradicts unification, since the distribution of the photon index is expected to remain approximately consistent for all Seyfert types for Compton-thin AGN. Therefore, something else must be the source of the steepening of the spectra, since inclination effects should not cause differences in photon index.

Table 4.3: Seyfert 1 Γ statistics and the results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 4.2.

Type	Mean	σ_M [a]	QSO		RL Sy 1		RQ Sy 1		Sy 1.2	
			t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]
Sy1 Sample	1.86	0.01	7.72 (516)	Y	4.53 (531)	Y	0.60 (513)	N	6.54 (617)	Y
QSO	1.69	0.01			8.13 (175)	Y	11.58 (157)	Y	11.29 (261)	Y
RL Sy1	1.77	0.01					7.48 (172)	Y	8.99 (276)	Y
RQ Sy1	1.88	0.01							3.86 (258)	Y
Sy1.2s	1.98	0.02								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the null hypothesis, H_0, that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

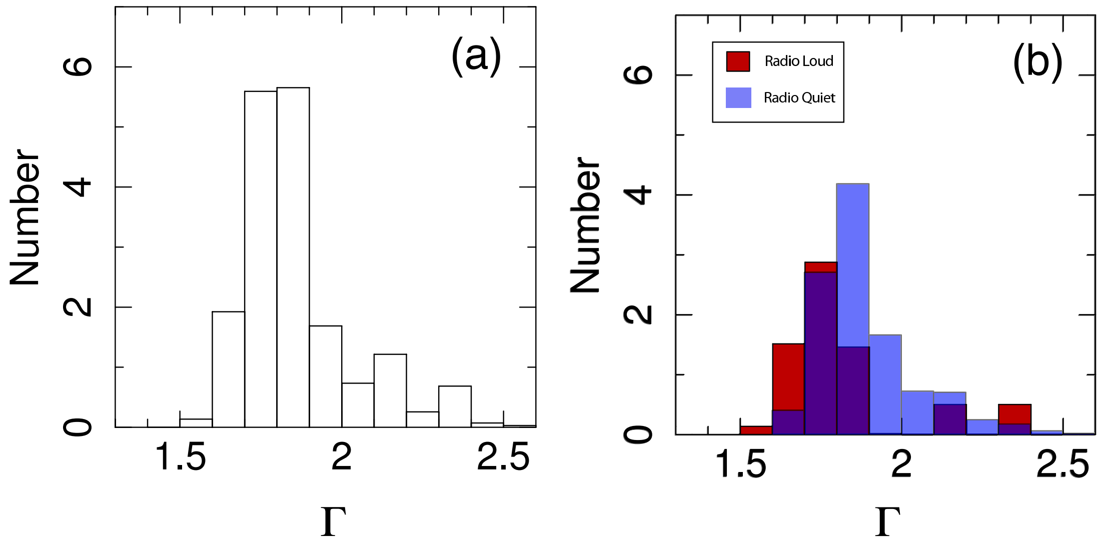

Figure 4.2: Weighted histograms of photon index for the Seyfert 1 sample. (a) histogram for the full Seyfert 1 sample. (b) histogram for the radio-loud sources in the Seyfert 1 sample Seyfert 1s (red) and the radio-quiet sources (blue), with any overlaps in the radio-loud and radio-quiet distributions shown in purple. The histograms are weighted as described in Figure 4.1

4.1.3 Reflection

The measured reflection fractions span the allowed range of 0 to 5 with a mean value $\overline{R} = 0.45 \pm 0.03$. However, if we exclude the 9 spectra in which R is more than 3σ over the sample mean, we find that R ranges from 0 to 2.38 with $\overline{R} = 0.39 \pm 0.02$. Figure 4.3a shows a histogram of R for the Seyfert 1 sample. Our value is considerably lower than that found by Dadina (2008) of $\overline{R} = 1.23 \pm 0.11$ for an average spectrum of 43 Seyfert 1s by *BeppoSAX*. While the *BeppoSAX* bandwidth extends to energies which should be high enough to measure the reflection fraction, its background and sensitivity at high energies may contribute to the differences compared to our $\overline{R}$. However, our results are also far lower than would be expected from a simple disk model. Figure 4.3a also shows the projected distribution of R for a simple disk model in gray, based on 39 galaxies with uniformly distributed inclination angles from $i = 0°$ to $90°$. The dark gray histogram bins indicate those that would be associated with inclinations less than $\sim 45°$, or roughly those that unification would predict are associated with our Seyfert 1 sample. The simple disk model predicts that the face-on disks ($i = 0°$) would show R of about 1, and R would decrease with increasing inclination angle. The measured distribution of R for our sample clearly does not follow the prediction of a simple disk model.

The RQ Seyfert 1s possess more Compton reflection than the RL Seyfert 1s (Figure 4.3b), as is confirmed by our t-test results, which give a t-value of 7.70 and 172 dof (Table 4.4). This is consistent with Eracleous et al. (2000), who found weaker reflection features in a sample of four RL AGN compared to typical Seyfert galaxies. As with the Γ distributions (Section 4.1.2), the difference between the RL and RQ R distributions may be explained in the context of unification by the presence of X-ray emission from the relativistic jet. The observed spectrum may be diluted by emission from the jet, thereby reducing the R.

We also see a trend of increasing R with Seyfert type with $\overline{R}_{\rm quasar} = 0.03 \pm 0.01$, $\overline{R}_{\rm RL\,Sy1} = 0.14 \pm 0.01$, $\overline{R}_{\rm RQ\,Sy1} = 0.39 \pm 0.03$, and $\overline{R}_{\rm Sy1.2} = 0.82 \pm 0.06$. However, the difference between the RQ Seyfert 1s and Seyfert 1.2s is opposite of what we expect from unification theory. As shown in the predicted distribution for a simple disk model in Figure 4.3a, the amount of observed reflection is maximized for a face-on disk, with a decreasing reflection for increasing inclination angle. If we consider the torus as well, the magnitude of the reflected spectrum from the absorbing torus is predicted to decrease with increasing inclination angle (Krolik et al. 1994) as well, so unless the absorbing material is diminishing the observed continuum or the X-ray continuum is not isotropically emitted, the observed reflection component from the torus should decrease with increasing inclination angle. In light of these predictions, our results are not easily explained in the context of unification.

Table 4.4: Seyfert 1 R statistics and the results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 4.2.

Type	Mean	σ_M [a]	QSO		RL Sy 1		RQ Sy 1		Sy 1.2	
			t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]
Sy1 Sample	0.45	0.03	5.73 (516)	Y	4.54 (531)	Y	0.74 (513)	N	5.86 (617)	Y
QSO	0.03	0.01			7.34 (175)	Y	11.40 (157)	Y	8.35 (261)	Y
RL Sy1	0.14	0.01					7.70 (172)	Y	7.75 (276)	Y
RQ Sy1	0.39	0.03							4.34 (258)	Y
Sy1.2s	0.82	0.06								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the null hypothesis, H_0, that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

4.1.4 Iron Line Equivalent Width

The measured iron line equivalent widths range from 0 to 482 eV, with a mean of $\overline{EW} = 130 \pm 2$ eV. We do not clearly observe an iron line in 3C 273, so if we exclude this source, then EW ranges from 23 to 339 eV with a mean of $\overline{EW} = 152 \pm 2$ eV. Figure 4.4a shows the distribution of EW for the Seyfert 1 sample. We find a systematically lower EW than Seyfert 1 measurements from *XMM*($\overline{EW} \simeq 215 \pm 80$ eV, Cappi et al. (2006)), *BeppoSAX*($EW = 222 \pm 33$ eV, Dadina (2008)), and *ASCA* ($\overline{EW} \simeq 215 \pm 80$ eV, Nandra et al. (1997)). Several of these studies included Seyfert 1.5s, which may skew the mean EW to higher values. If we include the Seyfert 1.5s (discussed in detail in Chapter 5), then we find $\overline{EW} = 164 \pm 2$ eV (still excluding 3C 273). However, these comparisons may not be meaningful, given that the mean values depend in part on the observed sample.

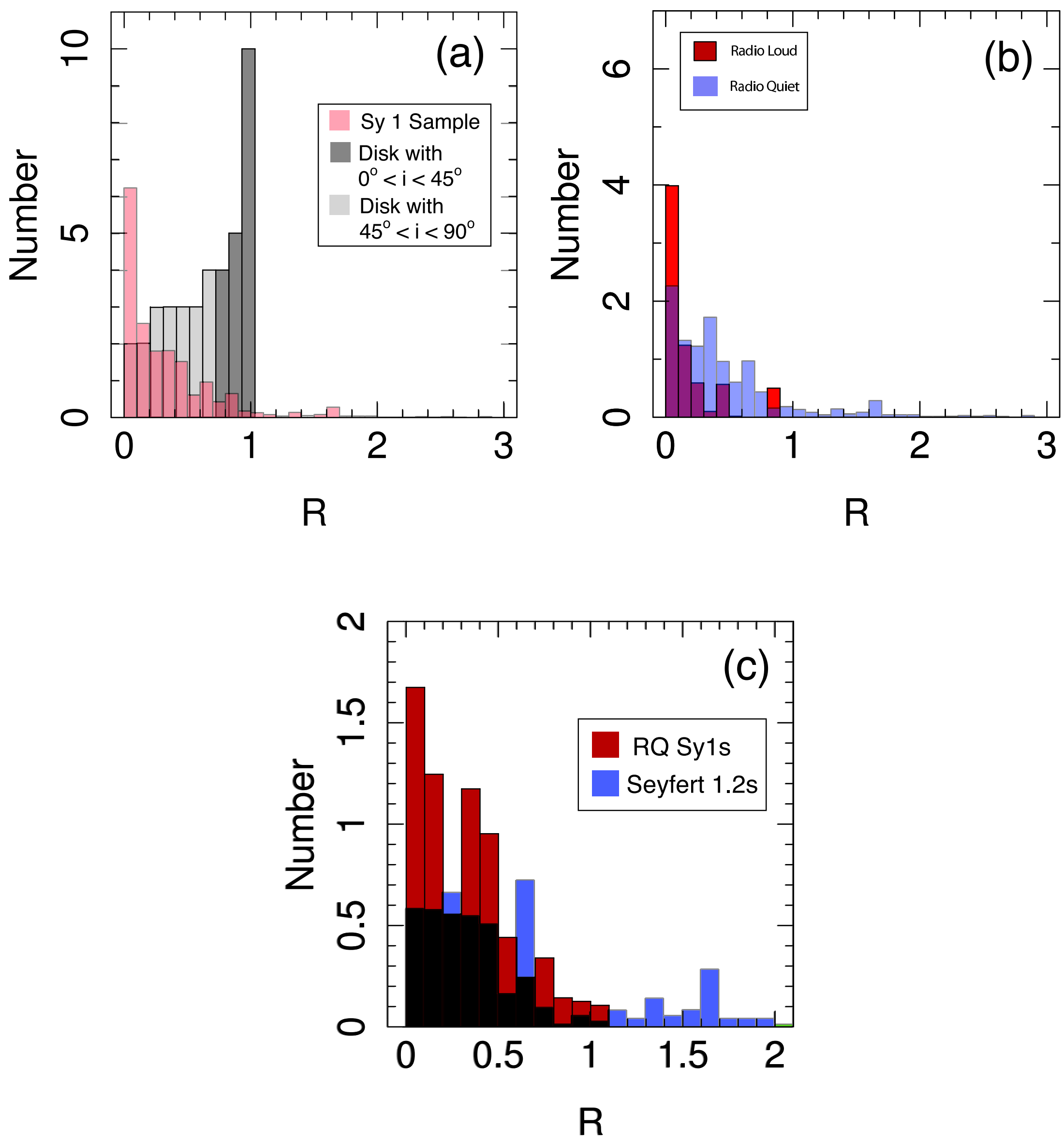

Figure 4.3: Weighted histograms of reflection for the Seyfert 1 sample. Histograms are for (a) the full Seyfert 1 sample, (b) the radio-loud sources in the Seyfert 1 sample (red) and the radio-quiet sources (blue), and (c) the radio-quiet Seyfert 1s (red) and Seyfert 1.2s (blue). Places where the distributions shown in red and blue overlap are shown in purple. In (a) the histogram for the full Seyfert 1 sample is shown in pink. The gray bins show the expected reflection fraction for a simple disk model based on 39 galaxies with uniformly distributed inclination angles from $i = 0°$ to $i = 90°$. The dark gray boxes show the bins corresponding to inclination angles less than $\sim 45°$. The histograms are weighted as described in Figure 4.1.

The RL Seyfert 1s show a smaller EW than the RQ Seyfert 1s with $\overline{EW}_{\rm RL} = 132 \pm 3$ eV and $\overline{EW}_{\rm RQ} = 186 \pm 6$ eV, as shown in Figure 4.4b and confirmed by a t-test, with a t-value of 7.97 and 172 dof (Table 4.5). These results may be understood in the context of unification if we, again, consider that the relativistic jet contributes to the observed X-ray spectrum. Since the relativistic jet does not contribute to the iron line, as discussed in Section 1.4.2, the presence of X-ray emission from the jet would dilute the observed iron line from the AGN.

Table 4.5: Seyfert 1 EW statistics and the results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 4.2.

Type	Mean (eV)	σ_M [a] (eV)	QSO t-value (dof)[b]	QSO Reject H_0?[c]	RL Sy 1 t-value (dof)[b]	RL Sy 1 Reject H_0?[c]	RQ Sy 1 t-value (dof)[b]	RQ Sy 1 Reject H_0?[c]	Sy 1.2 t-value (dof)[b]	Sy 1.2 Reject H_0?[c]
Sy1 Sample	130	2	13.48 (516)	Y	0.23 (531)	N	7.41 (513)	Y	3.39 (617)	Y
QSO	37	1			24.63 (175)	Y	22.37 (157)	Y	23.53 (261)	Y
RL Sy1	132	3					7.97 (172)	Y	3.25 (276)	Y
RQ Sy1	186	6							6.23 (258)	Y
Sy1.2s	147	3								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the null hypothesis, H_0, that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

In addition, we find that the RQ Seyfert 1s show a larger EW than the Seyfert 1.2s with $\overline{EW}_{\rm RQ\,Sy1} = 186 \pm 6$ eV and $\overline{EW}_{\rm Sy1.2} = 147 \pm 3$ eV. These distributions are shown in Figure 4.4c and the t-test confirms that they are statistically different, with a t-value of 6.23 and 258 dof (Table 4.5). The unification model predicts that EW will decrease for increasing inclination angle for iron line emission from the disk (e.g., George & Fabian (1991)). On the other hand, an iron line from the torus may produce a large EW when our line-of-sight passes through part of the obscuring torus, due to increased fluorescence. The fact that we see a decrease of EW from the RQ Seyfert 1s to the Seyfert 1.2s suggests that the observed iron line is dominated by the disk in these two samples, and any torus component is minimal. The difference between EW in the RQ Seyfert 1s and Seyfert 1.2s is also odd because the RQ Seyfert 1s show smaller R while at the same time showing larger EW. In the unification model, the reflection feature and iron lines should originate from the same material in the central region of the AGN. We would, therefore, expect that the R and EW would show similar trends. However, R primarily traces the Compton-thick regions (i.e. $N_H \geq 10^{24}$ cm^{-2}), so it is possible that we are seeing R only from the disk, but an iron line from both the disk and the torus.

4.1.5 Summary of Basic Properties

We find a mix of results, some of which are easily explained by standard unification and some that are not. When we compare the RQ Seyfert 1s to the RL Seyfert 1s, we find that the differences in their spectral properties can be explained in the context of unification by assuming that the relativistic jet affects the overall observed X-ray spectrum. In strict unification, RL sources are RQ sources with relativistic jets, and the radio properties should not necessarily have an effect on the X-ray properties, because they arise from different locations and mechanisms. The jet may "clear out" the immediate environment of the central engine through hydrodynamic forces, or shock waves. If the jet were to clear out its immediate environment, this would account for the lower N_H, R, and EW that we see in the RL sources. It may, instead, be the case that the jet emission is diluting the spectrum from the central engine, effectively hiding the absorbing and reflecting signatures while producing a flatter spectrum. In either case, we are seeing a connection between the radio and X-ray properties of these sources.

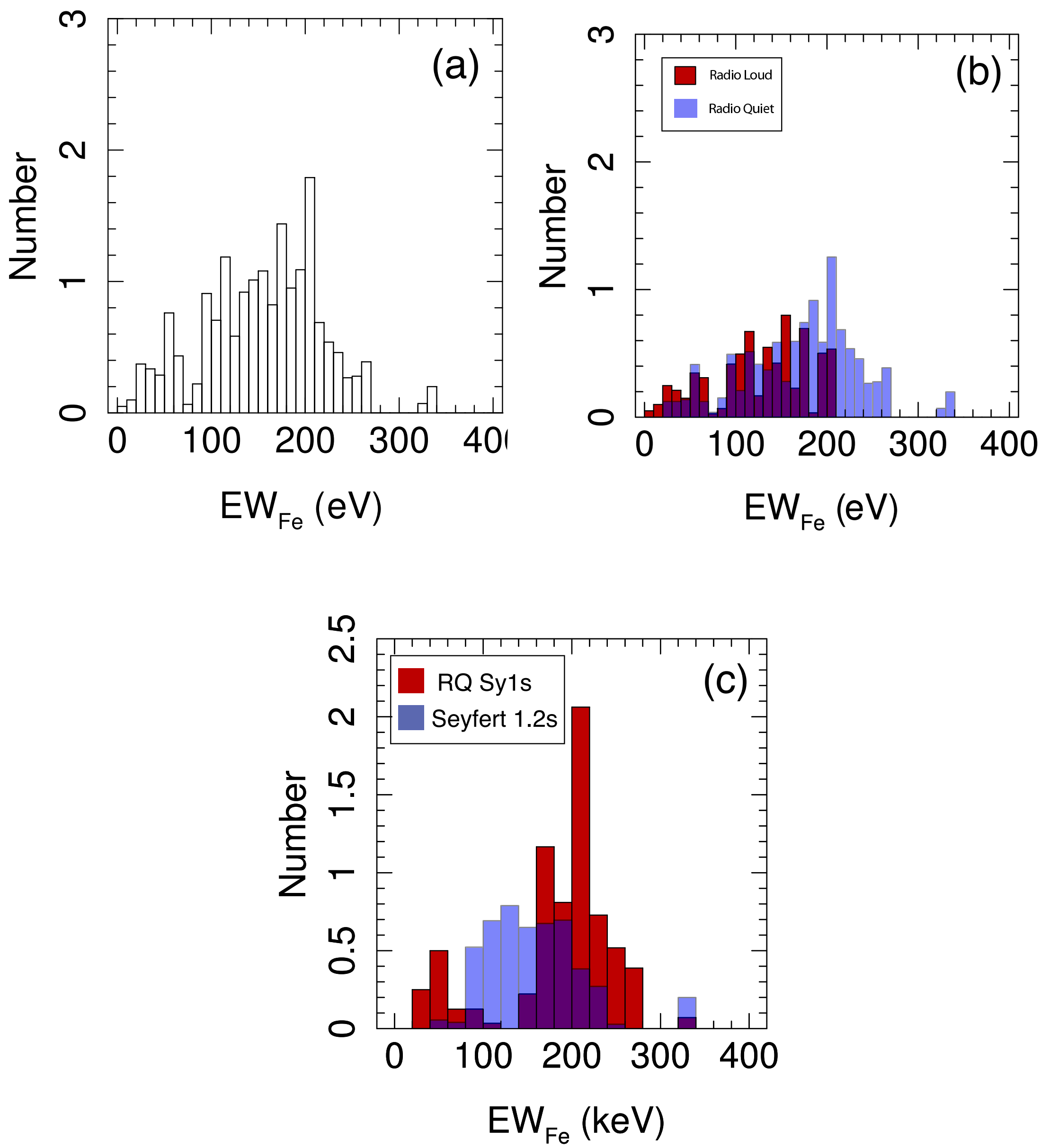

Figure 4.4: Weighted histograms for Fe K equivalent width of the Seyfert 1 sample. Histograms are for (a) the full Seyfert 1 sample, (b) the radio-loud sources in the Seyfert 1 sample (red) and the radio-quiet sources (blue), and (c) the radio-quiet Seyfert 1s (red) and Seyfert 1.2s (blue). Places where the distributions shown in red and blue overlap are shown in purple. The histograms are weighted as described in Figure 4.1.

If we consider only the radio-quiet sources, we should eliminate any dilution of the observed spectrum by the strong jet. If unification were strictly correct, then, we would expect that the distribution of power-law indices would be consistent between all Seyfert types, as discussed in Section 1.4.2. In addition, the absorbing column density should increase with Seyfert type. However, for RQ Seyfert 1s and the Seyfert 1.2s we find different distributions of Γ, while N_H shows a similar distribution. In addition, we expect R to be smaller in the Seyfert 1.2s compared to the RQ Seyfert 1s, but we find the opposite trend. It is also noteworthy that the Seyfert 1.2s show higher R than the RQ Seyfert 1s, but a lower EW. According to unification, we expect that R and the iron line should arise from the same regions of the AGN. However, R traces the Compton thick regions of the AGN (where Compton-thick is characterized by $N_H > 10^{24}$ cm^{-2}). Since none of the sources show a Compton thick absorber, it may be the case that the reflection comes primarily from the accretion disk, while the iron line is produced in both the accretion disk and the obscuring torus.

4.2 Spectral Correlations

After exploring the bulk spectral properties of the Seyfert 1 sample, we also examined spectral correlations by plotting all combinations of the parameters, along with the 2 to 10 keV luminosity (L_x) and the iron line equivalent width (EW). The EW-Γ and Γ-R plots show interesting relationships, so we discuss these in further detail (Sections 4.2.1 and 4.2.2). In addition, we look to see if our data show the previously reported "X-ray Baldwin effect", an anti-correlation between the X-ray luminosity and iron line equivalent width (Section 4.2.3). Individual plots for the complete Seyfert 1 sample are presented in Appendix C.3.1.

We also performed a Monte Carlo simulation to determine if our results are an artifact of modeling degeneracies. Each spectrum in the Monte Carlo sample was simulated with N_H=10^{22} cm^{-2}, Γ=2.0, R=1.0, E_{Fe}=6.4 keV, and σ_{Fe}=0.23 keV. The flux and exposure times were randomly varied for each spectrum. The flux was varied by randomly choosing the power-law normalization, A, from a uniform distribution between 0.004 and 0.06 photons keV^{-1} cm^{-2} s^{-1}. The exposure time was randomly generated from a uniform distribution between 300 and 11000s. The ranges for A and exposure time mimic those of the spectra in the full *RXTE* Seyfert 1 sample. Given these values of A, EW can range from $\sim$ 110 eV to $\sim$ 320 eV. We generated 200 low-absorption Monte Carlo spectra: 100 simulated using an *RXTE* Epoch 3 response, 50 using an Epoch 4 response, and 50 using an Epoch 5 response, roughly corresponding to our *RXTE* sample. Each spectrum was then fitted to the same model as our real data. To avoid confusion with the Monte Carlo sample we generated for the Seyfert 2 sample (Section 5.2), we will refer to this sample as the low-absorption Monte Carlo sample.

We also generated two smaller Monte Carlo samples with the same model spectra as described in the previous paragraph, but with Γ=1.0 for one sample and Γ=3.0 for the other. Each of these smaller samples consisted of 50 spectra, 25 simulated using an *RXTE* Epoch 3 response, 13 using an Epoch 4 response, and 12 using an Epoch 5 response. These were fitted to the same model as the full sample and the low-absorption Monte Carlo sample. The results of these smaller samples do not introduce any new correlations that are not present in the low-absorption Monte Carlo sample, so we will only address the low-absorption Monte Carlo results in this section.

4.2.1 EW-Γ Relationship

The EW-Γ plot in Figure 4.5a shows a complex relationship with a "hump" peaking near $\Gamma \sim 2.0$, such that there is a correlation for $\Gamma \lesssim 2.0$ and an anti-correlation for $\Gamma \gtrsim 2.0$. The relationship shows a peak near $\Gamma \sim 2.0$ and $EW \sim 250$ eV. If this relationship is caused by a degeneracy in the spectral fitting process, then the low-absorption Monte Carlo data would show the same relationship. However, from the low-absorption Monte Carlo EW-Γ plot in Figure 4.5b, it is clear that EW-Γ do not suffer modeling degeneracies. Based on the lack of correlation in our low-absorption Monte Carlo results, we are confident that the shape of the EW-Γ plot for the Seyfert 1 sample is real, and we are measuring something physically meaningful.

George & Fabian (1991) have predicted the equivalent width of the iron line from an illuminated slab of cold gas using Monte Carlo techniques to follow scattering, absorption, and fluorescence processes within the gas. They find that the iron line EW should gradually decrease as the spectrum softens. This is easy to understand, since as the spectrum softens (Γ increases), there are fewer photons with energies above the iron photoionization threshold. For example, if we look at a power-law distribution of photons with a power-law index, Γ, then the photoionization rate of photons above the iron K edge (assuming the photoionization cross-section goes as E^{-3}; Section 1.3.2) is $N_{Tot} \propto \int_{7.1}^{500} E^{-\Gamma}\, E^{-3} dE = (-1/\Gamma+2)E^{-(\Gamma+2)}|_{7.1}^{500}$. Comparing the photoionization rate for incident spectra with $\Gamma_1 = 1.5$ and $\Gamma_2 = 2.0$, we find:

$$\frac{N_{Tot,\Gamma=1.5}}{N_{Tot,\Gamma=2.0}} = \left(\frac{-A/3.7}{-A/4}\right) \frac{E^{-3.7}|_{7.1}^{500}}{E^{-4.0}|_{7.1}^{500}} \approx 2 \tag{4.1}$$

This quick calculation shows that the harder power-law ($\Gamma_1 = 1.5$) has about 2-times more photons than the softer one ($\Gamma_1 = 2.0$) for energies above the photoionization threshold $E = 7.1$ keV.

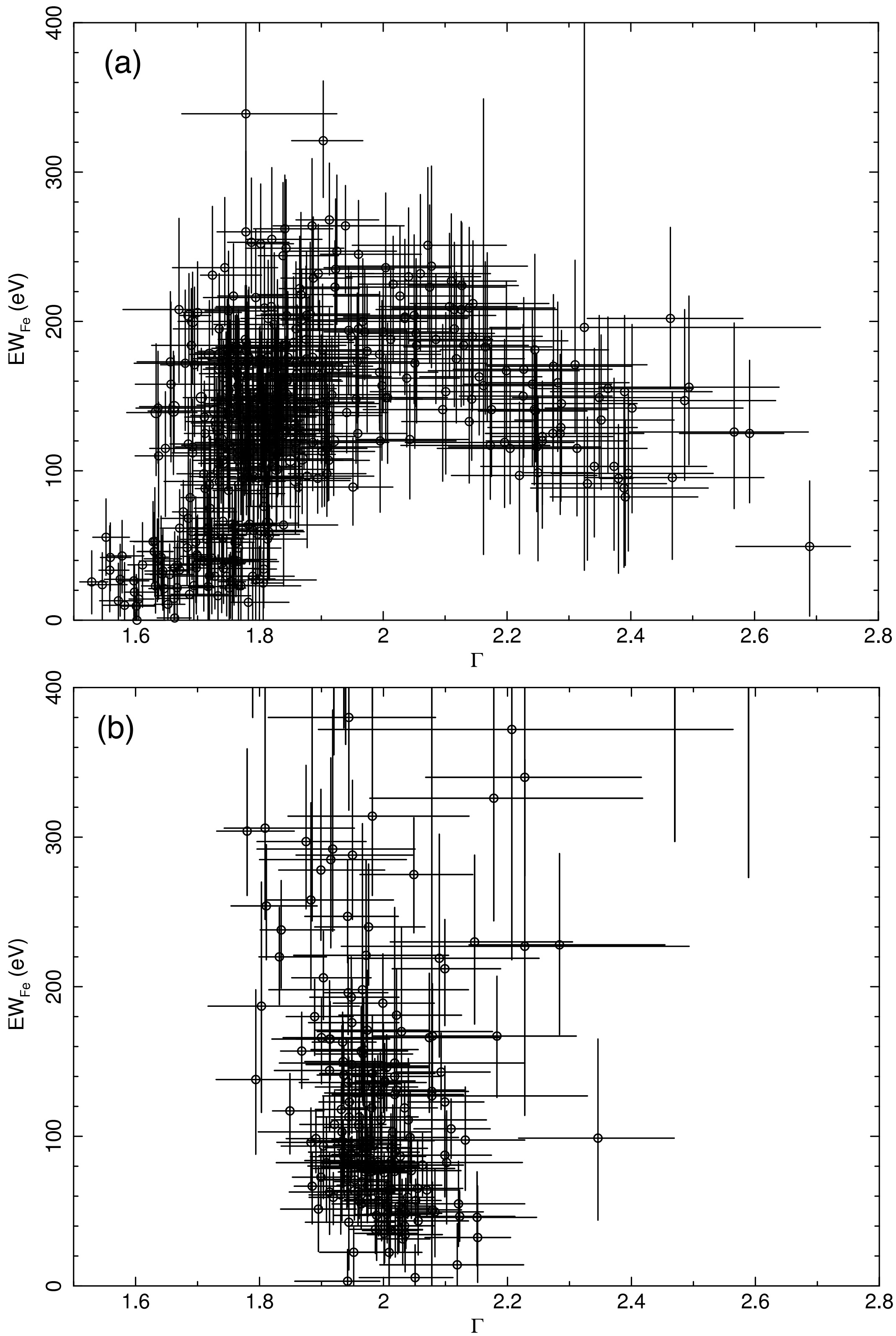

Figure 4.5: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for (a) each spectrum in the Seyfert 1 sample, and (b) the low-absorption Monte Carlo sample. Panel (a) shows one point for each spectrum in the sample.

Our results show that the observed relationship between EW and Γ is not quite as simple as that predicted by George & Fabian (1991). We do find an anticorrelation, but only for photon indices $\gtrsim 2.0$. For photon indices that are less than 2, we see a positive correlation. Such a correlation has been reported previously for Seyfert 1 galaxies by Perola et al. (2002) and Lubiński & Zdziarski (2001), but these galaxies primarily fell in the $\Gamma \lesssim 2$ region. Page et al. (2004) suggest a slight correlation for a sample of radio loud and radio quiet Type 1 AGN.

We reproduced the EW-Γ plot to separately show the contribution from each Seyfert type, as shown in Figure 4.6. A close examination of this plot shows a progression of galaxy type across the plot. The plot is anchored at the low-Γ/low-EW end by the quasar 3C 273. The rising arm of the plot, $\Gamma \sim 1.5$ to 2.0 and $EW \sim 0$ to 300 eV, is primarily formed by radio loud Seyfert 1 galaxies. The radio-quiet Seyfert 1 galaxies cluster near the $\Gamma \sim 2.0$, $EW \sim 300$ eV peak of the hump, and the radio-quiet Seyfert 1.2 galaxies form the falling arm of the plot for $\Gamma > 2.0$.

Physically, the most obvious difference between these sources is the presence or absence of a strong jet. We propose that the EW-Γ relationship is driven by the degree of jet-dominance of the source. The iron line features are associated with the X-ray emission from the disk, the obscuring torus and other structures in the central AGN region, such as the broad line region. The disk emission will excite an observable iron line no matter its inclination relative to our line-of-sight, though the observed line will decrease with increasing inclination. On the other hand, the jet is beamed away from the obvious configurations of cold matter in the system and, more importantly, can be beamed toward us, particularly in the quasar. The addition of a jet-related continuum to the emission from the disk plus intrinsic X-ray spectrum would act to reduce the equivalent width of iron line emission of the total observed (jet plus disk) spectrum. Interestingly, this scenario also explains

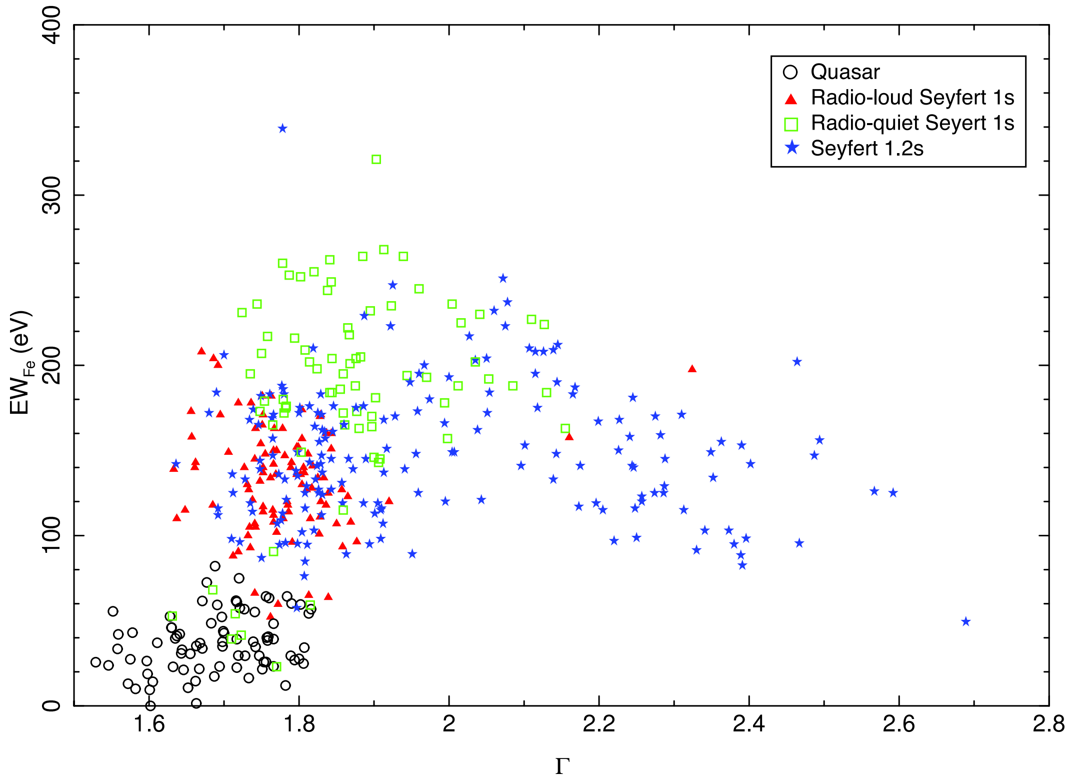

Figure 4.6: The iron line equivalent width versus the power-law photon index, with no error bars and each Seyfert 1 sub-classification plotted with a different symbol-color combination, as listed in the figure legend.

the differences in Γ, N_H, R, and EW between the RQ and RL Seyfert 1s that we found in Section 4.1.3. Because the jet-related continuum does not show reflection, the R component from a disk and/or absorbing matter would be diminished by the presence of a jet-relation continuum.

To see the spectrum harden (Γ decreasing) as the jet-dominance increases, the jets in these sources must produce a relatively flat spectrum of hard X-rays, which implies that the radio-loud Seyferts in our sample can be associated with low-peaked BL Lac objects (LBLs). BL Lac objects are highly luminous AGN that are assumed to be viewed down the jet axis. The spectral energy density plot of BL Lac objects shows two broad peaks (Giommi & Padovani 1994), with the lower-energy peak due to synchrotron emission and the higher-energy peak due to inverse Compton emission (Figure 4.7). BL Lacs are divided into two classes, depending on the spectral energy where the peaks occur: high-peaked BL Lacs (HBLs) and LBLs. The X-ray continuum in the HBLs is rather soft, since we are seeing the synchrotron spectrum cutting off in these sources. LBLs, on the other hand, tend to have a harder X-ray continuum, since we are observing well into the inverse Compton part of the spectrum (Donato et al. 2005). This flat, hard, continuum may be the X-ray spectrum that is diluting the observed AGN spectrum of the radio-loud Seyfert 1s in our sample.

Finally, since the number of spectra varies from source to source in our sample, we separate out the contributions of each galaxy to determine if the complex EW-Γ relationship is still present. Figure 4.8a shows the EW-Γ plot for all spectra with different symbol/color combinations for each galaxy, and Figure 4.8b shows the EW-Γ with one point per galaxy. From these plots, it appears that the anti-correlation portion of the plot, for $\Gamma > 2.0$, is formed entirely by two sources, MCG −6-30-15 and PKS 0558-504. The other sources have mean photon indices less than 2.0, and form a correlation. The low end (small Γ-small EW) of the plot is still primarily radio-loud sources, so the spectra of the radio-loud sources may be diluted by the strong jet; however, the anti-correlation that we saw in the plots with all spectra is no longer as prominent in these plots.

4.2.2 Γ-R Relationship

We also find a strong correlation between Γ and R. Figure 4.9a shows the Γ-R plot for all spectra in the Seyfert 1 sample and Figure 4.9b shows the same plot but with just one point for the mean Γ and R for each galaxy. Turning to the low-absorption Monte Carlo plots, however, we see a similarly strong correlation (Figure 4.10). The strong correlation seen in the low-absorption Monte Carlo results

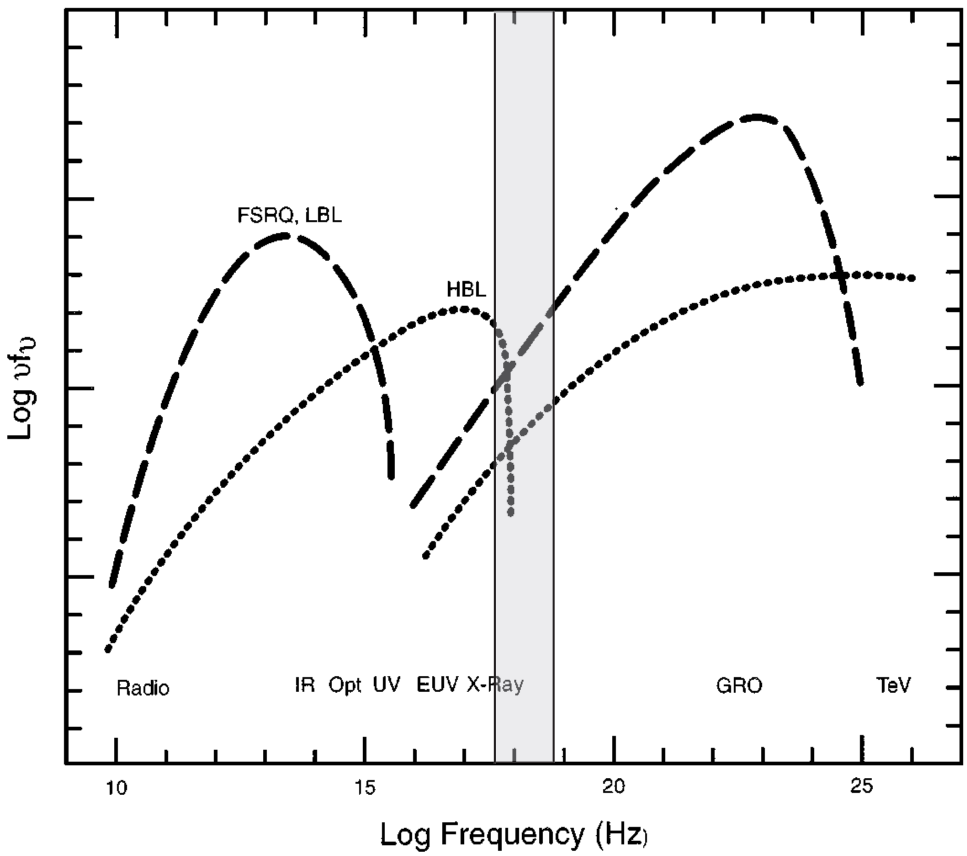

Figure 4.7: Characteristic spectral energy density plot (SED) for BL Lac objects, showing a double peak. The lower energy peak is due to synchrotron emission while the higher-energy peak is due to inverse-Compton emission. For low-peaked BL Lac objects (LBLs), the lower energy peak occurs in the IR-optical band while the higher energy peak occurs at GeV energies. For high-peaked BL Lac objects (HBLs), the lower energy peak occurs in the UV to X-ray band while the higher energy peak occurs at TeV energies. The gray region shows the 3 to 25 keV energy range. (Original figure from Ulrich et al. (1997).)

strongly suggests that the observed Γ-R correlation among our sample is a result of modeling degeneracies. The low-absorption Monte Carlo correlation shows a much steeper relationship than the Seyfert 1 sample data, with $R_{\rm Monte\,Carlo} = -1.8 + 1.1\,\Gamma$ ($\chi^2 = 1074/436 = 2.46$) and $R_{\rm Sy1} = -6.7 + 3.9\,\Gamma$ ($\chi^2 = 50.65/396 = 0.128$), due to the large number of Seyfert 1 sample spectra having $R \sim 0$.

A correlation between Γ and R has been well-established for galactic black hole sources (e.g., Gilfanov et al. (1999); Zdziarski et al. (1999)) and is explained phys-

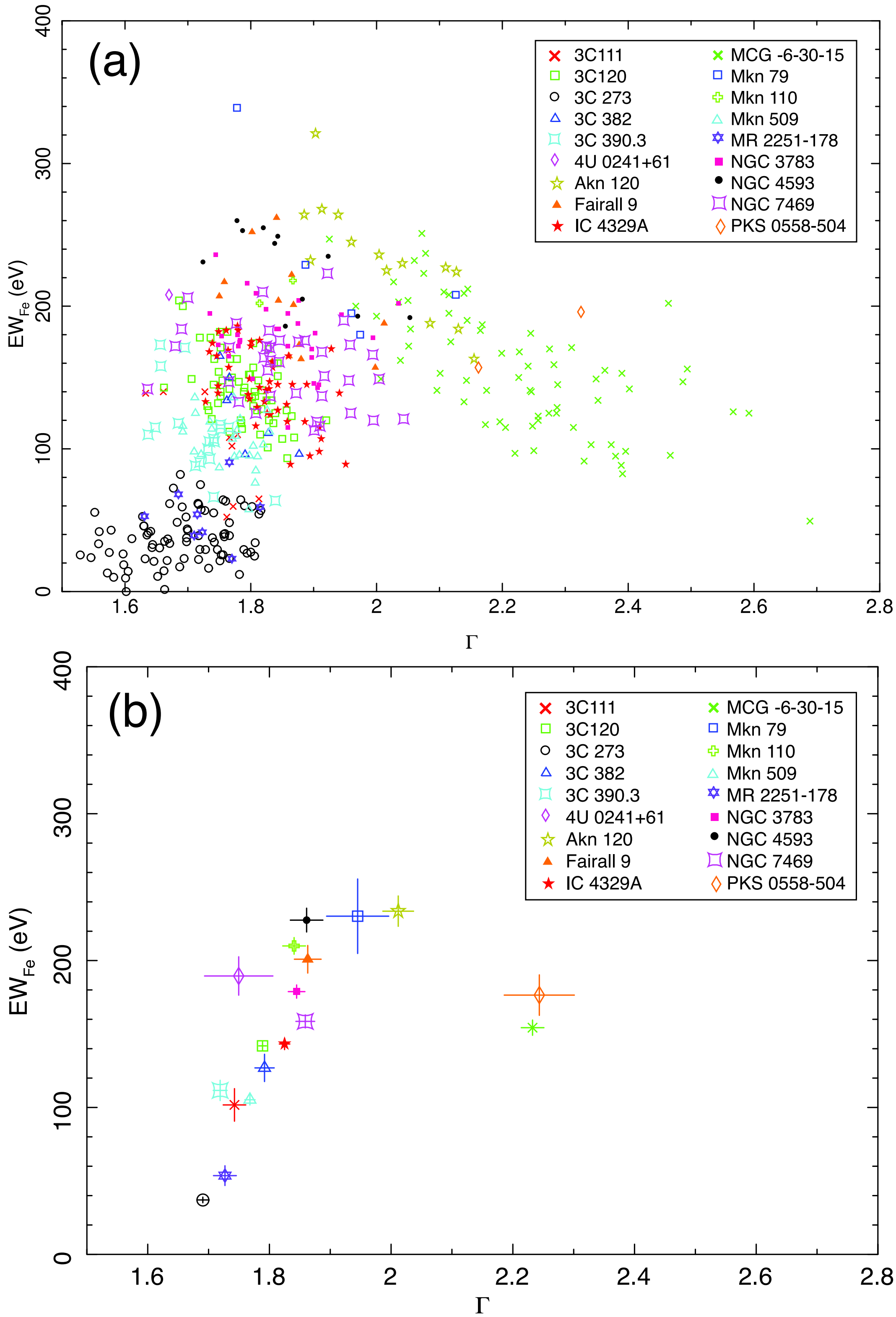

Figure 4.8: The iron line equivalent width versus the power-law photon index, with no error bars and each galaxy plotted with a different symbol-color combination, as listed in the figure legend. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

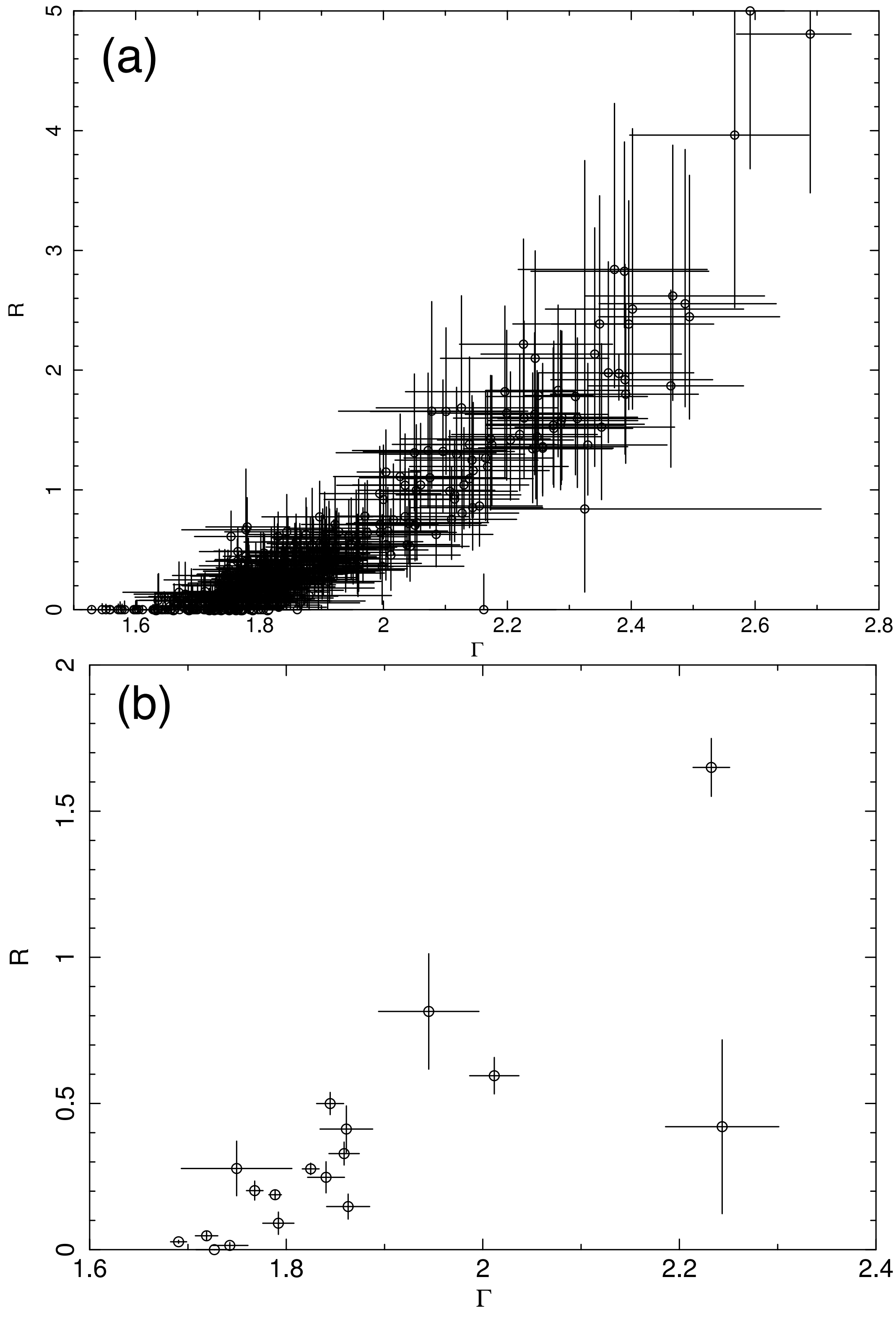

Figure 4.9: Reflection fraction (R) versus power-law photon index (Γ) for Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

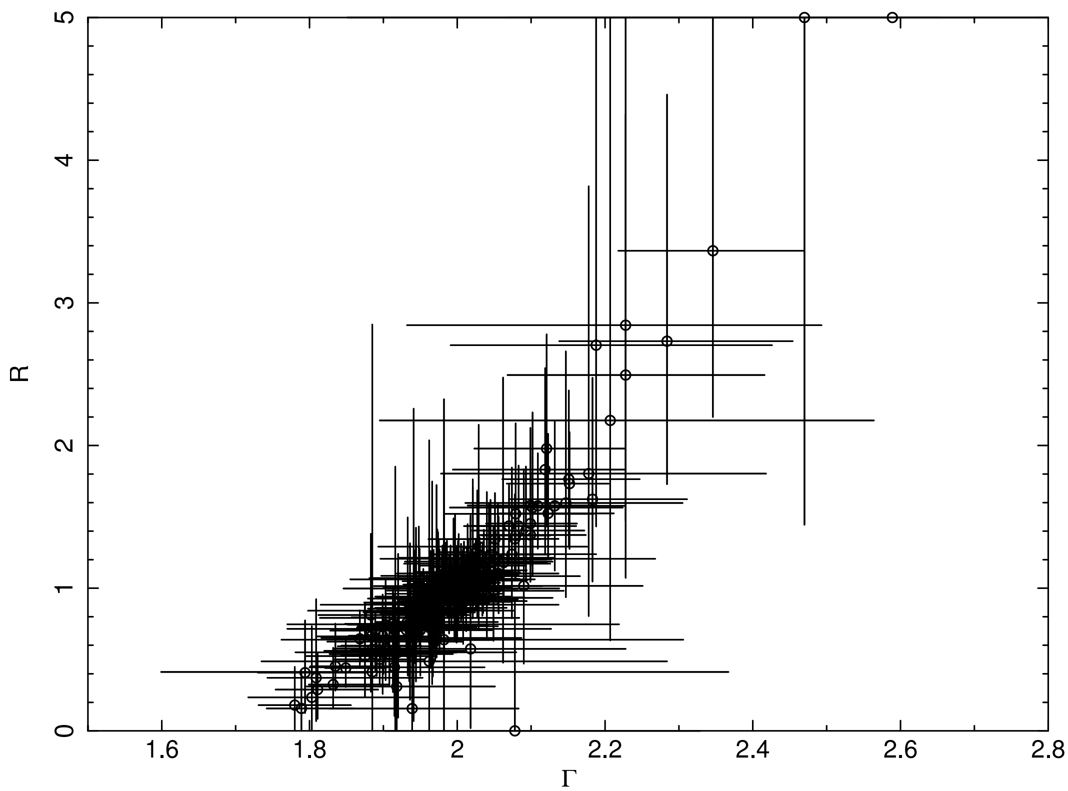

Figure 4.10: Reflection fraction (R) versus power-law photon index (Γ) for the low-absorption Monte Carlo sample.

ically as a feedback between the soft photons of the accretion disk and the X-ray emitting source. Essentially, the cold reflecting material, such as the accretion disk, emits soft photons (e.g., optical and UV) which irradiate the X-ray source and are inverse Compton scattered. The larger the region of reflection, the higher the flux of soft photons impinging on the X-ray source. However, the inverse Compton scattering of those soft photons tends to cool the plasma, and a high-enough soft photon flux would further soften the emitted X-ray spectrum. Since galactic black holes are similar to the central AGN engine, i.e., powered by accretion, it is natural to assume that similar processes are at work in both types of objects.

In Seyferts, however, there is some uncertainty as to whether the Γ-R correlation is real. The 3 to 25 keV bandpass that we use is a particularly confusing region with the confluence of absorption, reflection and the emitted unreprocessed continuum.

Degeneracies between the spectral parameters characterizing these feature can arise, with Γ, R, and N_H all trading off with each other in the spectral modeling procedure. Such degeneracies can easily lead to false conclusions about spectral correlations. Of particular importance is that the low-absorption Monte Carlo results mimic the R-Γ relationship we see for the Seyfert 1 sample. We conclude that the observed R-Γ correlation in our sample cannot be trusted to imply a physical correlation.

4.2.3 EW-L_x Relationship

An anti-correlation between the iron line equivalent width and the X-ray luminosity has been reported in the literature, the so-called "X-ray Baldwin effect" (Iwasawa & Taniguchi 1993). Figure 4.11 shows the EW-L_x plot for our Seyfert 1 sample. We fitted the data for each galaxy, each type, and the whole sample to a linear model ($EW \propto \alpha \times L_x$) and a power-law model ($EW \propto L_x^{\alpha}$). The data are well-fitted for either model, but we report the power-law results for consistency with other publications. For the sample as a whole, we do see the presence of an X-ray Baldwin effect, with $EW \propto L_x^{-0.18\pm0.01}$. Iwasawa & Taniguchi (1993) and Jiang et al. (2006) find $EW \propto L_x^{-0.20}$ and Page et al. (2004) find $EW \propto L_x^{-0.17}$. However, when Jiang et al. (2006) exclude the radio-loud galaxies from their sample, they find $EW \propto L_x^{-0.10}$. We also see anticorrelations for each galaxy type (Table 4.1). The anticorrelations range from $EW \propto L_x^{-0.06}$ for the quasar to $EW \propto L_x^{-0.25}$ for the radio-loud Seyfert 1s. The relationship breaks down when we examine each source individually, such that some sources show the anticorrelation and some do not. In some cases, the lack of an anticorrelation may be due to the small number of individual spectra (e.g., PKS 0558-504 and Mkn 110). The notable exception is MCG −6-30-15, which has 70 spectra and shows a large correlation between EW and L_x with $EW \propto L_x^{+0.25}$.

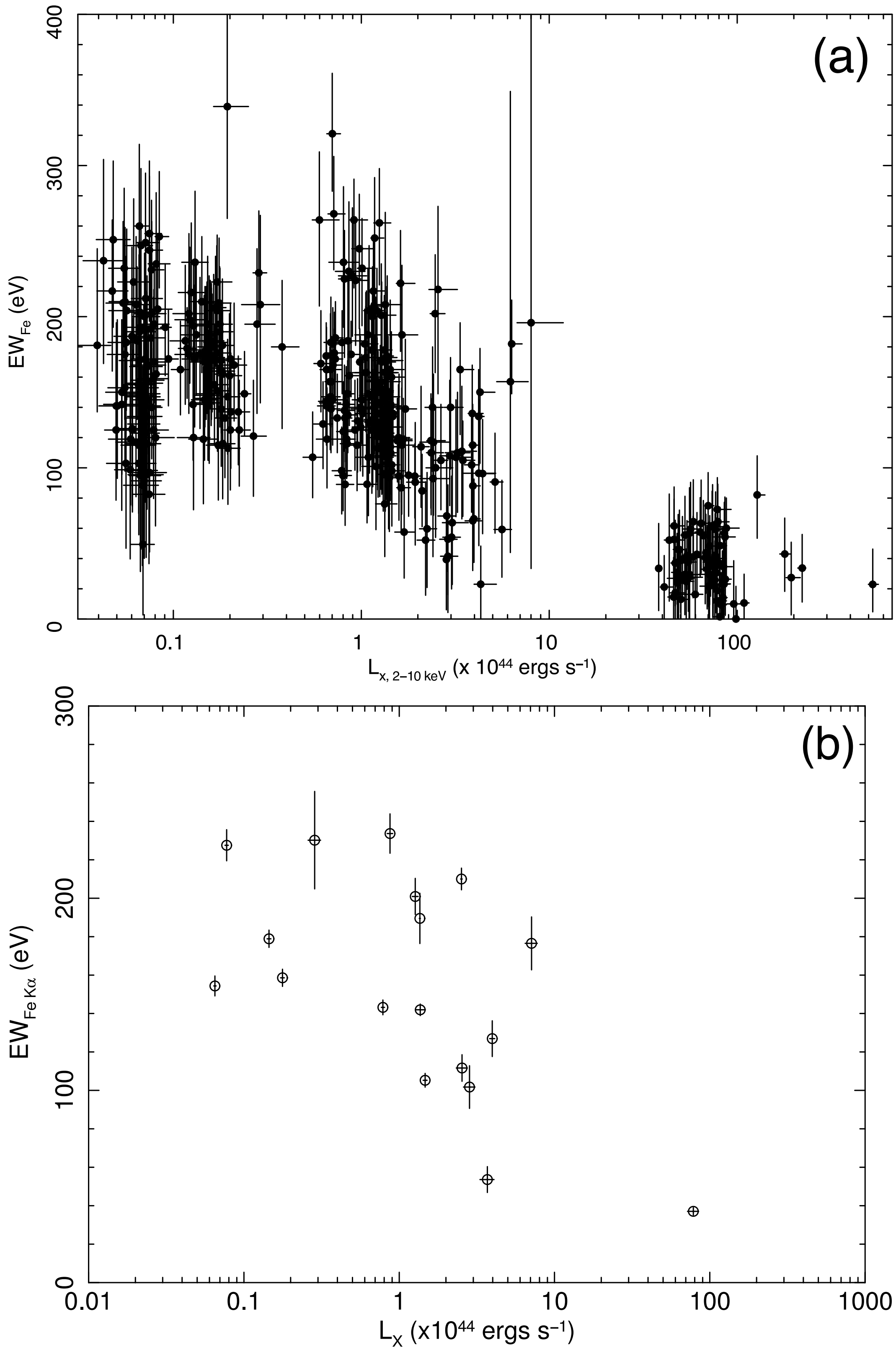

Figure 4.11: Iron line equivalent width (EW) versus the 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

The Baldwin effect may imply that high luminosity sources tend to "clean out" their immediate environments. Radiation pressure from a source emitting at less than the Eddington luminosity cannot clear out fully ionized gas; however, cold or not-fully-ionized gas can be cleared out of the central AGN region by radiation pressure. Perhaps a more likely scenario for a jet to clean out its environment is hydrodynamic forces (i.e. shock waves). Alternatively, it could be the case that an environment with less material in the immediate AGN vicinity could be more conducive to the formation of a relativistic jet. Because we see the X-ray Baldwin effect in all Seyfert 1 sub-classes, this may be an intrinsic property that is set up by the luminosity. However, the fact that we see the X-ray Baldwin effect in individual galaxies indicates that the EW changes with L_x on short timescales. Clearing out the large-scale environment around the central AGN would take timescales longer than we can probe in this sample. Instead of being interpreted as a clearing out of the environment, the short timescale changes could be explained by the iron lines being formed in the outer regions of the accretion disk or in the absorbing torus. There would then be a delay between changes in the X-ray continuum and changes in the iron line.

When we consider the average spectral values for each galaxy (Figure 4.11b), the observed correlation shows a large amount of scatter. Fitting the mean values of each galaxy to a power-law model, we find the same correlation as when we fitted all spectra in the sample, with $EW \propto L_x^{-0.18}$; however, the goodness-of-fit indicates that this fit is not nearly as good, with a weighted variance/number of points = WV/num = 949.7/18 = 52.8. For the sample of all spectra, WV/num = 676.9/437 = 1.5. This difference may be due to the variability in the individual sources.

4.3 Conclusions

We find a relationship between radio and X-ray properties for Seyfert 1 type AGN. A complex EW-Γ relationship shows a correlation between these parameters for the radio-loud sources and an anti-correlation for the radio-quiet sources. This complex relationship may be explained by X-rays from the relativistic jet in radio-loud sources diluting the observed X-ray spectrum. X-rays from a jet could also explain the lower observed EW and R in the radio-loud sources in general. The flatter X-ray spectrum from the jet would contribute to the total spectrum and dilute the reprocessing features, specifically the EW and R.

The correlation that we see between Γ and R could be explained in the context of the unification model. A physical explanation would be a feedback between the soft photons in the accretion disk and the X-ray source, such that the larger the reflection region, the more the accretion disk photons undergo inverse Compton scattering in the X-ray emitting plasma, thus cooling the plasma. However, there is a degeneracy between Γ and R which is particularly strong in the *RXTE* bandpass, so we find that the relationship cannot be trusted as instructive of the physics of the AGN.

We confirm a general anticorrelation between EW and L_x, the X-ray Baldwin effect, when we consider all spectra in the sample. The result may imply that there is fundamentally less material in the central regions of some galaxies, because the Fe K EW is a tracer of the solid angle subtended by matter as observed by the X-ray source. The fact that we see a lower EW in higher luminosity sources suggested that the material has been cleaned out of the system or pushed out of the way. However, we also see this effect in individual sources over relatively short timescales which suggests that there may be a time-lag effect in these sources such that there is a delay between changes in the L_x and corresponding changes in the iron line. When we consider the average values for each galaxy, rather than all spectra in the Seyfert 2 sample, we still see the anti-correlation, but it shows a wide range of scatter, which may be due to the variability we observe in individual sources.

Chapter 5

Seyfert 2 Results: Complex Environments

In this chapter, we present the results for the remaining galaxies in our *RXTE* sample. These galaxies, which we will collectively call the "Seyfert 2 sample," include the Seyfert 1.5, 1.8, 1.9 and 2 galaxies. This sub-sample consists of 21 galaxies and 437 time-resolved spectra fitted as described in Chapter 3. The galaxies are listed in Table 5.1 by sub-class.

We first review the basic properties of the sample and place these in context with other studies. We also discuss how the Seyfert 1 and 2 samples compare, specifically in the context of the unification model in Section 5.1. We examine any correlations between spectral features that show identifiable relationships (Section 5.2), and finally, we explore the origins of these relationships as they can be interpreted (or not) according to the unification model (Section 5.3).

Table 5.1: Seyfert 2 sample listed by sub-classification and including the number of time-resolved spectra for each source and the 12 μm flux density for each source, as measured by *IRAS*.

Galaxy	Fitted Spectra Spectra	Mean $\sigma_{FeK\alpha}$[a] (keV)	*IRAS* 12 μm $f_{12\,\mu\mathrm{m}}$[b] (mJy)	*IRAS* 12 μm $L_{12\,\mu\mathrm{m}}$[c] ($10^9 L_\odot$)	*IRAS* 60 μm $f_{60\,\mu\mathrm{m}}$[b] (mJy)	*IRAS* 60 μm $L_{60\,\mu\mathrm{m}}$[c] ($10^9 L_\odot$)
Seyfert 1.5						
MCG −2-58-22	7	0.16	...	...	...	...
Mkn 279	4	0.12	252[e]	32.28	1080 (16%)	27.67
Mkn 766	4	0.55	408 (13%)	9.81	4060 (12%)	9.81
NGC 3227	29	0.25	667 (7%)	1.52	7980 (10%)	3.63
NGC 3516	51	0.23	453 (8%)	5.22	1740 (7%)	4.01
NGC 4051	7	0.38	769 (8%)	0.44	8280 (10%)	0.94
NGC 4151	65	0.28	1960	2.51	6640	1.70
NGC 5548	41	0.25	356 (10%)	14.64	1730 (11%)	8.56
Seyfert 1.9						
Akn 564[d]	4	0.48	250[e]	22.24	1000 (11%)	17.79
NGC 4258	11	0.24	2250 (15%)	0.40	21600 (15%)	2.23
NGC 5506	53	0.26	1300 (7%)	6.66	8810 (11%)	9.03
NGC 7314	4	0.22	271[e]	0.96	3390 (11%)	2.41
Seyfert 2						
ESO 103-G035	6	0.12	577 (9%)	13.88	2270 (9%)	10.92
IRAS 04575-7537	2	0.18	392 (116%)	18.08	696 (5%)	6.42
IRAS 18325-5926	9	0.88	592 (7%)	33.70	3210 (9%)	36.55
MCG −5-23-16	17	0.13	...	...	...	...
Mkn 348	5	0.17	309 (34%)	9.90	1440 (10%)	9.22
NGC 2110	10	0.18	370 (9%)	3.37	4460 (9%)	8.13
NGC 4388	5	0.09	1000 (8%)	9.11	10900 (11%)	1.99
Radio-Loud Seyfert 2						
Cen A	39	0.10	11100 (4%)	1.58	172000 (9%)	4.90
Cyg A	11	0.14	250[e]	111.59	2330 (7%)	208.00

[a]The average physical width of the Fe Kα line for all spectra from a source when fitted to the absorbed power-law model with Compton reflection and Gaussian iron line (Section 3.3).

[b]Average f_ν observed by IRAS, available via the VizieR website and described in Beichman et al. (1988). Percentage in parentheses is the relative flux density uncertainty. If no percentage is present, the value is either an upper limit, denoted by a [d]or the uncertainty is not listed in the on-line VizieR catalog.

[c]Luminosity based on a Hubble constant of $H_0 = 70$ km s^{-1} Mpc^{-1}.

[d]Akn 564 is optically classified as a Seyfert 1.8 according to the NASA Extragalactic Database (NED), but we include it with the Seyfert 1.9 sample.

[e]Value is an upper limit.

5.1 Basic Sample Properties

We begin our discussion of the Seyfert 2 sample with a look at the basic observed spectral parameters. The parameters of primary interest are those characterizing the underlying X-ray emission, the absorbing medium and the reflection environment. Specifically, we examine the photon index (Γ), the absorbing column density (N_H), the reflection fraction (R) and the iron line equivalent width (EW) by calculating sample statistics. For each parameter, we calculate mean values for both the sample as a whole and the sample sub-classes. In addition, we perform t-tests to determine whether or not the parameters are consistent for each sub-class. For a t-test on two samples, the null hypothesis (H_0) is that the samples have the same mean value. The criterion for rejecting H_0 at a given significance level, α, depends on the t-value and the number of degrees of freedom (dof) of the test. The significance level is defined as the probability of rejecting the H_0 erroneously, and we use $\alpha = 0.02$ as the cut-off for determining whether or not two samples show the same mean values. The results for t-tests comparing the distributions of each parameter of interest for the Seyfert 1 and 2 samples are listed in Table 5.2 and for each pair of Seyfert 2 subclasses in Tables 5.3 through 5.6. In the tables, we list the t-value, the number of degrees of freedom, and whether or not we reject H_0 at $\alpha = 0.02$. If we reject H_0 (a "Y" in the appropriate table column), then the sample means are statistically different.

We plot weighted histograms of the distributions of the spectral parameters in Figures 5.1 through 5.4. The histograms are weighted in such a way that each galaxy is given a total value of 1 on the "number" axis (y-axis). Each individual spectrum for a given source is assigned a value of $y = 1/N$, where N is the total number of spectra for that galaxy. Throughout this section we also compare the Seyfert 2 sample properties with the Seyfert 1 sample, in particular concentrating on how the results support or refute unification. Errors on the sample means reported in this section are the calculated standard error of the mean.

Table 5.2: Comparison of the spectral parameter distributions for the Seyfert 1 and Seyfert 2 samples. Results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert 1 and 2 samples have the same mean value. The Seyfert 1 row lists t-test values comparing the parameter distribution listed in the corresponding column to the Seyfert 2 distribution. A "Y" indicates that the hypothesis is rejected and the means are not statistically the same; an "N" indicates that the possibility that the means are the same cannot be ruled out.

	Seyfert 2 Sample							
Type	N_H		Γ		R		EW	
	t-value (dof)[a]	Reject H_0?[b]	t-value (dof)[a]	Reject H_0?[b]	t-value (dof)[a]	Reject H_0?[b]	t-value (dof)[a]	Reject H_0?[b]
Sy1 Sample	16.77 (819)	Y	2.75 (819)	N	2.12 (819)	N	12.81 (819)	Y

[a]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[b]Reject the (H_0) that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

5.1.1 Absorbing Column

The absorbing column densities range from 0 to 24.76×10^{22} cm^{-2} with a mean of $\overline{N_H} = (5.03 \pm 0.26) \times 10^{22}$ cm^{-2}. Figure 5.1a shows a histogram of these values. The mean absorbing column densities reported by other studies of Seyfert 2s show a wide range of values from $N_H = (61.3 \pm 18.0) \times 10^{22}$ cm^{-1} (62 Seyfert 2s observed by *BeppoSAX*, Dadina (2008)) to $N_H = (10.6 \pm 0.2) \times 10^{22}$ cm^{-1} (7 Seyfert 2s observed by *Integral*, *XMM*, *Chandra*, and *ASCA*, De Rosa et al. (2008)) to $N_H = (2.24 \pm 0.003) \times 10^{22}$ cm^{-1} (25 Seyfert 2s observed by *ASCA* (Turner et al. 1997), using their reflection-model values). Our mean absorbing column density lies within this wide range of column densities, but may be on the smaller side. This may be due in part to the fact that we define Seyfert 1.5s to be part of our Seyfert 2 sample; whereas, other studies often include the Seyfert 1.5s with their Seyfert 1s, which would introduce a bias in other Seyfert 2 samples toward being dominated by more heavily absorbed sources.

Comparing the Seyfert 2 column densities to those of the Seyfert 1 sample, we find that the Seyfert 2 sample shows significantly more absorption, with the t-test comparing the Seyfert 1 and Seyfert 2 distributions giving a t-value of 16.77 for 819 dof (Table 5.2). A histogram of the N_H distribution for the Seyfert 1 and Seyfert 2 samples is shown in Figure 5.1b. According to unification, the difference in absorbing column is explained by our line-of-sight passing through more of the obscuring region as the inclination angle of the accretion disk increases and with increasing Seyfert type, based on optical classification, as shown in Figure 1.2. We may, then, expect to see a progression of N_H with increasing Seyfert type. Recall that N_H did not increase when comparing the radio-quiet (RQ) Seyfert 1s and the Seyfert 1.2s (Section 4.1.1). Looking at the Seyfert 2 sample, the $\overline{N_H}$ appears to show a trend to increase with Seyfert type; however, we cannot confirm this trend based on our t-test results. It is clear that the Seyfert 1.5s and Seyfert 2s possess different distributions of absorption. On the other hand, the Seyfert 1.9s are consistent with both the Seyfert 1.5s and the Seyfert 2s (Table 5.3). This might be explained by the fact that inclination will vary continuously from source-to-source, so that some of the Seyfert 1.9s may have inclinations closer to the Seyfert 1.5s while others are closer to the Seyfert 2s. Alternately, N_H may not change much in these Compton-thin sources with inclination angle after our line-of-sight passes through the torus. In this case, we would not expect to see an increase in the distribution of N_H with Seyfert types beyond Seyfert 1.5s.

For Seyfert 2s, the RL sources show more absorption than the RQ sources, with $\overline{N}_{H,RL\,Sy2} = (11.75 \pm 0.68) \times 10^{22}$ cm^{-2} and $\overline{N}_{H,RQ\,Sy2} = (6.55 \pm 1.09) \times 10^{22}$ cm^{-2}

(Figure 5.1c), and the t-test comparing these distributions gives a t-value of 3.98 with 102 dof. It could be that we are observing the radio-loud Seyfert 2s through more of the host galaxy than in the RQ Seyfert 2s. As we mentioned in Section 1.1, it is not necessarily the case that the central AGN is co-aligned with the host galaxy. This means that despite the fact that unification suggests that the Seyfert 2 AGN are viewed edge-on, we cannot assume that the host galaxy is also being viewed edge-on in these sources. However, the RL sources in our sample may be co-aligned with their host galaxies, so that we are viewing the central AGN through the plane of their host galaxy. As a matter of fact, one of the RL Seyfert 2s, Cen A, shows dark dust lanes in optical images. The added dust of this source may contribute to the absorption of the X-rays from the central AGN.

Table 5.3: Seyfert 2 N_H statistics and results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. Each row lists the mean value, the standard error on the mean, and the t-test values to comparing the row's sub-class with the corresponding column's sub-class. A "Y" indicates that the hypothesis is rejected and the means are not statistically the same; an "N" indicates that the possibility that the means are the same cannot be ruled out.

Type	Mean ($\times 10^{22}$) (cm^{-2})	σ_M [a] ($\times 10^{22}$) (cm^{-2})	Sy 1.5 t-value (dof)[b]	Sy 1.5 Reject H_0?[c]	Sy 1.9 t-value (dof)[b]	Sy 1.9 Reject H_0?[c]	RQ Sy 2 t-value (dof)[b]	RQ Sy 2 Reject H_0?[c]	RL Sy 2 t-value (dof)[b]	RL Sy 2 Reject H_0?[c]
Sy2 Sample	5.03	0.26	4.64 (590)	Y	1.10 (454)	N	1.90 (436)	N	8.87 (432)	Y
Sy1.5	3.25	0.21			2.90 (278)	N	4.82 (260)	Y	15.89 (256)	Y
Sy1.9s	4.36	0.26					2.21 (124)	N	11.47 (120)	Y
RQ Sy2s	6.55	1.09							3.98 (102)	Y
RL Sy2s	11.75	0.68								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the (H_0) that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

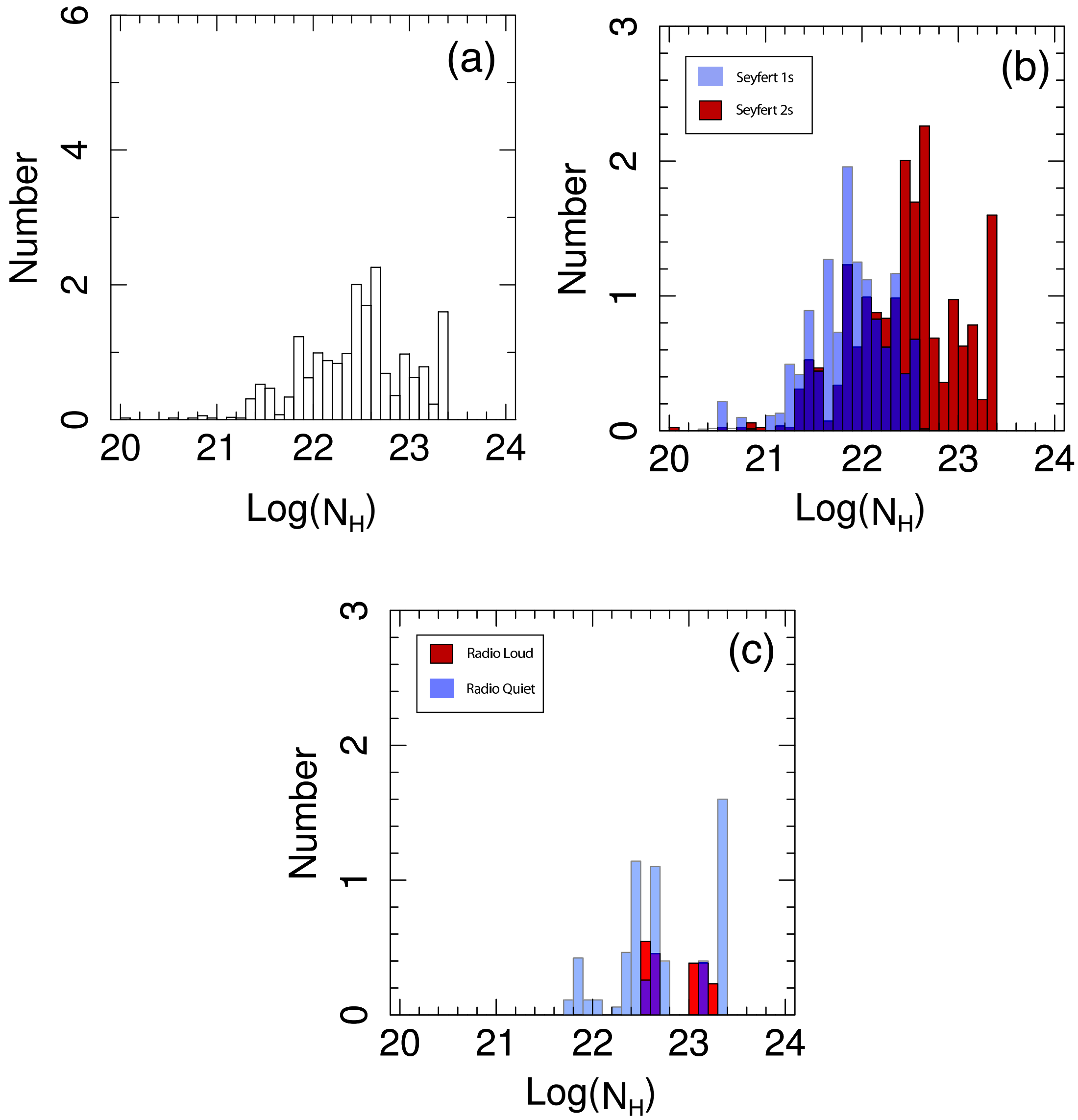

Figure 5.1: Weighted histogram for the Seyfert 2 sample N_H for (a) the Seyfert 2 sample alone (b) the Seyfert 1 (blue) and Seyfert 2 (red) samples together, and (c) the RQ Seyfert 2s (blue) and RL Seyfert 2s (red) together. Places where the distributions shown in red and blue overlap are shown in purple. The histograms are weighted in such a way that each galaxy is given a total value of 1 on the "number" axis (y-axis), so each individual spectrum for a source is given a value of $y = \frac{1}{N}$, where N is the total number of spectra for that galaxy.

5.1.2 Photon Index

The photon indices range from 1.03 to 3.04 with a mean of $\overline{\Gamma} = 1.82 \pm 0.01$. The histogram of Γ for the Seyfert 2 sample shown in Figure 5.2a peaks between 1.7 and 2.0. Our sample mean is in line with observations by *BeppoSAX* ($\overline{\Gamma} = 1.80 \pm 0.05$, (Dadina 2008)), *ASCA* ($\overline{\Gamma} = 1.88 \pm 0.02$, Turner et al. (1997)), and *Ginga* ($\overline{\Gamma} = 1.89 \pm 0.28$, Smith & Done (1996)). As we found with the Seyfert 1 sample (Section 4.1.2), our Seyfert 2 results are not far from the "canonical" photon indices of $\Gamma = 1.7$ to 1.9 that have been seen since the earliest X-ray observations of AGN (Section 1.3).

Our Seyfert 1 and 2 sample distributions show similar mean photon indices, with $\overline{\Gamma}_{\mathrm{Sy\,1}} = 1.86 \pm 0.01$ and $\overline{\Gamma}_{\mathrm{Sy\,2}} = 1.82 \pm 0.01$ (Figure 5.2), which is confirmed by our t-test results which gives a t-value of 2.75 with 819 dof (Table 5.2). The increase of Γ that we saw in the Seyfert 1 sample, from the quasar to the RL Seyfert 1s to the RQ Seyfert 1s to the Seyfert 1.2s, does not occur for the Seyfert 2 subclasses. The Seyfert 1.5s and RQ Seyfert 2s show similar distributions, with the t-test giving a t-value of 2.66 for 260 dof (Table 5.2). Surprisingly, the Seyfert 1.9s do not show the same distribution as either the Seyfert 1.5s or the RQ Seyfert 2s (Figures 5.2c and 5.2d), with t-tests giving t-values of 12.07 for 278 comparing the Seyfert 1.5/Seyfert 1.9 distributions and of 4.59 for 124 dof for the Seyfert 1.9/RQ Seyfert 2 distributions. This is a very unusual result in the context of unification.

The RL and RQ Seyfert 2s show similar distributions of Γ, as confirmed by our t-test results with a t-value of 0.97 and 102 dof. This is unlike the distributions of Γ that we found for the RL and RQ Seyfert 1s (Section 5.1.2). In the case of the Seyfert 1s, we found that the RL sources show a flatter spectrum than the RQ sources, which could be explained by X-ray emission from the relativistic jet diluting the spectrum from the central AGN source. In the context of unification, it should not be surprising that the RL and RQ Seyfert 2s show the same photon index distributions, because the jet is beamed away from our line-of-sight in these objects. Therefore, the observed spectrum in both RL and RQ Seyfert 2s should be from the central AGN source, as we find. This prediction is supported by our results.

Table 5.4: Seyfert 2 Γ statistics and results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 5.3.

Type	Mean	σ_M [a]	Sy 1.5		Sy 1.9		RQ Sy 2		RL Sy 2	
			t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]
Sy2 Sample	1.82	0.01	4.70 (590)	Y	7.46 (454)	Y	0.07 (436)	N	1.48 (432)	N
Sy1.5	1.72	0.01			12.07 (278)	Y	2.66 (260)	N	5.18 (256)	Y
Sy1.9	2.06	0.02					4.59 (124)	Y	5.98 (120)	Y
RQ Sy2	1.82	0.05							0.97 (102)	N
RL Sy2	1.87	0.01								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the (H_0) that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

5.1.3 Reflection

The reflection fraction for Seyfert 2s spans our allowed values from 0 to 5, though most spectra show $R < 2$ (Figure 5.3a). We find a mean value for R of $\overline{R} = 0.36 \pm 0.03$. It is difficult to interpret a comparison of our values for R with other studies, because other studies show such a wide range of R. For example, De Rosa et al. (2008) find $\overline{R} = 1.52 \pm 0.60$ for 5 Seyfert 2s with significant reflection observed by

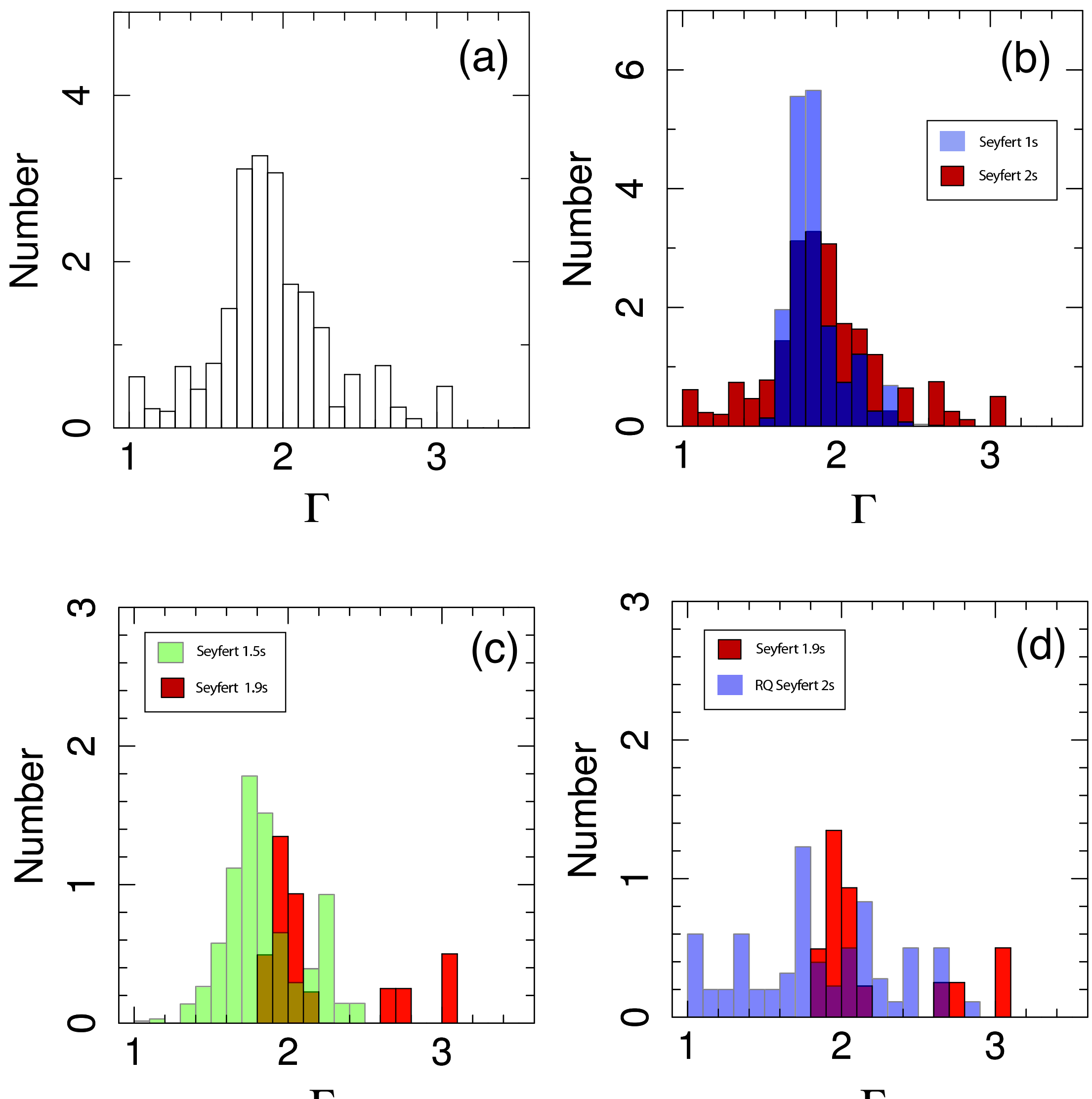

Figure 5.2: Weighted histogram for the Seyfert 2 sample Γ for (a) the Seyfert 2 sample alone, (b) the Seyfert 1 (blue) and Seyfert 2 (red) samples together, (c) the Seyfert 1.5s (green) and Seyfert 1.9s (red), and (d) the Seyfert 1.9s (red) and RQ Seyfert 2s (blue) together. Places where the distributions shown in red and blue overlap are shown in purple. The histograms are weighted as described in Figure 5.1

Integral, *XMM*, *Chandra*, and *ASCA*. However, their mean does not include the sources without significant reflection, which could explain the larger value that they find. Dadina (2008) find $\overline{R} = 0.87 \pm 0.14$ for 62 Seyfert 2s observed by *BeppoSAX*. Turner et al. (1997) find $\overline{R} = 0.04 \pm 0.17$ for 25 Seyfert 2s observed by *ASCA*. One reason for the scatter in the measured R could be that *XMM* and *ASCA* sensitivities cut off at $\sim$ 15 and $\sim$ 10 keV, respectively, making the observation of the reflection fraction difficult to characterize with those instruments. Even the *RXTE* sensitivity cuts off at energies where the reflection fraction is just starting to overtake the observed continuum. Observations covering a broader energy band than *RXTE* would help to better characterize the Compton reflection in AGN.

Table 5.5: Seyfert 2 R statistics and results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 5.3.

Type	Mean	σ_M [a]	Sy 1.5		Sy 1.9		RQ Sy 2		RL Sy 2	
			t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]
Sy2 Sample	0.36	0.03	1.17 (590)	N	5.78 (454)	Y	0.34 (436)	N	4.96 (432)	Y
Sy1.5	0.31	0.02			7.41 (278)	Y	0.95 (260)	N	5.29 (256)	Y
Sy1.9s	0.72	0.05					3.07 (124)	N	12.76 (120)	Y
RQ Sy2s	0.39	0.11							3.34 (102)	N
RL Sy2s	0.005	0.002								

[a] Standard error of the mean.

[b] Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c] Reject the (H_0) that the two samples have the same mean at a significance level of $\alpha = 0.002$. A “Y” indicates that the two samples are unlikely to have the same mean; whereas, a “N” in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

Comparing our Seyfert 1 and 2 samples, we find similar amounts of reflection $\overline{R}_{\text{Sy 1}} = 0.45 \pm 0.03$ and $\overline{R}_{\text{Sy 2}} = 0.36 \pm 0.03$ (Figure 5.3). If reflection occurred only in a cold, semi-infinite slab, we would expect the amount of observed reflection to decrease with increasing inclination angle (e.g., Bao et al. (1998); Magdziarz & Zdziarski

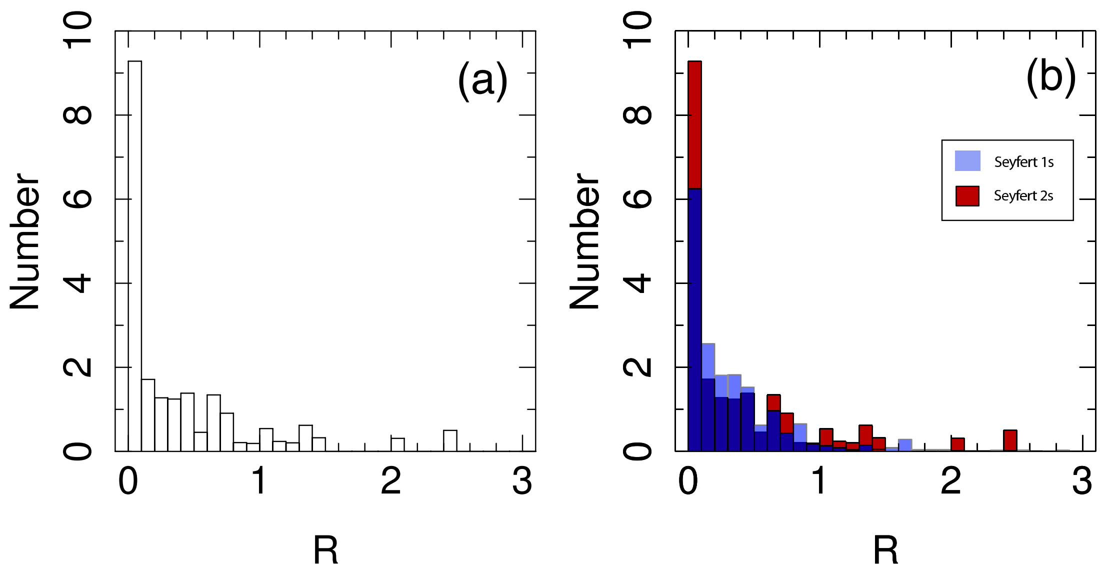

Figure 5.3: Weighted histogram for the Seyfert 2 sample R for (a) the Seyfert 2 sample alone and (b) the Seyfert 1 (blue) and Seyfert 2 (red) samples together. Places where the distributions shown in red and blue overlap are shown in purple. The histograms are weighted as described in Figure 5.1

(1995)). However, the absorbing material may also show reflection, and while the reflected spectrum from the absorber is expected to decrease with increasing inclination (Krolik et al. 1994), the direct continuum flux could be diminished by absorption as well. Thus, the observed (reflected plus direct) spectrum may show relatively more reflection at higher inclinations. The fact that we see similar R for the Seyfert 1 and Seyfert 2 samples may indicate that the effects of inclination and the dilution of the direct AGN continuum may cancel each other out for these Compton-thin AGN.

5.1.4 Iron Line Equivalent Width

The observed iron line equivalent widths range from 23 to 705 eV, with a mean of $\overline{EW} = 206 \pm 5$ eV. Figure 5.4a shows a histogram of the Seyfert 2 sample equivalent widths. Recent studies by *XMM* and *BeppoSAX* are finding systematically larger $\overline{EW}$ than we find. Cappi et al. (2006) find $\overline{EW} \simeq 700 \pm 220$ eV for the broad iron line feature in an *XMM* sample of 6 Seyfert 2 galaxies, and Dadina (2008) finds $\overline{EW} = 694 \pm 195$ eV for the broad line feature in an average spectrum of 62 Seyfert 2 galaxies observed by *BeppoSAX*. However, our $\overline{EW}$ is in line with the values found by Turner et al. (1997) of $\overline{EW} = 211 \pm 29$ eV for 25 Seyfert 2s observed by *ASCA* and Smith & Done (1996) of $\overline{EW} \simeq 183 \pm 191$ eV for a sample of 36 Seyfert 2 galaxies observed by *Ginga*. The high equivalent widths observed by *XMM* and *BeppoSAX* are likely due to their sensitivity to the complexities of the iron line. As we discussed in Sections 1.3.1 and 1.3.3, the iron line generally shows both a narrow and broad component (Figure 1.3), which *RXTE* is not sensitive to. However, *XMM* and *BeppoSAX* are able to disentangle some of the complex features, and the mean values for *EW* reported above represent only the broad component of their measured lines.

Table 5.6: Seyfert 2 *EW* statistics and results from t-tests to determine whether or not to reject null hypothesis (H_0) that the Seyfert sub-classes have the same mean value. The table should be read as described in Table 5.3.

Type	Mean	σ_M [a]	Sy 1.5		Sy 1.9		RQ Sy 2		RL Sy 2	
			t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]	t-value (dof)[b]	Reject H_0?[c]
Sy2 Sample	206	5	0.52 (590)	N	3.21 (454)	N	3.50 (436)	Y	1.40 (432)	N
Sy1.5	210	6			3.95 (278)	Y	3.17 (260)	N	1.77 (256)	N
Sy1.9	166	5					4.93 (124)	Y	1.25 (120)	N
RQ Sy2	262	21							2.95 (102)	N
RL Sy2	184	15								

[a]Standard error of the mean.

[b]Value of the t-test statistic, with the number of degrees of freedom (dof) in parenthesis.

[c]Reject the (H_0) that the two samples have the same mean at a significance level of $\alpha = 0.002$. A "Y" indicates that the two samples are unlikely to have the same mean; whereas, a "N" in this column indicates that the hypothesis cannot be rejected, so the samples may have the same mean.

In the context of unification, we would expect to see an iron line from both the disk and the absorbing torus. As we discussed in Section 4.2.1, for an iron line from the accretion disk, we expect the EW to decrease with increasing disk inclination (George & Fabian 1991). However, the EW from the torus will increase with increasing inclination for heavily absorbed AGN, since the direct AGN continuum will be diminished in the vicinity of 6 keV by the absorber (Levenson et al. 2002). We find that our Seyfert 2 sample shows a higher EW than our Seyfert 1s, with $\overline{EW}_{\rm Sy1} = 130 \pm 2$ eV and $\overline{EW}_{\rm Sy2} = 206 \pm 5$ eV, which is confirmed by the t-test, with a t-value of 12.81 for 819 dof. However, when we examine the Seyfert 2 sub-classes, we do not find a clear trend with Seyfert type. The Seyfert 1.5s and RQ Seyfert 2s both show a larger EW than the Seyfert 1.9s, with $\overline{EW}_{\rm Sy\,1.5} = 210 \pm 6$ eV, $\overline{EW}_{\rm Sy\,1.9} = 166 \pm 5$ eV, and $\overline{EW}_{\rm RQ\,Sy2} = 262 \pm 21$ eV. Since our sources are not Compton-thick, however, it is difficult to make predictions about what the EW should do as a function of inclination angle. We observed that the distributions of N_H did not show a clear trend with Seyfert type, nor did the R so it may be reasonable that we do not see a trend in the EW either.

5.1.5 Basic Parameter Summary

The bulk properties of our optically classified Seyfert 2 sample generally support, or at least do not contradict, unification. The distribution of N_H supports unification, with the RQ Seyfert 2s showing more absorption than the Seyfert 1.5s. In addition, the R and EW distribution results do not contradict unification, but it is difficult to make strong conclusions based on these values. We do find that the Γ distribution of the Seyfert 1.9s is not consistent with the other Seyfert 2 sub-classes, which cannot be explained by unification alone.

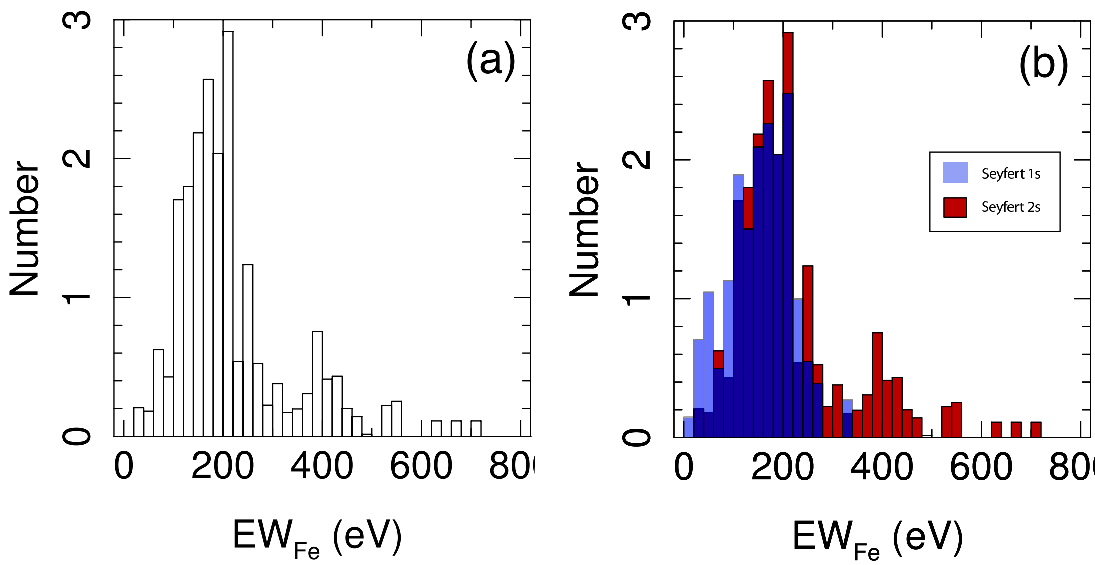

Figure 5.4: Weighted histogram for the Seyfert 2 sample EW for (a) the Seyfert 2 sample alone and (b) the Seyfert 1 (blue) and Seyfert 2 (red) samples together. Places where the distributions shown in red and blue overlap are shown in purple. The histograms are weighted as described in Figure 5.1

When we compare results from the Seyfert 1 and 2 samples, we find a general progression toward large absorbing column densities, which is expected from unification. We also find that the photon index of the underlying continuum emission has the same mean value for each of the two Seyfert samples. We see similar reflection fractions between the Seyfert 1s and Seyfert 2s, which does not necessarily contradict unification. The equivalent width also increases from the Seyfert 1 sample to the Seyfert 2 sample, which we expect from simple unification. It appears that when the broad classes of the Seyfert 1s and Seyfert 2s are considered together, the unification model is supported. However, when we break the samples into sub-classifications, the results are not as clear.

5.2 Spectral Parameter Correlations

After exploring the bulk spectral properties of the Seyfert 2 sample, we also examined spectral correlations by plotting all combinations of the parameters, along with the 2 to 10 keV luminosity (L_x) and the iron line equivalent width (EW). We first look at the EW-Γ relationship (Section 5.2.1) to see if the Seyfert 2 sample shows a similar relation to the one we found for the Seyfert 1 sample (Section 4.2.1). We next explore the Γ-R relationship in the Seyfert 2 sample (Section 5.2.2). Finally, we look to see if our data show a relationship between Γ and L_x, as has been reported in other sample studies (Section 5.2.3). Individual plots for the complete Seyfert 2 sample are presented in Appendix C.3.2. In addition, plots comparing the correlations for the Seyfert 1 and 2 samples are presented in Appendix C.3.3.

As with the Seyfert 1 sample, we performed a Monte Carlo simulation to determine if any of our results could be an artifact of the modeling process. This time we simulated spectra using a higher value of absorption to better represent Seyfert 2 galaxies. Each spectrum in the high-absorption Monte Carlo sample was simulated with $N_H = 10^{23}$ cm^{-2}, Γ= 2.0, R= 1.0, $E_{Fe} = 6.4$ keV, $\sigma_{Fe} = 0.23$ keV, and $z = 0.01$. The flux and exposure times were randomly varied for each of the spectra to mimic those found in the complete Seyfert 2 sample. The flux was varied by randomly choosing the power-law normalization, A, from a uniform distribution between 0.003 and 0.08 photons keV^{-1} cm^{-2} s^{-1}. The exposure time was randomly generated from a uniform distribution between 2000 and 14,000 seconds. With this range of A, EW can range from ~ 80 eV to ~ 750 eV. To avoid confusion with the Monte Carlo sample generated for the Seyfert 1 sample, we will refer to this sample as the high-absorption Monte Carlo sample.

We generated 200 high-absorption Monte Carlo spectra: 110 were simulated using an *RXTE* Epoch 3 response, 20 were simulated using an Epoch 4 response, and

70 were simulated using an Epoch 5 response. These numbers roughly correspond to the distribution of spectra in the Seyfert 2 sample. Each spectrum was fitted to the same models as our actual *RXTE* data.

5.2.1 EW-Γ Relationship

We start by examining the EW-Γ relationship, prompted by the complex relationship we found with the Seyfert 1 sample (Figure 4.5). Figure 5.5a shows the EW-Γ plot with one point for each spectrum in the sample. Since the number of spectra varies from source to source, we also produce a plot, shown in Figure 5.5b, with one point per galaxy, based on the mean value for all spectra of a given source. Both forms of the EW-Γ plot show more scatter than we saw in the Seyfert 1 plot. The high-absorption Monte Carlo EW-Γ plot, shown in Figure 5.6, does not show a clear relationship either, but neither does it mimic the scatter seen in the Seyfert 2 sample plot. Therefore, we believe our fitting results represent physical properties.

As discussed in Section 4.2.1, simulations of George & Fabian (1991) predict that the EW should decrease with increasing Γ for an X-ray source illuminating a half-slab, in the case of an iron line from an accretion disk. We clearly do not see this result in the Seyfert 2 sample. The most obvious factor that could produce the scatter is the presence of an absorbing torus, such as the torus inferred from NGC 1068 (Section 1.1). Another possible factor in the scatter of the EW-Γ relationship for the Seyfert 2 sample could be the presence of fluorescence from material associated with starburst activity. Signatures of starburst activity and additional regions in the galaxy that might contribute to the reprocessed X-rays, which we may locate via dust signatures, are often present in the infrared spectra of AGN. The *Infrared Astronomical Satellite* (*IRAS*) mission performed an unbiased all-sky survey of the infrared sky at 12, 25, 60 and 100 μm, so we examined our Seyfert 2 galaxies by

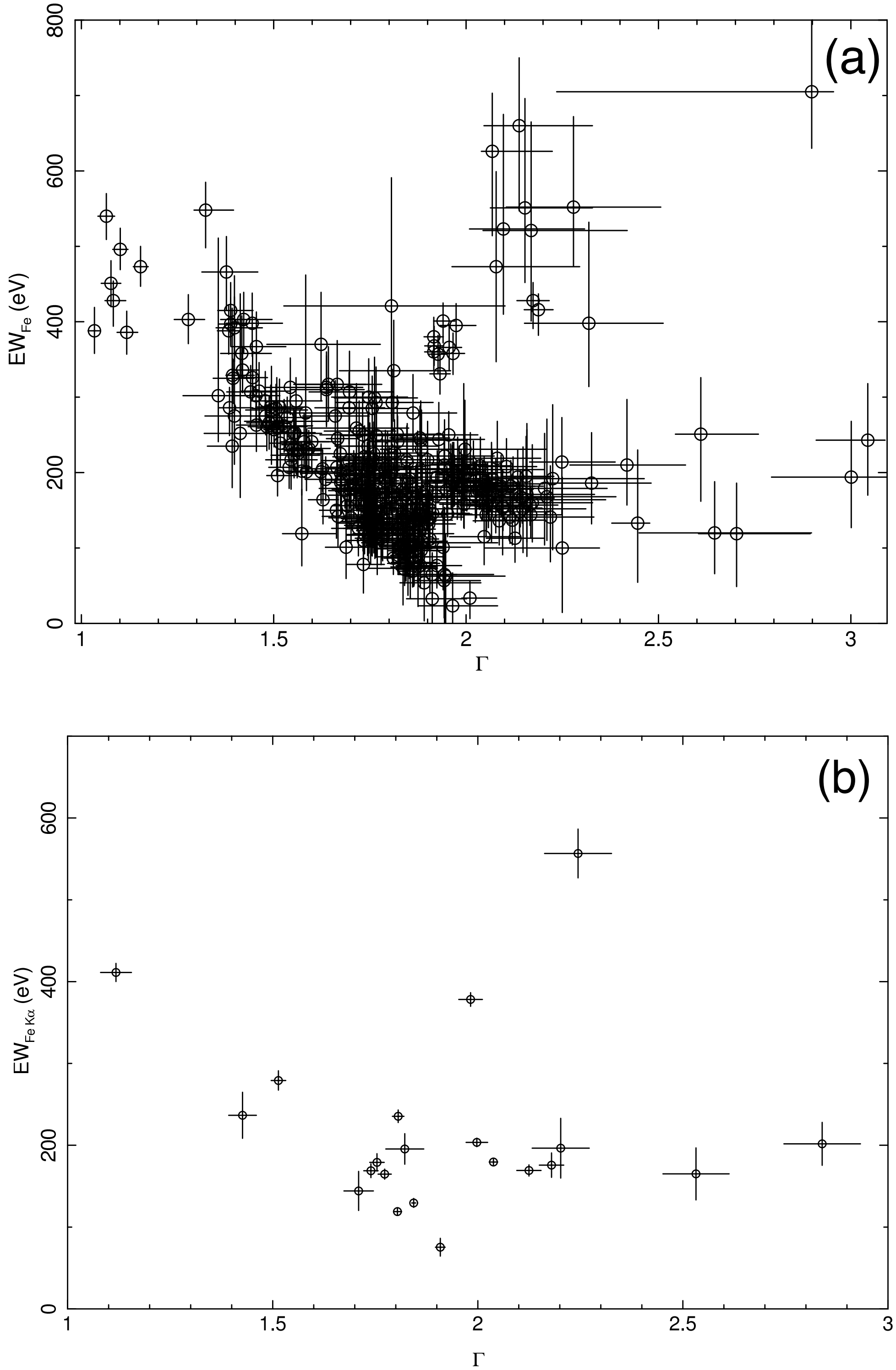

Figure 5.5: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

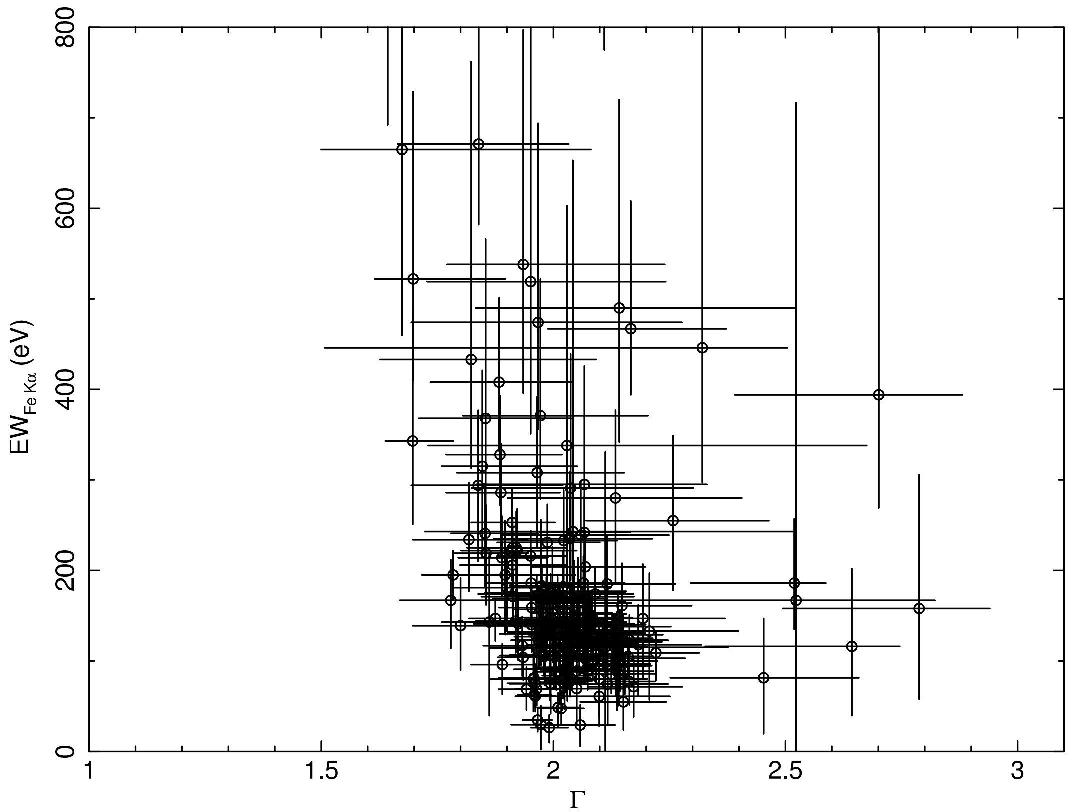

Figure 5.6: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the high-absorption Monte Carlo sample.

differentiating the sources by *IRAS* luminosity at 12μm. The 12μm data is the closest in wavelength to one of the characteristic absorption features of polycyclic aromatic hydrocarbon (PAH) molecules, or interstellar dust, which can be a tracer of star formation and absorption in the galaxy (Genzel et al. 1998; Roche et al. 1991). Large 12μm luminosities may indicate that the signature of the central AGN is not being absorbed by intervening interstellar dust. At 60μm, the IR spectra can be dominated by a starburst, if one is present in the galaxy.

To explore this further, we looked up the 12μm and 60μm flux densities as reported by the *IRAS* catalog[1] for each source (listed in Table 5.1). We used this information to reproduce the EW-Γ plot, differentiated by the 12μm luminosity

[1]Available through the VizieR web site, `http://vizier.u-strasbg.fr/`

($L_{12\mu\mathrm{m}}$) and 60μm luminosity ($L_{60\mu\mathrm{m}}$). These plots are shown in Figure 5.7a and 5.7b. Two sources do not have listed *IRAS* fluxes at either 12μm or 60μm, likely because they fall below the *IRAS* detection limit ($\sim$ 200 mJy at 12 μm and $\sim$ 500 mJy at 60 μm). We do not see a clear trend with either $L_{12\mu\mathrm{m}}$ or $L_{60\mu\mathrm{m}}$. Interestingly, one source which has a very large EW in the 60μm plot is NGC 4388, which is a source with star formation throughout the disk (Veilleux et al. 1999). NGC 4388 is one of the sources with a relatively flat X-ray spectrum ($\Gamma < 1.5$), but a high iron line equivalent width ($EW > 350$ eV), well outside of the original relationship that we found with the Seyfert 1 sample. This suggests that at least some of the sources in the Seyfert 2 sample must be more complex than unification alone can account for, with more going on than the AGN activity alone.

Since *IRAS* performed an all-sky survey (surveying more than 97% of the sky[2]), the sources which do not have *IRAS* data either do not have 12 μm fluxes detectable by *IRAS*, or they lie in the 3% of the sky not surveyed by *IRAS*. The Seyfert 2s without *IRAS* data are: MCG −2-58-22 (Seyfert 1.5) and MCG −5-23-16 (Seyfert 2). While *IRAS*-detected Seyfert 2 sources appear to be more complex than our model can account for, the non-*IRAS*-detected sources may be well-described by unification. We explore this further by overlaying the EW-Γ plots for the non-*IRAS* Seyfert 2 sample and the Seyfert 1s (Figure 5.8). The non-*IRAS* Seyfert 2s overlay the Seyfert 1 sample data quite nicely, with none of the scatter that we see in the full Seyfert 2 sample.

Before moving on, we look at one more correlation of the Seyfert 2 sample differentiated by *IRAS* luminosity. Figure 5.9a shows the N_H-EW plot differentiated by $L_{12\mu\mathrm{m}}$, and Figure 5.9b shows the plot differentiated by $L_{60\mu\mathrm{m}}$. Examining these plots, there is no clear trend with *IRAS* luminosity for either the 12μm or 60μm

[2]From the *IRAS* Explanatory Supplement online, `http://irsa.ipac.caltech.edu/IRASdocs/exp.sup/`

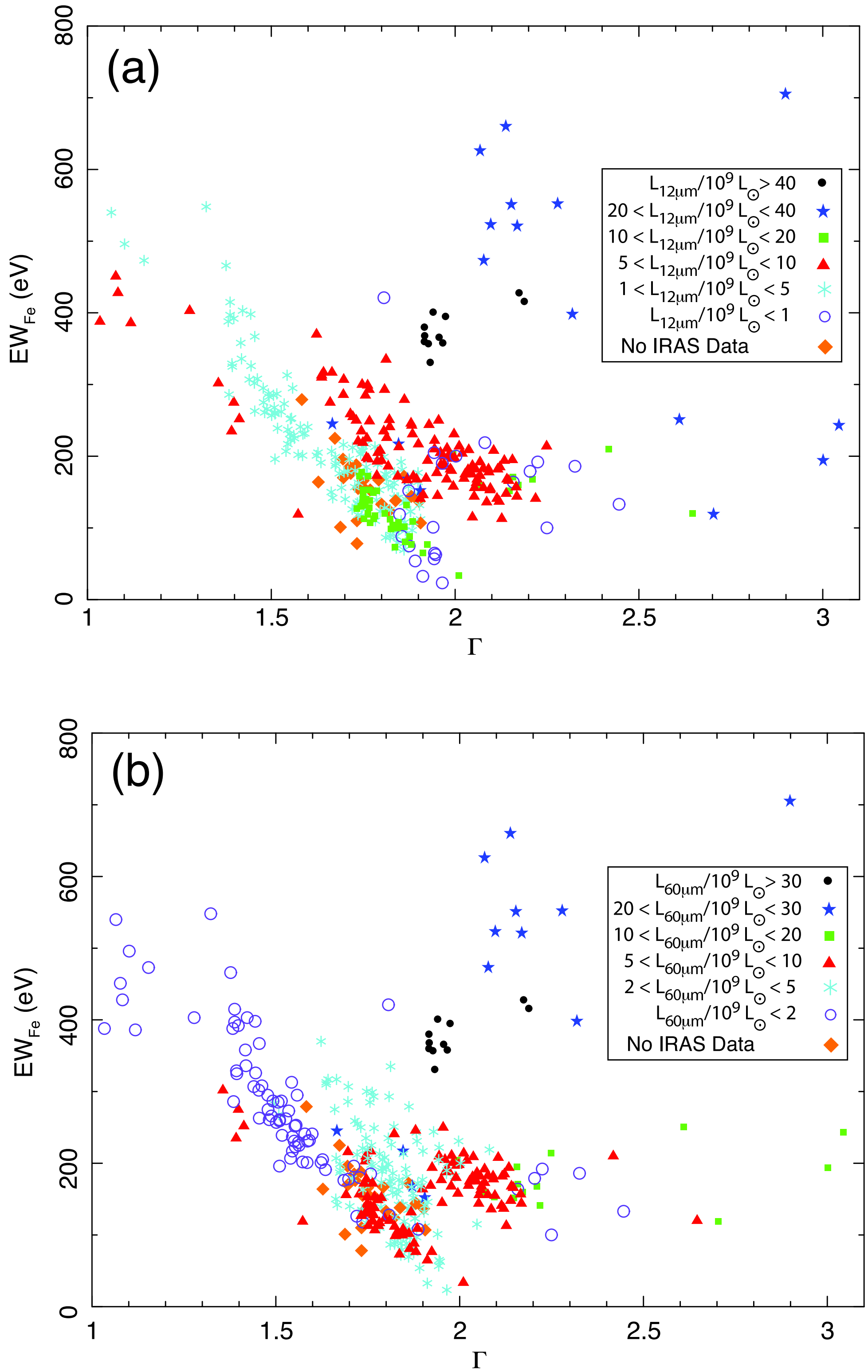

Figure 5.7: The iron line equivalent width versus the power-law photon index plotted by *IRAS* luminosity with (a) showing the 12 μm luminosity and (b) showing the 60 μm luminosity.

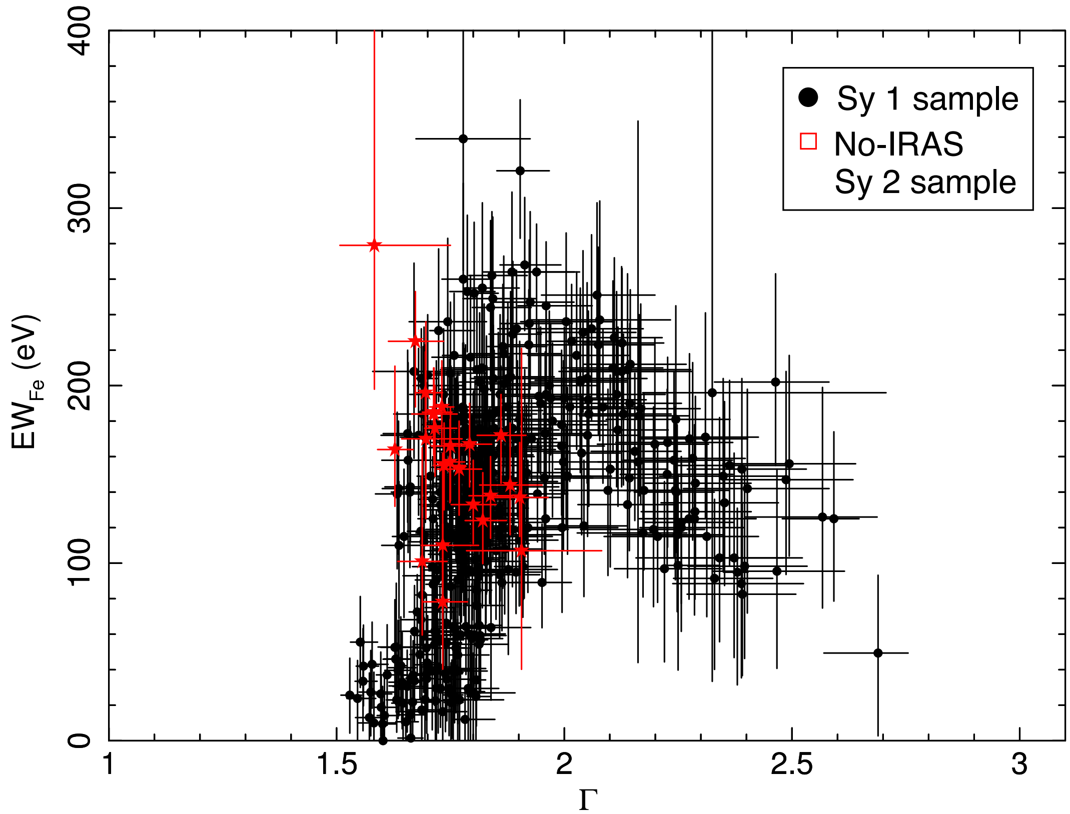

Figure 5.8: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the Seyfert 2s with no *IRAS* data (red) with the Seyfert 1 sample (black).

data. However, given the Compton-thin nature of our sample (where a Compton-thick material has $N_H \gtrsim 10^{24}$ cm^{-2}), the large EW that we find in some of our sources is larger than can be accounted for by reprocessing in a typical disk plus torus (e.g., Ghisellini et al. (1994)). In addition, it is noteworthy that the source with the highest *IRAS* luminosity, Cyg A, is among those with a relatively high EW. Cyg A is a bright radio-galaxy embedded in a nearby cluster, and the cluster gas may be contributing to the observed iron line in this source. These observations reinforce our view that the Seyfert 2s show extra complexity, with extra locations for Fe K reprocessing other than the accretion disk and absorbing torus of the unified model.

The scatter in the EW-Γ plot and the large EW that we see for Compton-thin sources indicates that Seyfert 2s are more complicated than predicted by unification.

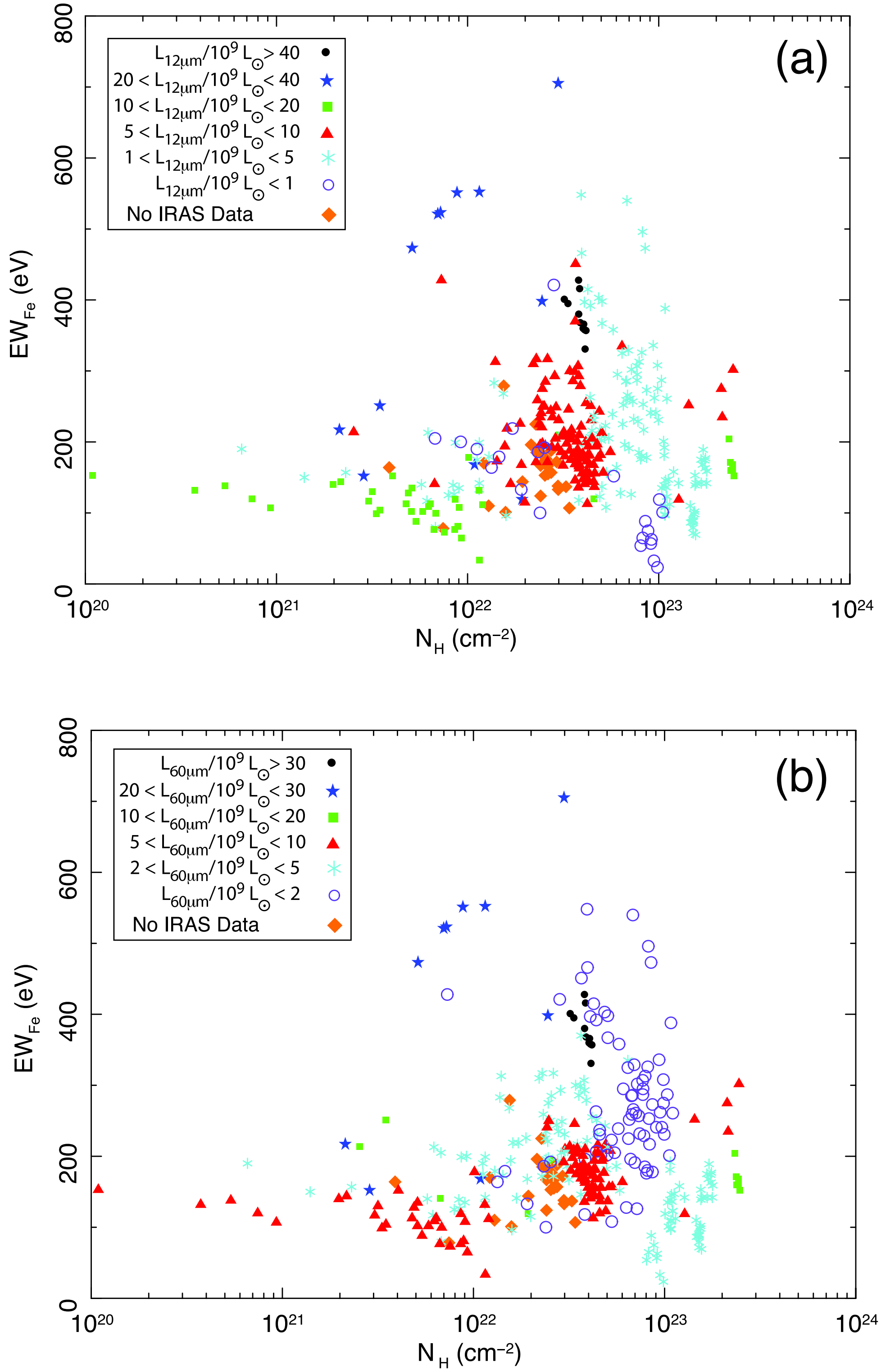

Figure 5.9: The iron line equivalent width versus the absorbing column density plotted by *IRAS* luminosity with (a) showing the 12 μm luminosity and (b) showing the 60 μm luminosity.

The circumnuclear environments of the Seyfert 2s appear to be highly complicated, likely more complicated than the *RXTE* data can deconstruct.

5.2.2 Γ-R Relationship

We find a strong relationship between Γ and R (Figure 5.10). However, the high-absorption Monte Carlo plot of Γ-R (Figure 5.11) shows a similar relationship. Because of this, the observed relationship is likely the result of degeneracies in the fits, as we found with the Seyfert 1 sample and discussed in detail in Section 4.2.2.

5.2.3 Γ-L_x/L_{EDD} Relationship

Finally, we examined a possible relationship between the ratio of the X-ray luminosity to the Eddington luminosity (L_x/L_{EDD}) and Γ. Shemmer et al. (2006) report a correlation between these two values, proposing that it indicates that the spectrum depends on the accretion rate of the central black hole. To calculate L_{EDD} (Equation 1.5), we first need the mass of the black hole. Several methods for determining black hole masses in galaxies are currently in use. For normal galaxies (i.e., non-active), stellar kinematics and gas dynamics can be used. For Seyferts, however, reverberation mapping of the broad line region (BLR) is often used (e.g., Blandford & McKee (1982); Peterson (1993)). Reverberation mapping has the benefit of not depending on high angular resolution, which means that it can be used for high and low luminosity sources alike, and also can be used for sources at large distances. Unfortunately, uncertainties in this method still exist. For example, black hole masses reported for Seyfert 1, 1.2 and 1.5s that are common to samples studied by Peterson et al. (2004) and Kaspi et al. (2000) are consistently different by about a factor of two. Given that the relative masses are consistent for the two samples, we eliminate some of the uncertainty by considering black hole masses

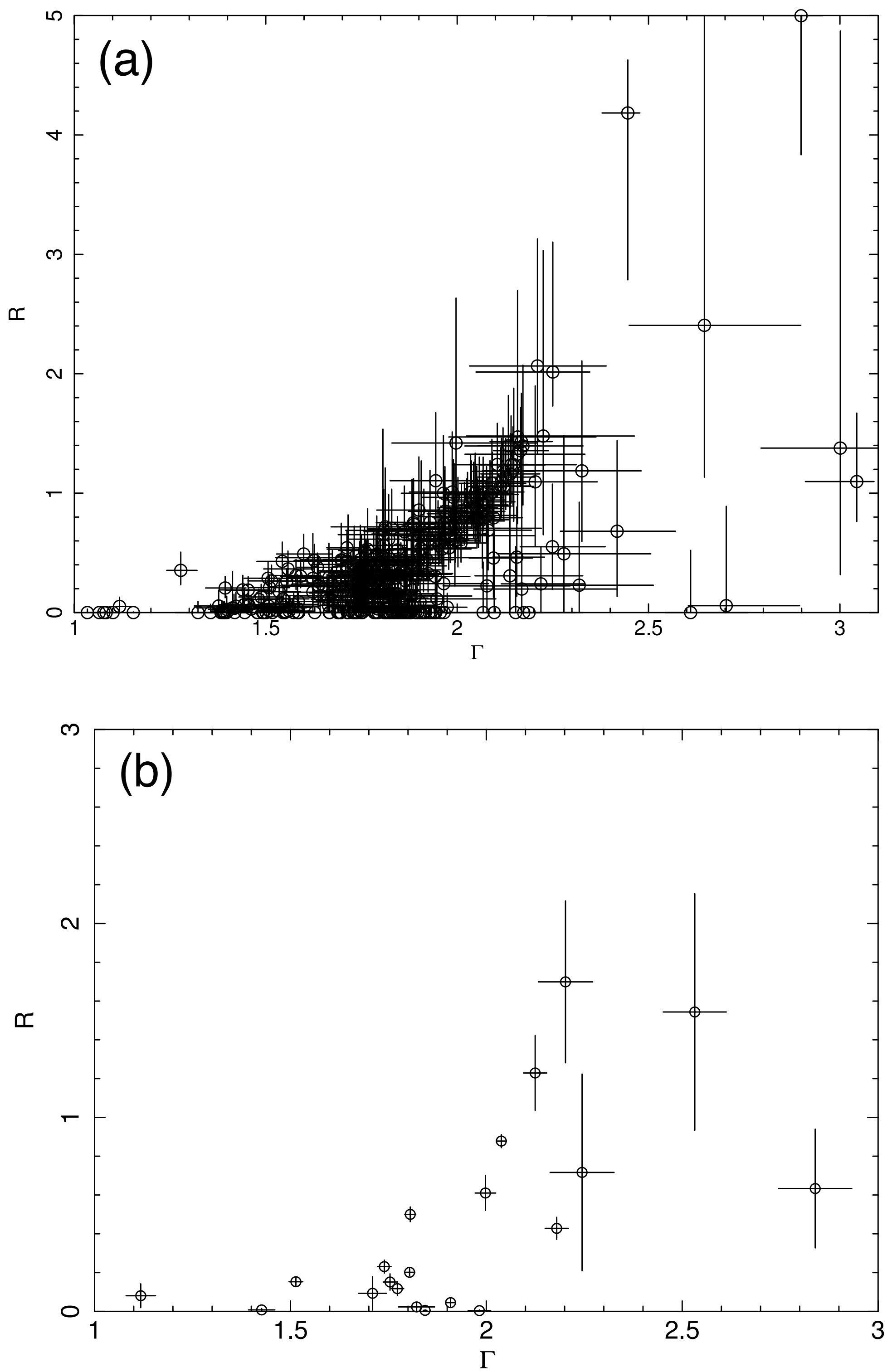

Figure 5.10: Reflection fraction (R) versus power-law photon index (Γ) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

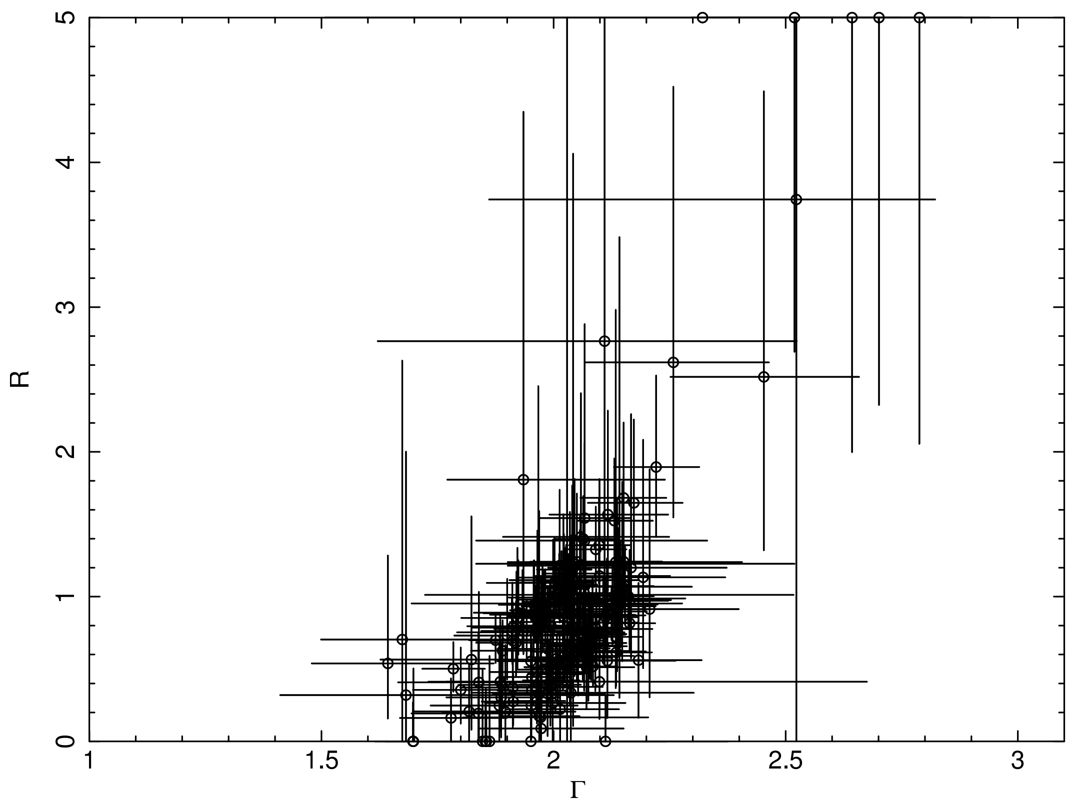

Figure 5.11: Reflection fraction (R) versus power-law photon index (Γ) for the high-absorption Monte Carlo sample.

studied by Peterson et al. (2004) alone. We have confidence, then, that the trend in our Γ-L_x/L_{EDD} plot will be correct, even if the exact values of L_{EDD} are not. Table 5.7 lists the Seyferts in our full (Seyfert 1 and Seyfert 2) sample for which Peterson et al. (2004) report black hole masses. In addition, the table reports the derived L_{EDD} for each source. Because the black hole mass estimates depend on observations of the BLR and the BLR is obscured (or not present, if the unification model is not correct) in optically-classified Seyfert 1.9 and 2 AGN, Seyfert 1.9s and Seyfert 2s are not represented in the sample of sources with a black hole estimate.

Using the L_{EDD} reported in Table 5.7, we produced the Γ-L_x/L_{EDD} plot in Figure 5.12. The plot does not show a clear relationship, as was found by Shemmer et al. (2006) for the L_{bol}/L_{EDD} of a sample of radio-quiet quasars. L_x/L_{EDD} is an indicator of the mass accretion rate, so a correlation between this value and Γ would indicate that the X-ray hardness is determined by the accretion rate. Since AGN are assumed to be powered by accretion onto a central supermassive black hole, it is reasonable that a relationship between the X-ray emission and the mass accretion rate would exist. More importantly, a correlation between Γ and L_x/L_{EDD} would indicate a direct connection between the accretion disk and the X-ray emitting source, such that the delay between changes in the accretion rate and changes in the X-ray spectrum near the source would be relatively short.

Shemmer et al. (2006) only consider radio-quiet quasars, which are more luminous than our sample. In addition, our sample consists of radio-loud and radio-quiet sources ranging from Seyfert 1 to 1.5. It is possible that a lack of correlation might be related to the inclusion of radio-loud sources. To attempt to disentangle these effects, we produce a plot for each of the sub-types: radio-loud Seyfert 1s, radio-quiet Seyfert 1s, Seyfert 1.2s, and Seyfert 1.5s (Figure 5.13). The amount of scatter in the plots for each sub-type increases from radio-loud to Seyfert 1.5s. The radio-loud Seyfert 1s, radio-quiet Seyfert 1s, and Seyfert 1.2s all show clear groupings of points, with relatively little scatter outside those groups. The RL Seyfert 1s may show a slight correlation, with a best-fit line of $L_x/L_{EDD} \propto (1.7 \pm 1.0) \times \Gamma$ and $\chi^2 = 0.26/87 = 0.003$. The RQ Seyfert 1s and Seyfert 1.2s show a much flatter distribution. The Seyfert 1.5s show a wide range of scatter. We have already seen that the Seyfert 1.5s have significantly more absorption than any of the Seyfert 1 sub-classes (Section 5.1.1). It is possible that the black hole mass measurements are less accurate for more absorbed sources, since the BLR may be obscured in these sources. This might cause the scatter seen in the Seyfert 1.5 plot. Alternately, it is also possible that Seyfert 1.5s have more complex environments, so that the accretion rate alone would not dominate the behavior of the X-ray spectrum.

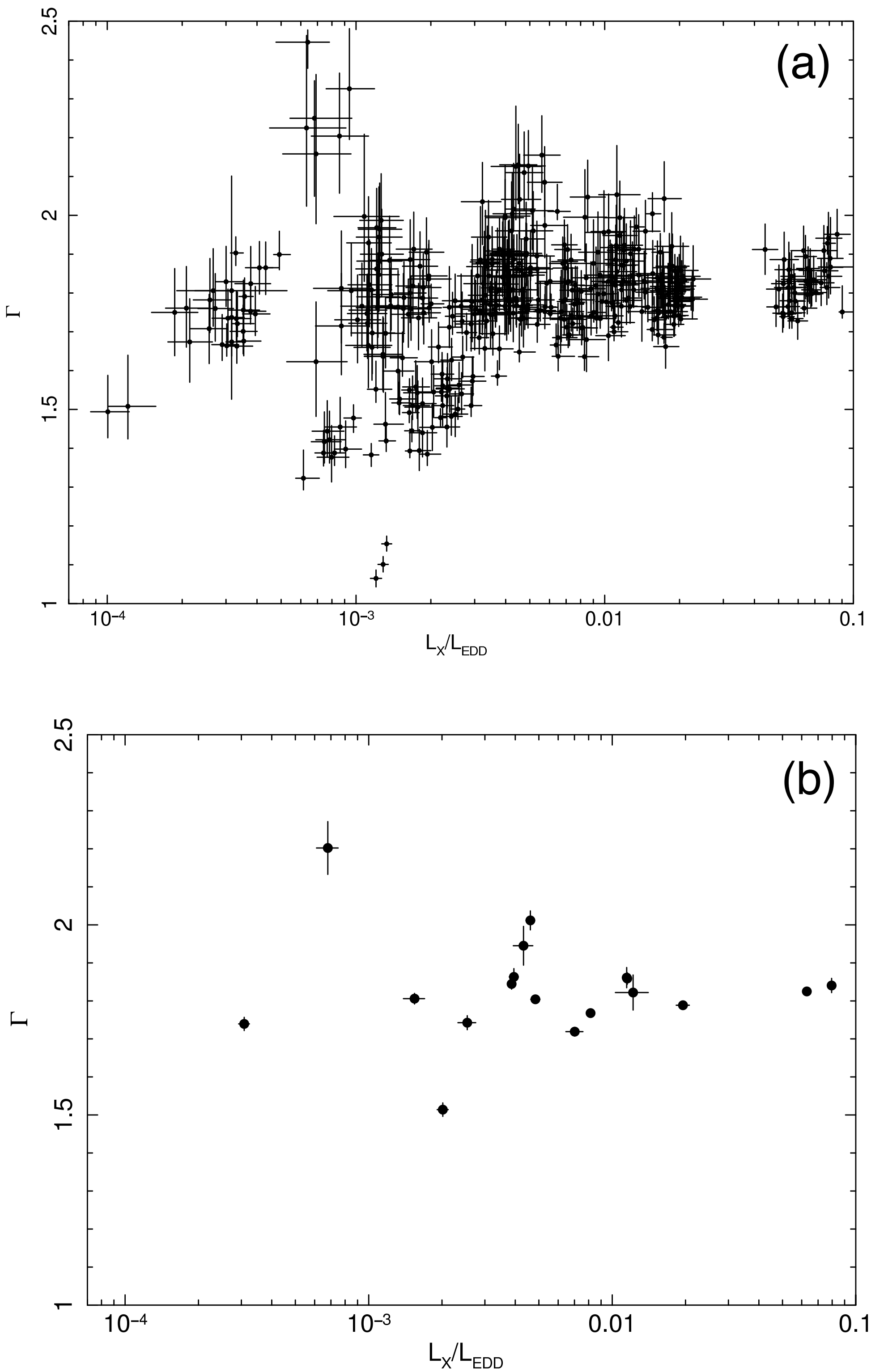

Figure 5.12: Γ versus L_x/L_{EDD} for the sources with black hole mass estimates by Peterson et al. (2004). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

Table 5.7: Central black hole masses from reverberation mapping of the broad line regions, as reported by Peterson et al. (2004).

Galaxy	**BH Mass**[a] ($10^6 M_\odot$)	L_{EDD} **erg s**$^{-1}$
Radio-loud Seyfert 1s		
3C 111	866	1.12×10^{47}
3C 120	55.5	6.99×10^{45}
3C 390.3	287	3.62×10^{46}
Radio-quiet Seyfert 1s		
Akn 120	150	1.89×10^{46}
Fairall 9	255	3.21×10^{46}
Mkn 110	25.1	3.16×10^{45}
NGC 3783	29.8	3.75×10^{45}
NGC 4593	5.36	6.75×10^{44}
Seyfert 1.2s		
IC 4329A	9.9	1.25×10^{45}
Mkn 79	52.4	6.60×10^{45}
Mkn 509	143	1.80×10^{46}
NGC 7469	12.2	1.54×10^{45}
Seyfert 1.5		
Mkn 279	34.9	4.40×10^{45}
NGC 3227	42.2	5.32×10^{45}
NGC 3516	42.7	5.38×10^{45}
NGC 4051	1.91	2.41×10^{44}
NGC 4151	13.3	1.68×10^{45}
NGC 5548	67.1	8.45×10^{45}

[a]Black hole masses measured by reverberation mapping, from Peterson et al. (2004).

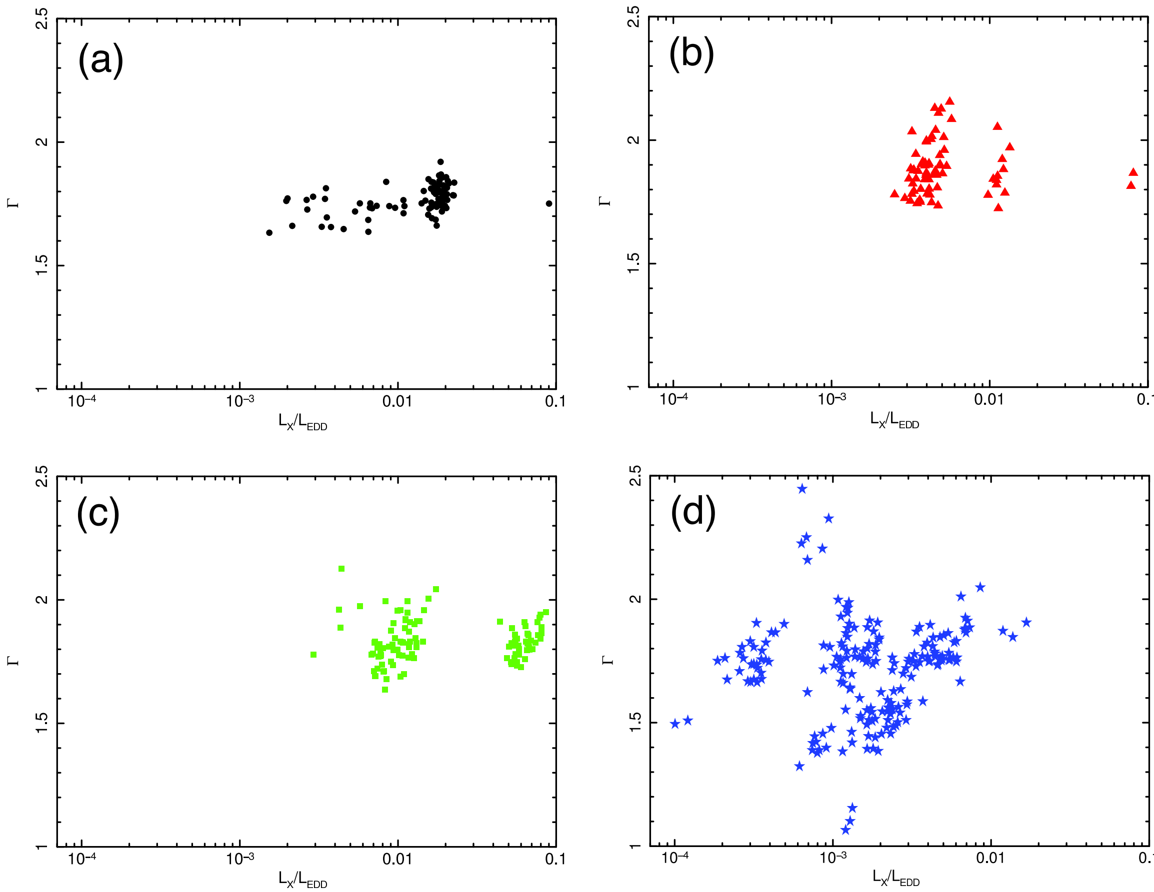

Figure 5.13: Γ versus L_x/L_{EDD} for the sources with black hole estimates by Peterson et al. (2004) by galaxy type: (a) radio-loud Seyfert 1s, (b) radio-quiet Seyfert 1s, (c) Seyfert 1.2s, (d) Seyfert 1.5s.

5.3 Conclusions

Our results suggest that classical Type 2 Seyferts (i.e., optically classified) contain environments that are far more complex than can be explained by unification alone. Most telling is the scatter in the EW-Γ relationship. In the Seyfert 1 sample, we found a complex relationship, with a correlation for the radio-loud sources and an anticorrelation for the radio-quiet sources. The Seyfert 2 sample does not show a clear trend, with much more scatter than the Seyfert 1 relationship. This implies that there must be significant Fe K emission coming from not only the accretion disk, but the absorbing torus and possibly other places. A candidate for the more complex environment is the presence of star forming regions in Seyfert 2s. This seems to be a reasonable conclusion, given that sources which had clear observations by *IRAS* at 12μm and 60μm, regions of tracers of dust and star formation activity, were the sources that showed the scatter in the EW-Γ plot. The sources which did not have *IRAS* detections overlay the Seyfert 1 relationship, without the scatter observed in the rest of the Seyfert 2 sample.

In addition, we do not find the same relationship between Γ and L_x/L_{EDD} as Shemmer et al. (2006). A Γ-L_x/L_{EDD} correlation would imply that the mass accretion directly feeds the central X-ray source, such that a higher mass accretion rate leads to a harder X-ray spectrum. The fact that we do not find this relationship could be attributed to the lower luminosities of our sources compared to theirs. Lower luminosities imply a lower accretion rate, so our sources may not be able to set up the feedback mechanism proposed for the more luminous sources. The Seyfert 1.5s in our sample do show much more scatter on the Γ-L_x/L_{EDD} plot, which may be due to the presence of very low-luminosity AGN in our sample or to modeling effects that appear to be giving our Seyfert 1.5s very small values of Γ.

Chapter 6

Results and Conclusions

6.1 Main Results

The main observational results we find are:

1. We observe a relationship between radio and X-ray properties for Seyfert 1 type AGN. The distributions of the absorbing column density (N_H), power-law index (Γ), reflection fraction (R), and Fe K equivalent width (EW), are all different when comparing the radio-loud (RL) and radio-quiet (RQ) Seyfert 1s (Sections 4.1.1 through 4.1.4). The RL Seyfert 1s sources show a flatter spectrum than the RQ Seyfert 1s. In addition, the RL Seyfert 1s show a lower N_H, R, and EW than the Seyfert 1s. We find that the observed differences in the RL and RQ Seyfert 1 distributions of Γ, R, and EW could be explained if X-rays from the relativistic jet in radio-loud sources were contaminating the observed X-ray continuum spectrum. The difference between the RL and RQ distributions could also be explained by the presence of the jet, either if some of the observed X-rays come from the jet, so that at least part of the observed spectrum comes from a place well above the disk, away from the absorbing

material, or if the environment responsible for strong radio emission is related to the amount of absorbing material near the central AGN engine.

2. We find a complex relationship between the Fe K *EW* and Γ for the Seyfert 1 sample, such that there is a correlation between these parameters for the radio-loud sources and an anti-correlation for the radio-quiet sources (Section 4.2.1). This relationship could also be explained by jet-related phenomena, such that the flatter X-ray spectrum from the jet would contribute to the total observed spectrum and dilute *EW*.

3. For the Seyfert 2 sample, we observe a large amount of scatter in the EW-Γ relationship (Section 5.2.1). These observations suggest that optically classified Type 2 Seyferts may contain environments that are more complex than can be explained by unification alone. A candidate for the more complex environment is the presence of dust and star formation in Seyfert 2s. This is supported by our examination of the infrared luminosities from *IRAS* of the Seyfert 2 sample sources. We do not see a trend in the data with *IRAS* luminosity, but the distribution indicates that at least some of the sources in the Seyfert 2 sample must be more complex than unification can account for, with more going on than the AGN activity alone.

4. We see a strong correlation between Γ and R in both the Seyfert 1 and Seyfert 2 samples (Sections 4.2.2 and 5.2.2). A physical explanation for this correlation would be a feedback between the soft photons in the accretion disk and the X-ray source, such that the larger the reflection region, the more accretion disk photons would inverse Compton scatter in the X-ray emitting plasma, thus cooling the plasma. However, there is a modeling degeneracy between Γ and R which is particularly strong in the *RXTE* bandpass, so we

find that the relationship cannot be trusted as instructive of the physics of the AGN.

5. We find a general anticorrelation between EW and 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample, which is also known as the X-ray Baldwin effect (Section 4.2.3). This observation suggests that the higher luminosity sources have less material in their immediate environment, because the Fe K EW is a tracer of the solid angle subtended by matter as observed by the X-ray source. It could be that the higher luminosity sources clean out their immediate environments. However, we observe the X-ray Baldwin effect in a few of the individual galaxies in our sample, which may indicate that time-lag effects are causing the observed EW-L_x relationship.

6. We do not observe a clear relationship between the power-law photon index and the ratio of the X-ray luminosity to the Eddington luminosity (L_x/L_{EDD}), as has been found by Shemmer et al. (2006) (Section 5.2.3). A Γ-L_x/L_{EDD} correlation would imply that the mass accretion directly feeds the central X-ray source, such that a higher mass accretion rate leads to a harder X-ray spectrum. The fact that we do not find this relationship could be attributed to the lower luminosities of our sources compared to Shemmer et al. (2006). The lower luminosities in our sources may not be capable of setting up the feedback mechanism between accretion rate and X-ray emission proposed for the more luminous sources. The Seyfert 1.5s in our sample do show much more scatter on the Γ-L_x/L_{EDD} plot, which may be due to the presence of very low-luminosity AGN in our sample or to modeling effects that appear to be giving some of our Seyfert 1.5s very small photon indices.

7. The photon indices for our Seyfert 1 and Seyfert 2 samples show a consistent

distribution when considered as a whole (Section 5.1.2). In addition, the sub-classes in the Seyfert 2 sample were similar to one another, with the exception of the Seyfert 1.9s. However, we found a different distribution for each of the Seyfert 1 sub-classes. Finally, the radio-loud (RL) sources show a flatter spectrum than the radio-quiet (RQ) ones. The difference between the RL and RQ sources can be explained in the context of unification if there is dilution of the observed spectrum by X-rays from the relativistic jet. However, the differences in the Γ distributions for the other sub-classes of Seyferts is not consistent with unification.

8. We find that the Seyfert 2 sample shows significantly more absorption than the Seyfert 1 sample; however, we do not see a clear progression of increasing N_H in the Seyfert sub-classes from Seyfert 1, 1.2, 1.5, 1.9 to 2 (Sections 4.1.1 and 5.1.1. These results may not contradict unification, however, if N_H does not change much with inclination angle in these Compton-thin sources once our line-of-sight passes through part of the torus.

Table 6.1: Summary of results in the context of the unification model.

Parameter or Correlation	**Population**	**Consistent with Unification?**	**Explanation**	**Section in Text**
N_H distribution	Sy 1, Sy 2	Yes	Sy 2s are more absorbed, consistent with observing through the obscuring torus	4.1.1, 5.1.1
	RQ Sy 1, Sy 1.2	Maybe	RQ Sy 1s are more absorbed, but may be that torus is thick enough to obscure optical but not X-rays	
	RQ Sy 1, RL Sy 1	Maybe	RQ Sy 1s are more absorbed, but may be due to some jet X-rays originating away from absorbing material	
	Sy 1.5, RQ Sy 2	Yes	RQ Sy 2s are more absorbed, consistent with a line-of-sight through more of the obscuring torus	
	RQ Sy 2, RL Sy 2	No	RL Sy 2s are more absorbed, which may come from excess material in the galaxy, and inconsistent with all absorption coming from the torus	
Γ distribution	Sy 1, Sy 2	Yes	Similar distributions, consistent with isotropic X-ray emission	4.1.2, 5.1.2
	RQ Sy 1, Sy 1.2	No	Different distributions, inconsistent with unification	
	RQ Sy 1, RL Sy 1	Yes	Different distributions, but can be understood by X-rays from jet diluting observed spectrum	
	Sy 1.5, 1.9, Sy 2	No	Sy 1.9 distribution different from Sy 1.5 and RQ Sy 2 inconsistent with isotropic emitter	
	RQ Sy 2, RL Sy 2	Yes	Similar distributions, consistent with isotropic emitter, and no dilution of spectrum from jet	

Parameter or Correlation	**Population**	**Consistent with Unification?**	**Explanation**	**Section in Text**
R distribution	Sy 1, Sy 2	Maybe	Similar distributions, might expect more if Sy 2s Compton thick, but harder to predict with Compton thin sources.	4.1.3, 5.1.3
	RQ Sy 1, Sy 1.2	No	More reflection in Sy 1.2, opposite what is expected since line-of-sight crosses little of the torus	
	RQ Sy 1, RL Sy 1	Yes	Less reflection in the RL Sy 1, which may be due to jet spectrum diluting observed AGN spectrum	
EW distribution	Sy 1, Sy 2	Maybe	Similar distributions, might expect more if Sy 2s Compton thick, but harder to predict with Compton thin	4.1.4, 5.1.4
	RQ Sy 1, RL Sy 1	Yes	Smaller EW in the RL Sy 1, which may be due to jet spectrum diluting observed AGN spectrum	
EW-Γ relationship	Sy 1	Yes	The complex relationship can be understood if X-rays from the jet are diluting the observed spectrum	4.2.1
	Sy 2	No	The scatter is more than can be accounted for by inclination effects alone. One source that accounts for some of the scatter is a galaxy with star formation, so clearly there is more contributing to the absorption and iron line in these sources than unification can explain.	4.2.1

Parameter or Correlation	Population	Consistent with Unification?	Explanation	Section in Text
Γ-R relationship	Sy 1, Sy 2	Maybe	Strong correlation can be explained by a feedback between the accretion disk and X-ray source, but our data shows a strong modeling degeneracy, so cannot be trusted as physically meaningful.	4.2.2, 5.2.2
EW-L_x relationship	Sy 1	Yes	Anti-correlation observed in sample as a whole, sub-classes, and some individual sources. Can be understood as a time lag between changes in the X-ray source and corresponding changes in the observed iron line EW.	4.2.3
EW-N_H relationship	Sy 2	No	Compton thin sources are showing much higher EW than can be explained by arising from the disk and torus alone. There must be contributions to the iron line from out of our line-of-sight.	5.2.1
Γ-L_x/L_{EDD} relationship	Sy 1, 1.2, 1.5	Yes	Lack of observed relationship indicates that the sources may notbe powerful enough to set up the feedback reportedfor high luminosity quasars. However, Unification does notrequire that such a reltionship.	5.2.3

6.2 Spectral Studies

The work represented by this thesis only begins to take advantage of the vast database of spectral fits that have been performed. In addition to the sample-wide studies, such as those presented here, several individual sources have a number of time-resolved spectra, which would allow a detailed study of these sources alone, with the possibility of extracting variability information. To underscore this point, we show how one source varies over the course of its *RXTE* observations in this section (Section 6.2.1). In addition, we describe the future of the database, which will be made available for other researchers to use (Section 6.2.2).

6.2.1 Variability Case Study

One source that shows variability in its *RXTE* spectra is MR 2251-178. MR 2251-178 is optically classified as a Seyfert 1 galaxy, though it is also a radio-quiet quasar[1]. In our analysis, MR 2251-178 has 8 time-resolved spectra, which are listed, along with the best-fit values, in Table 6.2. The 2 to 10 keV flux ($F_{2-10keV}$) changes by a factor of two between December 1996 and March 2005 from $\sim 3\times10^{-11}$ ergs cm^{-2} s^{-1} to $\sim 6 \times 10^{-11}$ ergs cm^{-2} s^{-1}. The variability is confirmed when we find that the $F_{2-10keV}$ is not well fit by a constant (weighted variance/number = 36.2/8 = 4.5). Figure 6.1 shows the spectral parameters for MR 2251-178 over time.

In addition to the flux varying in MR 2251-178, N_H and Γ both vary over time. The low flux state in December 1996 corresponds to high N_H and low Γ, and the higher flux state in March 2005 corresponds to low N_H and high Γ. Figure 6.2 shows the confidence contours for N_H and Γ for the high flux spectrum (2005-03-

[1] The NASA Extragalactic Database (NED) does not list MR 2251-178 as a quasar, so it is not treated as such in our analysis in Chapters 4 and 5.

28) and low flux spectrum (1996-12-09), and the contours are clearly distinct. As mentioned previously, variability in N_H appears to be a common feature in Seyferts (e.g. Risaliti et al. (2002); Weaver et al. (1996)). The iron line remains constant throughout the *RXTE* observations.

MR 2251-178 is only one of many sources in our database that show flux variability. We did not have time to examine the variability properties of the sample, and so leave that to future studies by other researchers.

Table 6.2: Results of spectral fitting for MR 2251-178.

Spectrum[a]	$\mathbf{F}_{2-10KeV}$[b]	N_H[c]	Γ[d]	R[e]	**EW**[f]
1996-12-09	$3.03^{+0.48}_{-0.62}$	$3.17^{+1.01}_{-1.16}$	$1.69^{+0.07}_{-0.07}$	$0.00^{+0.00}_{-0.07}$	$68.17^{+58.88}_{-63.83}$
1996-12-10a	$3.10^{+0.50}_{-0.77}$	$2.98^{+1.07}_{-1.21}$	$1.63^{+0.07}_{-0.11}$	$0.00^{+0.00}_{-0.18}$	$52.80^{+46.36}_{-44.36}$
1996-12-10b	$3.04^{+0.50}_{-0.60}$	$3.81^{+0.45}_{-0.46}$	$1.71^{+0.05}_{-0.08}$	$0.00^{+0.00}_{-0.06}$	$39.30^{+39.30}_{-60.70}$
1996-12-11	$3.10^{+0.46}_{-0.69}$	$3.91^{+1.00}_{-1.13}$	$1.72^{+0.06}_{-0.09}$	$0.00^{+0.00}_{-0.13}$	$41.54^{+41.54}_{-53.76}$
1996-12-12	$3.24^{+0.53}_{-0.65}$	$3.23^{+1.12}_{-0.96}$	$1.72^{+0.07}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$54.12^{+54.12}_{-62.88}$
2004-03-27	$5.44^{+0.41}_{-1.08}$	$0.20^{+0.20}_{-0.96}$	$1.77^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.17}$	$90.66^{+53.79}_{-47.34}$
2004-08-27	$4.59^{+0.63}_{-1.45}$	$1.20^{+0.88}_{-1.36}$	$1.77^{+0.06}_{-0.14}$	$0.00^{+0.00}_{-0.31}$	$23.04^{+23.04}_{-44.91}$
2005-03-28	$5.93^{+0.85}_{-1.44}$	$0.94^{+0.92}_{-0.99}$	$1.81^{+0.06}_{-0.10}$	$0.00^{+0.00}_{-0.23}$	$59.24^{+53.23}_{-54.76}$

[a]Spectrum name, based on start date of the observation, in the form of YYYY-MM-DDx, where "x" takes on values "a", "b", etc. for spectra which start on the same date for the same source.

[b]The 2 to 10 keV flux in units of 10^{-11} ergs cm^{-2} s^{-1}.

[c]Absorbing column density in units of 10^{22} cm^{-2}.

[d]Photon index of the intrinsic power-law spectrum.

[e]Reflection fraction.

[f]Equivalent width of Fe Kα line, in units of eV.

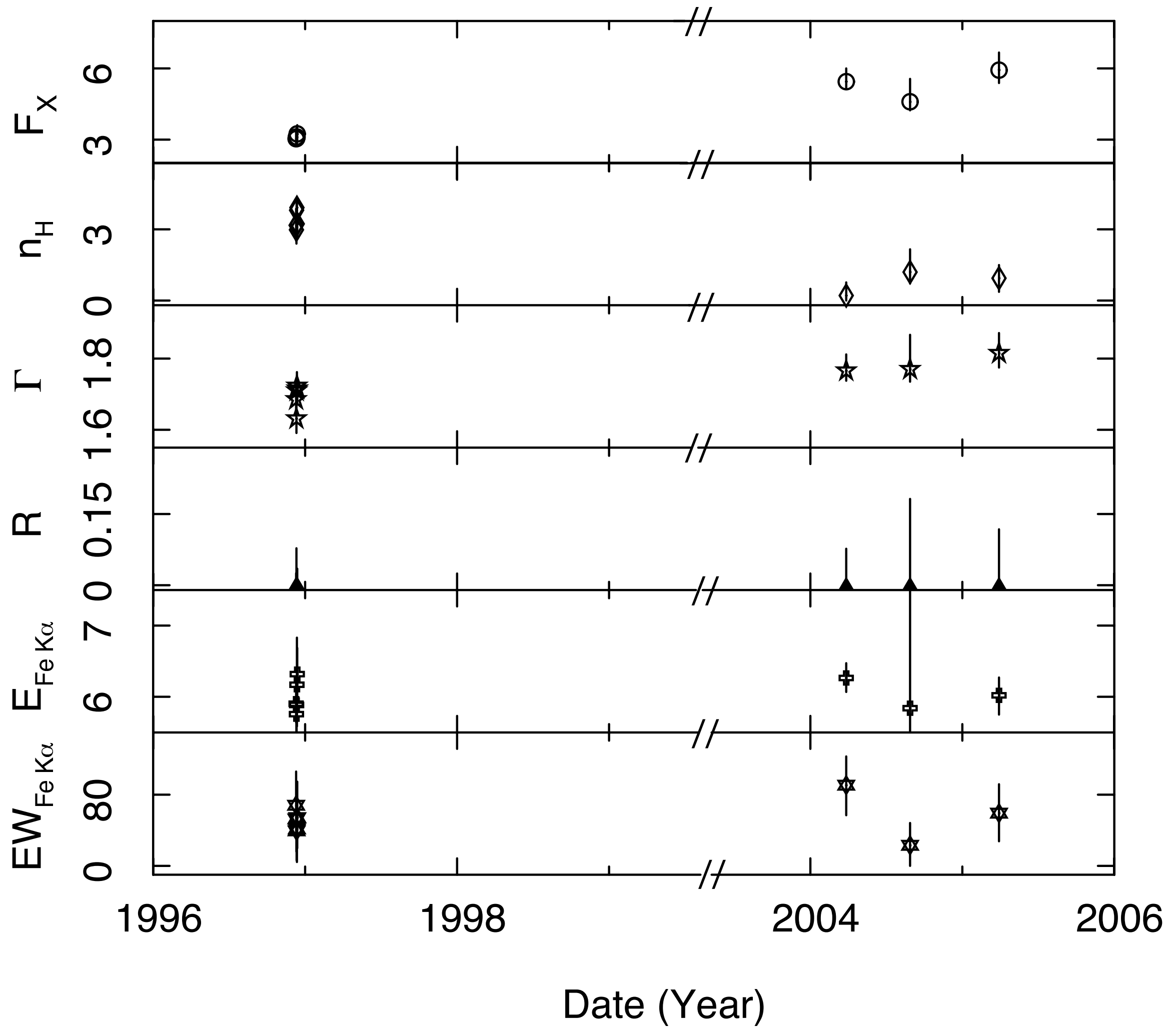

Figure 6.1: The spectral fit parameters of MR 2251-178 over time. From top to bottom: 2 to 10 keV flux in units of 10^{-11} ergs cm^{-2} s^{-1}, N_H in units of 10^{22} cm^{-2}, Γ, R, iron line energy in units of keV, EW in units of eV.

6.2.2 Spectral Database

Since the analysis here only begins to cover the range of studies that can be performed with our database, we will make the fit database and the individual spectral files available for download on a website. The website will contain a text file with all of the spectral parameter values and error bars for the fixed-σ_{Fe} model fits. The text file can easily be searched with any scripting language. In addition, and perhaps more importantly, the website will contain a master index of all spectral files

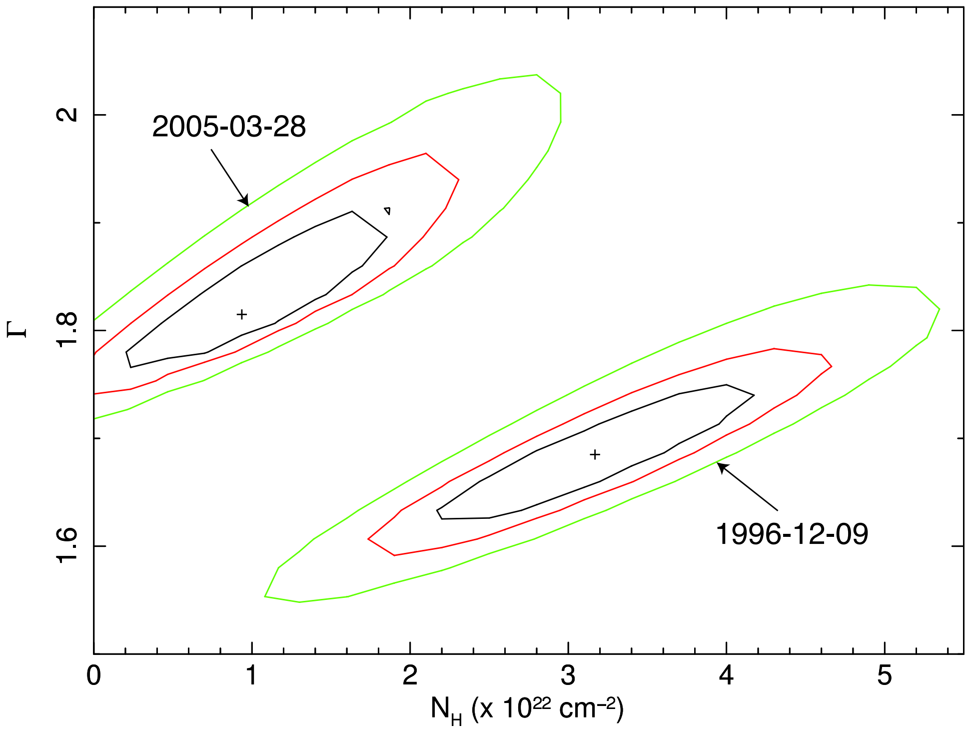

Figure 6.2: Confidence contours for the highest flux spectrum (2005-03-28) and lowest flux spectrum (1996-12-09) of MR 2251-178. The contours correspond to the 68, 90 and 95% levels.

associated with the 821 spectra in our sample. The directory for each spectrum will contain the source spectrum file, the background spectrum file, the response matrix, and the `XSPEC` files for the fixed-σ_{Fe} models.

6.3 Conclusions

At the beginning of this thesis, we posed several questions about Seyferts in the introduction (Section 1.1): Do all Seyfert 2s contain a Seyfert 1 geometry at their core? Are the environments of the central regions all the same in nature? How does the environment affect our view of the central engine? How does the choice of X-ray bandpass affect conclusions that we make about these sources? The results discussed in the preceding chapters allow us to begin to formulate answers to these questions.

The Seyferts in our sample are classically-defined, with their Seyfert classifications based on their optical spectra, and they are the ones that unification was hypothesized to explain. When we look at the broad classes of the Seyfert 1s and Seyfert 2s considered together, the unification model is supported. However, when we break the samples into sub-classifications, the results are not as clear. It may be the case that Seyfert 2s do contain the heart of a Seyfert 1, but based on our observations of the EW-Γ relationship, it appears that the Seyfert 2s contain environments that are more complex than our simple model can account for. There appears to be more at work in these sources than a simple inclination and line-of-sight effect.

Our view of Seyferts in the X-ray band can be highly affected by the choice of bandpass studied. The X-ray spectrum of AGN from $\sim$ 3 to 25 keV is an important band, where several X-ray signatures come together. For energies $\lesssim$ 5 keV, absorption plays an important role. At $\sim$ 10 keV, Compton scattering begins to dominate the spectrum compared to photoelectric absorption. Between these, the iron line lies at $\sim$ 6.4 keV. Underlying all of this is the intrinsic X-ray continuum emitted by the X-ray source. These factors make the 3 to 25 keV spectrum of particular interest to AGN studies. However, the number of processes that come together in this band also contributes to uncertainties in the modeling process, as is made clear by our Γ-R results.

Progress in understanding of the X-ray spectra of Seyferts, in particular the Compton reflection hump, is only going to come with observations at higher bandpasses. Observations across the 1 to 200 keV band (or higher) would allow a look at the absorption, iron line, and reflection hump simultaneously, breaking the observed degeneracies between these components in the current models. Observations by *Integral* have begun to unveil the high energy nature of AGN, but do not go to low enough energies to simultaneously characterize the absorption and the reflection. *Constellation-X*, a planned future X-ray mission, will have exquisite spectral capabilities in the iron line region and high-energy coverage up to 40 keV; however, we will not be able to see the high-energy cut-off of the X-ray emission. The answer may lie with simultaneous observations of low-energy and high-energy X-rays.

Appendix A

Sample Selection

The source sample for this study was compiled using data from the public *RXTE* archive, as discussed in Section 3.1. This section discusses the sample selection process in more detail.

The final sample consists of data from galaxies which was archived in the *RXTE* archive prior to November 1, 2006 that are classified as Seyfert galaxies in the NASA Extragalactic Database (NED)[a], with a minimum of 40 ks total observed time and at least two pointed observations spanning at least 2 weeks.

First I compiled a list of AGN observed by *RXTE* using the Browse interface "subject category" search. This resulted in a sample of 149 unique sources, listed in Table A.1.

[a]`http://nedwww.ipac.caltech.edu/`

A.1 First Cut of Data: Seyfert Galaxies

The sample first consisted of all types of AGN, such as quasars and BL Lacterate objects, in addition to Seyfert galaxies. To eliminate non-Seyfert AGNs from the sample, I used the NED galaxy classifications for each of the initial sources.

In three cases, the NED classification was not sufficient for determining if the source was a Seyfert galaxy or not. NED lists NGC 6393 as a spiral galaxy, with no active galaxy classification, so we supplemented this classification with a literature search. The NED classification for Mkn 421 includes a "S?", which indicates that it might be a Seyfert type galaxy; however, a search of the literature did not turn up any further reference to a Seyfert type for this object. For M 87, NED lists a Seyfert classification with no sub-type. A literature search for M 87 did not show any recent mention of a Seyfert type for this galaxy, so it was also eliminated from this study.

The AGN classifications are listed in Table A.1. Of the initial 149 galaxies, 99 are classified as Seyferts. The 50 galaxies subsequently cut from the sample are indicated in Table A.1 with an "×" in all columns to the right of the "Galaxy Type" column.

A.2 Second Cut of Data: 40-ks Minimum Observing Time

To address the requirement of a minimum of 40 ks total observed time, we returned to the HEASARC's Browse interface to examine the observed time for each accepted proposal for the 99 Seyfert galaxies remaining in the sample. Unfortunately, the HEASARC archive does not consistently report the observed time. To supplement this search, we produced a list of the time awarded for each proposal; however, the awarded time is also not consistently reported. Table A.1 lists the total observed time and total awarded time for each source. A plus (+) indicates lower bounds for those sources where one or more proposal does not report a time.

Sources for which all observed times are reported and the total is < 40 ks are trivially eliminated. Likewise, sources for which all awarded times are reported and the total is < 40 ks are eliminated. Sources with unreported observed and awarded times are not eliminated at this point. Those sources which do not have enough observation time to produce at least two good quality spectra will be eliminated after their data are run through the data pipeline (Section 3.2). Two sources, ESO 141-G55 and NGC 7674, had not been observed by *RXTE* as of November 1, 2006 and are also eliminated from the sample.

Using the criterion of a minimum of 40 ks observed time, 29 further galaxies were eliminated, leaving 70 galaxies in the sample. The eliminated sources are indicated in Table A.1 by "×" in all columns to the right of the "Awarded Time" column.

A.3 Third Cut of Data: Observations Spanning at Least Two Weeks

The final criterion for determining the data sample was that the first and last observations of the source be separated by at least two weeks. We once again consulted the Browse interface, this time to produce a detailed observation log for each of the remaining 70 galaxies. The dates of the beginning of the first observation and the end of the last observation are listed in Table A.1. Fourteen sources are eliminated with this requirement, leaving 56 galaxies in the culled sample.

Table A.1: Source sample selection process. The sources listed are all of the sources observed by *RXTE* that are classified as AGN. Sources that have been eliminated have a "$\times$" in the columns following the criterion for their elimination.

Galaxy	**Type**[a]	**Time Obs**[b]	**Time Award**[b]	**First Obs**[c]	**Last Obs**[c]	**In initial sample?**[d]
HB89 0414+009	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
HB89 0420-014	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
HB89 1553+113	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
4C 29.45	blazar, HPQ	$\times$	$\times$	$\times$	$\times$	$\times$
1E 1415.6+2557	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 0033+595	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 0229+200	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 0323+022	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 0806+524	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1028+511	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1101-232	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1218+304	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1426+428	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1553+113	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1741+196	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 1959+650	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1ES 2344+514	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
1H 0707-495	NLS1	130	100	1997-03-14	1997-03-15	$\times$
1H 0348-120	QSO	$\times$	$\times$	$\times$	$\times$	$\times$
3C 111	BLRG, Sy 1	55+	560	1997-03-22	2006-09-20	$\star$
3C 120	LPQ, BLRG, Sy 1	540+	2100	1996-03-11	2007-01-12	$\star$
3C 273	blazar, LPQ, Sy 1	770+	1900	1996-02-02	2007-02-23	$\star$
3C 279	blazar, HPQ, BL LAC	$\times$	$\times$	$\times$	$\times$	$\times$
3C 382	BLRG, Sy 1	200+	180	1997-03-28	2004-10-31	$\star$
3C 390.3	BLRG, Sy 1	480+	700	1996-05-17	2005-01-14	$\star$
3C 446	HPQ, BL LAC	$\times$	$\times$	$\times$	$\times$	$\times$
3C 454.3	blazar, HPQ	$\times$	$\times$	$\times$	$\times$	$\times$
3C 66A	blazar, BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
4U 0241+61	Sy 1	210	0+	1997-10-12	1997-11-13	$\star$
AKN 120	Sy 1	730+	220+	1998-02-24	2006-12-22	$\star$
AKN 564	Sy 1.8	300+	650	1996-12-23	2003-03-04	$\star$
ARP 220	S?, LINER, Sy 2	1	1	$\times$	$\times$	$\times$
BL LAC	BL Lac	$\times$	$\times$	$\times$	$\times$	$\times$
CEN A	Sy 2	100+	700	1996-08-14	2006-12-08	$\star$
CIRCINUS GALAXY	Sy 2	69+	130	1998-10-12	2000-06-16	‡[j]
CTA 102	blazar, HPQ	$\times$	$\times$	$\times$	$\times$	$\times$

Galaxy	Type[a]	Time Obs[b]	Time Award[b]	First Obs[c]	Last Obs[c]	In initial sample?[d]
CYGNUS A	S?, Radio gal., Sy 2	120+	140	1996-04-10	2000-05-27	⋆
ESO 103-G35	Sy 1, Sy 2[e]	140	0+	1997-04-11	1997-11-14	⋆
ESO 141-G55	S?, Sy 1	N/A[i]	N/A[i]	×	×	×
ESO 253-G3	Sy 2	7	2	×	×	×
FBQS J1217+301	BL Lac	×	×	×	×	×
FAIRALL 9	Sy 1	780+	860	1996-11-03	2003-03-01	⋆
H 0147-537	QSO	×	×	×	×	×
H 1426+428	BL Lac	×	×	×	×	×
H 1722+119	BL Lac	×	×	×	×	×
H 2356-309	BL Lac	×	×	×	×	×
HS 1133+6753	BL Lac	×	×	×	×	×
IC 4329A	Sy 1.2	560+	900	1996-08-03	2006-02-28	⋆
IC 5063	Sy 2	95	80	1996-02-27	1996-12-20	‡[j]
IRAS 00521-7054	Sy 2	3	2	×	×	×
IRAS 01475-0740	Sy 2	6	4	×	×	×
IRAS F03362-1642	Sy 2	10	2	×	×	×
IRAS 04385-0828	Sy 2	4	2	×	×	×
IRAS 04575-7537	Sy 2	70	60	1996-12-10	1997-07-20	⋆
IRAS 05189-2524	Sy 2	3	2	×	×	×
IRAS 08572+3915	LINER, Sy 2	4	4	×	×	×
IRAS 13349+2438	Sy 1	8	0+	×	×	×
IRAS 18325-5926	Sy 2	270+	200	1996-01-31	1998-02-24	⋆
IRAS 19254-7245	Sy 2	2	2	×	×	×
I ZW 187	BL Lac	×	×	×	×	×
BSF97 J111706.2+201407	BL Lac, Sy 2	N/A[i]	N/A[i]	×	×	×
LBQS 2212-1759	BL Lac	×	×	×	×	×
M 87	NLRG, Sy	×	×	×	×	×
MCG-2-40-4	Sy 2	8	4	×	×	×
MCG-2-58-22	Sy 1.5	88+	250	1997-12-15	1999-11-05	⋆
MCG-3-34-63	Sy 2[f]	11	2	×	×	×
MCG-5-23-16	Sy 2	300+	195	1996-04-24	2005-12-09	⋆
MGC-6-30-15	Sy 1.2	2000+	2100	1996-03-17	2006-02-28	⋆
MKN 3	Sy 2	120	60	1996-12-25	1997-07-06	‡[j]
MKN 79	Sy 1.2	0+	590	2000-03-07	2006-03-01	⋆
MKN 110	Sy 1	0+	220	2000-03-07	2006-03-01	⋆
MKN 180	BL Lac	×	×	×	×	×
MKN 279	Sy 1.5	91+	220	1996-05-21	2002-05-24	⋆
MKN 335	Sy 1.2	0+	40	2000-04-27	2001-02-11	‡[j]
MKN 348	Sy 2	580	260	1996-05-24	1997-07-12	⋆
MKN 421	BL Lac[g]	×	×	×	×	×
MKN 501	BL Lac	×	×	×	×	×
MKN 509	Sy 1.2	240+	830	1996-05-01	2006-07-25	⋆

Galaxy	Type[a]	Time Obs[b]	Time Award[b]	First Obs[c]	Last Obs[c]	In initial sample?[d]
MKN 590	Sy 1.2	0+	40	2000-05-20	2001-03-07	‡[j]
MKN 766	Sy 1.5	0+	270	2001-05-05	2006-02-28	⋆
MR 2251-178	Sy 1	170+	260	1996-12-09	2006-01-29	⋆
NGC 1068	Sy 1, Sy 2	110	60	1996-08-16	1996-08-19	×
NGC 1320	Sy 2	5	4	×	×	×
NGC 1386	Sy 2	5	2	×	×	×
NGC 2110	Sy 2	300+	300	1997-12-07	2003-03-06	⋆
NGC 2992	Sy 1, Sy 2	0+	79	2005-03-04	2005-05-08	‡[j]
NGC 3227	Sy 1.5	300+	1200	1996-11-18	2005-07-22	⋆
NGC 3281	Sy 2	0+	40	2005-02-04	2005-02-05	×
NGC 3516	Sy 1.5	1900+	1200	1997-03-15	2006-10-13	⋆
NGC 3660	Sy 2	17	4	×	×	×
NGC 3783	Sy 1	240+	1300	1996-01-29	2006-03-03	⋆
NGC 4051	Sy 1.5	680+	1900	1996-04-23	2006-02-27	⋆
NGC 4151	Sy 1.5	660+	640+	1996-01-17	2004-06-01	⋆
NGC 4258	LINER, Sy 1.9	1000+	1200	1996-12-03	2006-03-03	⋆
NGC 4388	Sy 2	160+	110	1996-03-06	2003-05-10	⋆
NGC 4507	Sy 2	190+	360	1996-02-24	2003-06-26	‡[k]
NGC 4593	Sy 1	0+	430	2001-06-29	2006-02-09	⋆
NGC 4945	Sy 2	300+	800+	1996-01-16	2006-01-24	‡[j]
NGC 526A	Sy 1.5	0+	12	×	×	×
NGC 5347	Sy 2	11	4	×	×	×
NGC 5506	Sy 1.9	480+	840	1996-03-17	2004-08-08	⋆
NGC 5548	Sy 1.5	970+	860+	1996-04-23	2006-03-02	⋆
NGC 6240	LINER, Sy 2	220+	140	1997-11-09	2005-02-04	‡[j]
NGC 6251	LERG, Sy 2	0+	180	2005-03-04	2006-02-27	‡[j]
NGC 6300	Sy 2	55	37	1997-02-14	1997-02-20	×
NGC 6393	Sy 2[h]	48	30	1996-10-07	1996-10-13	×
NGC 6890	Sy 2	9	4	×	×	×
NGC 7172	Sy 2	170	100	1996-12-13	1996-12-25	×
NGC 7213	LINER, Sy 1.5	0+	180	2006-03-03	2006-03-03	×
NGC 7314	Sy 1.9	37+	320	1999-01-01	2002-07-22	⋆
NGC 7469	Sy 1.2	1500+	1100	1996-04-12	2006-02-11	⋆
NGC 7582	Sy 2	0+	210	2003-06-04	2004-08-30	‡[j]
NGC 7674	Sy 2	N/A[i]	N/A[i]	×	×	×
OJ 287	BL Lac	×	×	×	×	×
PDS 456	RQQ	×	×	×	×	×
PG 0052+251	Sy 1	53+	180+	1997-08-29	2005-03-03	‡[j]
PG 0804+761	Sy 1	73+	470	1999-01-24	2004-12-23	‡[l]
PG 1116+215	Sy 1	65	60	1996-07-22	1996-07-29	×
PG 1202+281	Sy 1	29	0+	1997-10-04	1997-10-09	×
PG 1211+143	RQQ, Sy 1	370	120+	1997-10-09	1998-07-06	‡[j]

Galaxy	Type[a]	Time Obs[b]	Time Award[b]	First Obs[c]	Last Obs[c]	In initial sample?[d]
PG 1416-129	BAL QSO, Sy 1	44	24	1998-08-21	1998-08-23	×
PG 1424+240	BL Lac	×	×	×	×	×
PG 1440+356	Sy 1	55	0+	1997-08-16	1997-08-21	×
PG 1700+518	BAL, Sy 1, Sbrst	44	40	1997-01-24	1997-01-26	×
PICTOR A	Sy 1	64	40	1997-05-08	1997-05-11	×
PKS 0528+134	blazar, LPQ	×	×	×	×	×
PKS 0548-322	BL Lac	×	×	×	×	×
PKS 0558-504	NLS1	1+	230	1997-10-13	2006-03-02	⋆
PKS 0921-213	Radio Galaxy	×	×	×	×	×
PKS B1510-089	Sy 1, HPQ	370+	1100	1996-12-13	2007-02-23	‡[l]
PKS B1622-297	blazar, LPQ	×	×	×	×	×
PKS 2005-489	BL Lac	×	×	×	×	×
PKS B2126-158	LPQ	×	×	×	×	×
PKS 2155-304	BL Lac	×	×	×	×	×
RHS 03	Sy 1	15	10	×	×	×
RHS 15	Sy 1	20	10	×	×	×
RHS 17	Sy 1	17	10	×	×	×
RHS 53	BL Lac	×	×	×	×	×
RHS 54	Sy 1	1	10	×	×	×
RHS 56	NLS1, Sy 1	17	10	×	×	×
RHS 61	Sy 1	1	10	×	×	×
RX J1211.9+2242	candidate BL Lac	×	×	×	×	×
S5 0716+714	HPQ, blazar, BL Lac	×	×	×	×	×
S5 0836+710	blazar, LPQ	×	×	×	×	×
TOL 1238-364	Sy 2	4	2	×	×	×
TON S180	Sy 1.2	0+	510	1999-05-03	2000-03-04	‡[j]
TON 1542	Sy 1	160	100	1996-08-03	1996-08-09	×
XSS J05054-2348	Sy 2	0+	0+	2004-06-23	2004-06-23	×

Galaxy	Type[a]	Time Obs[b]	Time Award[b]	First Obs[c]	Last Obs[c]	In initial sample?[d]
XSS J18236-5616	Sy 2	9	9	×	×	×

[a]These classifications are taken from the Nasa Extragalactic Database (`http://nedwww.ipac.caltech.edu/`), unless otherwise stated. Abbreviations for galaxy type are: BAL=Broad Absorption Line, BLRG=Broad Line Radio Galaxy, BLS1=Broad Line Seyfert 1, HPQ=Highly Polarized Quasar, LERG=Low-Excitation Radio Galaxy, LINER=Low-Ionization Nuclear Emission-line Region, LPQ=Low Polarization Quasar, NLRG=Narrow Line Radio Galaxy, RQQ=Radio Quiet Quasar

[b]As of November 1, 2006, as listed in the HEASARC public archive for RXTE observations. The archive does not consistently list this information, and often some or all of the accepted observations for a source do not show this information in a search of the archive. In cases where there was no awarded or observed time listed, the number in this column shows a plus (+) sign to indicate that the number listed in the table is a lower-bound.

[c]As of November 1, 2006, as listed in the HEASARC public archive for RXTE observations.

[d]A '×' in this column indicates that the source has been eliminated from the sample. A '$\star$' indicates that the source will remain in the sample, to be run through the data pipeline.

[e]ESO 103-G035 is listed as a Seyfert 1 and a Seyfert 2 galaxy in NED. A literature search shows that when this source was first observed, it was classified as a Seyfert 1 galaxy (e.g. Marshall et al. (1979)). However, more recent papers identify this source as a Seyfert 2, so we class this source as a Seyfert 2.

[f]NED points out that this source is often confused with MCG −3-34-64 in the literature. It appears as though MCG −3-34-64 is the type 1.8 Seyfert galaxy, while the source named in the accepted proposal, MCG −3-34-63 is not. The separation between the to is less than 1.8 arcmin. However, the observations of this source do not meet the minimum time requirements for inclusion in this study, so the question of which source was observed is purely academic as far as this study is concerned.

[g]NED also listed this source as a "S?", which means that it might be a Seyfert-type galaxy. However, there was no further reference in the literature to its Seyfert status, so this was eliminated in the first cut of the data.

[h]NED did not have a definite classification for this galaxy, but a literature search shows that NGC6393 is a Seyfert 2 (e.g. Lipovetsky et al. (1988)).

[i]This source has an accepted proposal for observation, but as of November 1, 2006, it has not been observed.

[j]After running the data pipeline, there were fewer than 2 resulting time-resolved spectra for this source.

[k]After running the data pipeline, the resulting time-resolved spectra spanned less than 2 weeks.

[l]After running the data pipeline and eliminating the epcoh-spanning spectra, only one spectrum was left for this source.

Appendix B

Spectral Information

B.1 Spectral Log – All Spectra in Sample

Table B.1 lists the spectra which were analyzed in this study. They were extracted as described in Chapter 3. The table lists the start and end time for the input data for each spectrum, the spectrum name, the originating *RXTE* observation number, and the total exposure time for each spectrum and for each galaxy as a whole.

Table B.1: Log of all time-resolved spectra in the sample, listing the spectrum name, total exposure time, the observation start and stop times, originating proposal number from *RXTE* and PCUs used for data reduction for each spectrum.

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
3C 111 Total Exposure = 193799 s, Total spectra = 9, Average exposure per spectrum = 21533 s					
1997-03-22	10351	03/22/1997 01:23:43.56	03/24/1997 01:23:43.56	20334	0,1,2
1997-03-24	11775	03/24/1997 02:59:43.56	03/24/1997 09:23:43.56	20334	0,1,2
2001-03-14	17471	03/14/2001 08:49:19.56	03/15/2001 05:37:19.56	60142	2
2001-03-15	20191	03/15/2001 07:13:19.56	03/16/2001 05:37:19.56	60142	2
2004-03-01	40015	03/01/2004 09:28:31.56	07/31/2004 23:52:31.56	90152	2
2004-08-04	24543	08/04/2004 22:16:31.56	10/06/2004 23:52:31.56	90152	2
2004-10-10	21871	10/10/2004 14:16:31.56	01/22/2005 17:28:31.56	90152	2
2005-03-31	23055	03/31/2005 02:33:03.56	07/20/2005 00:57:03.56	91146	2
2005-07-20	24527	07/20/2005 02:33:03.56	10/13/2005 16:57:03.56	91146	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
3C 120					
Total Exposure = 1160913 s, Total spectra = 59, Average exposure per spectrum = 19676 s					
1996-03-11a	11199	03/11/1996 00:48:15.56	03/11/1996 07:12:15.56	10339	0,1,2
1996-03-11b	12447	03/11/1996 21:36:15.56	03/12/1996 04:00:15.56	10339	0,1,2
1997-01-10	8127	01/10/1997 11:43:11.56	01/14/1997 13:19:11.56	20333	0,1,2
1997-01-15	9935	01/15/1997 10:07:11.56	01/19/1997 13:19:11.56	20333	0,1,2
1997-01-20	9215	01/20/1997 06:55:11.56	01/23/1997 11:43:11.56	20333	0,1,2
1997-01-24	8527	01/24/1997 06:55:11.56	01/27/1997 13:19:11.56	20333	0,1,2
1997-01-28	8847	01/28/1997 13:19:11.56	02/01/1997 06:55:11.56	20333	0,1,2
1997-02-02	8415	02/02/1997 11:43:11.56	02/07/1997 06:55:11.56	20333	0,1,2
1997-02-08	8543	02/08/1997 06:55:11.56	02/11/1997 06:55:11.56	20333	0,1,2
1997-02-11	9567	02/11/1997 08:31:11.56	02/16/1997 08:31:11.56	20333	0,1,2
1997-02-17	8655	02/17/1997 06:55:11.56	02/21/1997 16:31:11.56	20333	0,1,2
1997-02-22	11743	02/22/1997 11:43:11.56	02/27/1997 08:31:11.56	20333	0,1,2
1997-03-01	8383	03/01/1997 16:31:11.56	03/07/1997 05:19:11.56	20333	0,1,2
1997-12-30	11423	12/30/1997 01:17:19.56	04/30/1998 10:53:19.56	30241	0,1,2
1998-02-13a	12079	02/13/1998 04:53:03.56	02/13/1998 11:17:03.56	30404	0,1,2
1998-02-13b	11711	02/13/1998 12:53:03.56	02/14/1998 08:05:03.56	30404	0,1,2
1998-02-14	12127	02/14/1998 09:41:03.56	02/15/1998 08:05:03.56	30404	0,1,2
1998-02-15	8815	02/15/1998 09:41:03.56	02/15/1998 14:29:03.56	30404	0,1,2
1998-04-30	9007	04/30/1998 12:29:19.56	10/23/1998 23:41:19.56	30241	0,1,2
1998-10-27	7919	10/27/1998 09:17:19.56	01/07/1999 04:29:19.56	30241	0,1,2
1999-01-15	15231	01/15/1999 17:05:19.56	03/23/1999 04:17:19.56	40166	0,2
1999-03-30	11647	03/30/1999 04:17:19.56	07/24/1999 17:05:19.56	40166	0,2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
1999-07-29	14511	07/29/1999 15:29:19.56	10/28/1999 05:53:19.56	40166	0,2
1999-10-31	12479	10/31/1999 04:17:19.56	01/12/2000 21:53:19.56	40166	0,2
2002-03-01	30288	03/01/2002 21:53:03.56	07/08/2002 00:14:23.56	70164	2
2002-07-09	24799	07/09/2002 08:14:23.56	09/18/2002 03:26:23.56	70164	2
2002-09-18	23504	09/18/2002 05:02:23.56	11/26/2002 20:17:03.56	70164	2
2002-11-29	24784	11/29/2002 15:29:03.56	02/06/2003 11:26:23.56	70164	2
2002-12-13	26703	12/13/2002 21:33:19.56	12/14/2002 23:09:19.56	70162	2
2002-12-15	23871	12/15/2002 00:45:19.56	12/15/2002 23:09:19.56	70162	2
2002-12-16a	23503	12/16/2002 00:45:19.56	12/16/2002 21:33:19.56	70162	2
2002-12-16b	25279	12/16/2002 23:09:19.56	12/18/2002 00:45:19.56	70162	2
2002-12-18	25279	12/18/2002 02:21:19.56	12/19/2002 00:45:19.56	70162	2
2002-12-19	27455	12/19/2002 08:45:19.56	12/20/2002 19:57:19.56	70162	2
2002-12-20	24415	12/20/2002 21:33:19.56	12/21/2002 19:57:19.56	70162	2
2002-12-21	22607	12/21/2002 21:33:19.56	12/22/2002 19:57:19.56	70162	2
2003-02-06	24224	02/06/2003 13:02:23.56	04/11/2003 23:29:03.56	70164	2
2003-02-08a	24703	02/08/2003 04:17:35.56	02/08/2003 18:41:35.56	70163	2
2003-02-08b	23935	02/08/2003 20:17:35.56	02/09/2003 15:29:35.56	70163	2
2003-04-29	31872	04/29/2003 07:32:31.56	08/02/2003 01:00:15.56	80175	2
2003-08-04	27487	08/04/2003 02:36:15.56	09/05/2003 18:36:15.56	80175	2
2003-08-26	27791	08/26/2003 02:55:11.56	08/27/2003 09:19:11.56	80176	2
2003-09-07	28784	09/07/2003 15:24:15.56	10/09/2003 02:44:31.56	80175	2
2003-10-09	31087	10/09/2003 04:20:31.56	11/23/2003 13:56:31.56	80175	2
2004-01-11	24671	01/11/2004 13:48:15.56	02/14/2004 05:48:15.56	80175	2
2004-02-15	27840	02/15/2004 05:48:15.56	03/23/2004 09:08:31.56	80175	2
2004-03-24	28496	03/24/2004 23:32:31.56	03/09/2005 23:32:31.56	80175	2
2004-06-24	27007	06/24/2004 08:10:39.56	07/22/2004 04:58:39.56	90152	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2004-07-23	27487	07/23/2004 16:10:39.56	08/27/2004 16:10:39.56	90152	2
2004-08-29	25472	08/29/2004 16:10:39.56	09/28/2004 15:12:15.56	90152	2
2004-09-30	24127	09/30/2004 04:00:15.56	10/27/2004 08:48:15.56	90152	2
2004-10-29	23807	10/29/2004 23:12:15.56	11/26/2004 18:24:15.56	90152	2
2004-11-28	24624	11/28/2004 20:00:15.56	01/06/2005 00:10:39.56	90152	2
2005-01-06	27583	01/06/2005 01:46:39.56	02/15/2005 14:34:39.56	90152	2
2005-02-17	24784	02/17/2005 04:58:39.56	05/01/2005 20:58:39.56	90152	2
2005-03-11	29664	03/11/2005 07:32:31.56	04/14/2005 05:56:31.56	80175	2
2005-06-24	25311	06/24/2005 20:21:19.56	07/22/2005 23:33:19.56	91146	2
2005-07-23	24271	07/23/2005 01:09:19.56	08/23/2005 13:57:19.56	91146	2
2005-08-25	22847	08/25/2005 13:57:19.56	10/07/2005 18:45:19.56	91146	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
3C 273					
Total Exposure = 903377 s, Total spectra = 81, Average exposure per spectrum = 11152 s					
1996-05-21	5488	05/21/1996 11:26:23.56	08/13/1996 03:26:23.56	10354	0,1,2
1996-07-16	6095	07/16/1996 23:17:19.56	07/17/1996 02:29:19.56	10330	0,1,2
1996-07-17a	5951	07/17/1996 04:05:19.56	07/17/1996 07:17:19.56	10330	0,1,2
1996-07-17b	5711	07/17/1996 08:53:19.56	07/17/1996 15:17:19.56	10330	0,1,2
1996-07-17c	8159	07/17/1996 21:41:19.56	07/18/1996 02:29:19.56	10330	0,1,2
1996-07-18a	5887	07/18/1996 04:05:19.56	07/18/1996 07:17:19.56	10330	0,1,2
1996-07-18b	4735	07/18/1996 08:53:19.56	07/18/1996 13:41:19.56	10330	0,1,2
1996-11-03	2592	11/03/1996 15:14:23.56	11/24/1996 20:02:23.56	20349	0,1,2
1996-12-02	3232	12/02/1996 23:14:23.56	12/24/1996 18:26:23.56	20349	0,1,2
1996-12-25	3648	12/25/1996 04:02:23.56	01/01/1997 07:14:23.56	20349	0,1,2
1997-01-01	2912	01/01/1997 15:14:23.56	01/06/1997 07:14:23.56	20349	0,1,2
1997-01-07	3856	01/07/1997 07:14:23.56	01/12/1997 10:26:23.56	20349	0,1,2
1997-01-13	3616	01/13/1997 10:26:23.56	01/16/1997 02:26:23.56	20349	0,1,2
1997-01-16	3904	01/16/1997 12:02:23.56	01/20/1997 16:50:23.56	20349	0,1,2
1997-01-21	3728	01/21/1997 05:38:23.56	01/25/1997 15:14:23.56	20349	0,1,2
1997-01-26	3232	01/26/1997 04:02:23.56	01/29/1997 02:26:23.56	20349	0,1,2
1997-01-29	3120	01/29/1997 15:14:23.56	02/01/1997 20:02:23.56	20349	0,1,2
1997-02-02	3120	02/02/1997 10:26:23.56	02/05/1997 15:14:23.56	20349	0,1,2
1997-02-10	5328	02/10/1997 07:14:23.56	03/21/1997 16:50:23.56	20349	0,1,2
1997-03-29	5695	03/29/1997 02:26:23.56	05/28/1997 20:57:35.56	20349	0,1,2
1997-06-03	7215	06/03/1997 06:33:35.56	08/03/1997 04:57:35.56	20349	0,1,2
1997-08-12	5599	08/12/1997 16:09:35.56	12/11/1997 20:57:35.56	20349	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
1998-06-24	4864	06/24/1998 07:45:03.56	06/25/1998 04:33:03.56	30805	0,1,2
1998-06-25	6271	06/25/1998 06:09:03.56	06/26/1998 07:45:03.56	30805	0,1,2
1999-01-04	173231	01/04/1999 06:25:35.56	03/02/1999 16:29:19.56	40176	0,2
1999-01-19a	5759	01/19/1999 18:32:31.56	01/19/1999 21:44:31.56	40177	0,1,2
1999-01-19b	5408	01/19/1999 23:20:31.56	01/26/1999 18:32:31.56	40177	0,1,2
1999-01-26	5472	01/26/1999 20:08:31.56	02/01/1999 12:08:31.56	40177	0,1,2
1999-02-01	8831	02/01/1999 13:44:31.56	02/01/1999 18:32:31.56	40177	0,1,2
2000-01-16	5648	01/16/2000 18:05:19.56	01/20/2000 14:53:19.56	40176	0,2
2000-01-26	5440	01/26/2000 16:01:35.56	02/24/2000 08:01:35.56	40176	0,2
2000-02-23a	4576	02/23/2000 12:39:27.56	02/23/2000 15:51:27.56	50183	0,2
2000-02-23b	4752	02/23/2000 17:27:27.56	02/24/2000 11:03:27.56	50183	0,2
2000-02-24	5584	02/24/2000 12:39:27.56	02/25/2000 19:03:27.56	50183	0,2
2000-02-26a	7184	02/26/2000 09:27:27.56	02/26/2000 14:15:27.56	50183	0,2
2000-02-26b	5968	02/26/2000 15:51:27.56	02/28/2000 12:39:27.56	50183	0,2
2000-02-28	6464	02/28/2000 14:15:27.56	02/29/2000 07:51:27.56	50183	0,2
2001-03-02	17951	03/02/2001 20:36:47.56	03/29/2001 06:12:47.56	60144	2
2001-03-29	15776	03/29/2001 07:48:47.56	04/23/2001 12:36:47.56	60144	2
2001-04-23	14352	04/23/2001 14:12:47.56	05/21/2001 11:00:47.56	60144	2
2001-05-23	12128	05/23/2001 17:24:47.56	06/10/2001 03:00:47.56	60144	2
2001-06-13	10240	06/13/2001 04:36:47.56	07/06/2001 04:47:11.56	60144	2
2001-07-06	9952	07/06/2001 06:23:11.56	07/23/2001 07:59:11.56	60144	2
2001-07-24	10016	07/24/2001 23:59:11.56	08/12/2001 01:35:11.56	60144	2
2001-08-14	13888	08/14/2001 23:59:11.56	11/03/2001 17:35:11.56	60144	2
2001-11-03	11776	11/03/2001 19:11:11.56	11/22/2001 17:35:11.56	60144	2
2001-11-24	10432	11/24/2001 19:11:11.56	12/20/2001 23:48:47.56	60144	2
2002-01-14	11472	01/14/2002 17:24:47.56	02/01/2002 17:24:47.56	60144	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
2002-02-01	9888	02/01/2002 19:00:47.56	02/16/2002 07:48:47.56	60144	2
2002-02-16	10736	02/16/2002 09:24:47.56	03/04/2002 11:00:47.56	60144	2
2002-03-04	11264	03/04/2002 12:36:47.56	03/22/2002 03:00:47.56	60144	2
2002-03-24	10624	03/24/2002 15:48:47.56	04/07/2002 09:35:11.56	60144	2
2002-04-07	13712	04/07/2002 18:46:23.56	04/10/2002 18:46:23.56	70153	2
2002-04-10	13424	04/10/2002 20:22:23.56	04/14/2002 21:58:23.56	70153	2
2002-04-15	15248	04/15/2002 01:10:23.56	04/28/2002 10:46:23.56	70153	2
2002-05-01	12064	05/01/2002 09:10:23.56	05/19/2002 18:46:23.56	70153	2
2002-05-22	10592	05/22/2002 09:10:23.56	06/09/2002 10:46:23.56	70153	2
2002-06-12	14624	06/12/2002 07:34:23.56	07/07/2002 04:22:23.56	70153	2
2002-07-09	14528	07/09/2002 21:58:23.56	07/31/2002 04:22:23.56	70153	2
2003-05-09	13024	05/09/2003 23:32:31.56	05/30/2003 07:32:31.56	80169	2
2003-05-30	11312	05/30/2003 09:08:31.56	06/20/2003 05:56:31.56	80169	2
2003-06-16	9520	06/16/2003 06:40:15.56	07/21/2003 00:16:15.56	80165	2
2003-06-23	9792	06/23/2003 05:56:31.56	07/06/2003 23:32:31.56	80169	2
2003-07-07	10192	07/07/2003 01:08:31.56	07/23/2003 02:44:31.56	80169	2
2003-07-21	12896	07/21/2003 01:52:15.56	01/01/2004 19:28:15.56	80165	2
2003-07-25	15136	07/25/2003 05:56:31.56	08/23/2003 02:44:31.56	80169	2
2003-08-23	11776	08/23/2003 04:20:31.56	11/12/2003 18:44:31.56	80169	2
2003-11-14	11392	11/14/2003 01:08:31.56	12/05/2003 02:44:31.56	80169	2
2004-01-02	13952	01/02/2004 06:40:15.56	07/01/2004 05:04:15.56	80165	2
2004-02-27	12976	02/27/2004 15:40:15.56	04/05/2004 06:04:15.56	90142	2
2004-04-07	13264	04/07/2004 12:28:15.56	05/21/2004 01:16:15.56	90142	2
2004-05-23	15536	05/23/2004 12:28:15.56	07/12/2004 04:28:15.56	90142	2
2004-07-14	14000	07/14/2004 04:28:15.56	08/28/2004 17:46:07.56	90142	2
2004-10-29	10336	10/29/2004 22:04:15.56	12/01/2004 04:28:15.56	90142	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
2004-12-03	9600	12/03/2004 10:52:15.56	12/21/2004 18:52:15.56	90142	2
2004-12-21	10688	12/21/2004 20:28:15.56	12/29/2004 16:10:07.56	90142	2
2004-12-30	13024	12/30/2004 04:58:07.56	01/09/2005 03:22:07.56	90142	2
2005-03-04	17791	03/04/2005 16:45:35.56	04/22/2005 08:45:35.56	91127	2
2005-04-24	13488	04/24/2005 10:21:35.56	06/10/2005 05:33:35.56	91127	2
2005-06-12	10576	06/12/2005 03:57:35.56	07/11/2005 05:33:35.56	91127	2
2005-07-13	10144	07/13/2005 03:57:35.56	08/14/2005 19:57:35.56	91127	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
3C 382					
Total Exposure = 109577 s, Total spectra = 7, Average exposure per spectrum = 15653 s					
1997-03-28	11695	03/28/1997 23:26:23.56	03/29/1997 20:14:23.56	10339	0,1,2
1997-03-29	10447	03/29/1997 21:50:23.56	03/30/1997 20:14:23.56	10339	0,1,2
1999-04-11	12783	04/11/1999 14:46:07.56	04/11/1999 22:46:07.56	40167	0,2
1999-04-12a	12047	04/12/1999 00:22:07.56	04/12/1999 21:10:07.56	40167	0,2
1999-04-12b	11791	04/12/1999 22:46:07.56	04/13/1999 19:34:07.56	40167	0,2
2004-10-27	24751	10/27/2004 07:16:31.56	10/28/2004 05:40:31.56	80189	2
2004-10-28	26063	10/28/2004 07:16:31.56	10/30/2004 18:28:31.56	80189	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
3C 390.3					
Total Exposure = 410851 s, Total spectra = 18, Average exposure per spectrum = 22825 s					
1996-05-17	11743	05/17/1996 14:14:39.56	05/22/1996 20:38:39.56	10340	0,1,2
1996-05-23	16767	05/23/1996 19:02:39.56	05/30/1996 19:02:39.56	10340	0,1,2
1996-05-31	15647	05/31/1996 17:26:39.56	06/06/1996 19:02:39.56	10340	0,1,2
1996-06-07	22255	06/07/1996 15:50:39.56	06/17/1996 20:38:39.56	10340	0,1,2
1996-06-17	25391	06/17/1996 22:14:39.56	06/26/1996 22:14:39.56	10340	0,1,2
1996-06-26	23855	06/26/1996 23:50:39.56	07/07/1996 14:14:39.56	10340	0,1,2
1999-04-29	27168	04/29/1999 06:50:55.56	07/22/1999 03:41:51.56	40170	0,2
1999-07-25	18175	07/25/1999 22:53:51.56	09/14/1999 18:05:51.56	40170	0,2
1999-09-17	20448	09/17/1999 21:17:51.56	11/10/1999 08:26:55.56	40170	0,2
1999-11-13	15119	11/13/1999 21:14:55.56	12/25/1999 13:14:55.56	40170	0,2
1999-12-28	18415	12/28/1999 14:50:55.56	02/26/2000 03:38:55.56	40170	0,2
2000-03-03	27759	03/03/2000 04:26:23.56	05/05/2000 10:50:23.56	50178	2
2000-07-28	36496	07/28/2000 15:38:23.56	10/23/2000 12:21:51.56	50178	2
2000-10-26	28080	10/26/2000 18:45:51.56	12/16/2000 10:45:51.56	50178	2
2000-12-19	28464	12/19/2000 15:33:51.56	02/23/2001 23:38:23.56	50178	2
2005-01-12a	24703	01/12/2005 01:58:39.56	01/12/2005 19:34:39.56	90130	2
2005-01-12b	25215	01/12/2005 21:10:39.56	01/13/2005 05:10:39.56	90130	2
2005-01-13	25151	01/13/2005 06:46:39.56	01/14/2005 00:22:39.56	90130	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
4U 0241+61 Total Exposure = 28702 s, Total spectra = 2, Average exposure per spectrum = 14351 s					
1997-10-12	13519	10/12/1997 12:16:31.56	10/27/1997 18:40:31.56	20324	0,1,2
1997-10-30	15183	10/30/1997 10:40:31.56	11/13/1997 09:04:31.56	20324	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Akn 120 Total Exposure = 229668 s, Total spectra = 14, Average exposure per spectrum = 16404 s					
1998-02-24	10895	02/24/1998 02:02:07.56	04/04/1998 05:14:07.56	30232	0,1,2
1998-04-07	15071	04/07/1998 02:02:07.56	09/12/1998 03:38:07.56	30232	0,1,2
1998-09-15	15647	09/15/1998 03:38:07.56	11/26/1998 13:14:07.56	30232	0,1,2
1998-12-02	11167	12/02/1998 08:26:07.56	12/15/1998 21:14:07.56	30232	0,1,2
1998-12-16a	13583	12/16/1998 02:21:19.56	12/16/1998 19:57:19.56	30232	0,1,2
1998-12-16b	11712	12/16/1998 21:33:19.56	12/17/1998 05:33:19.56	30232	0,1,2
1998-12-17a	12703	12/17/1998 07:09:19.56	12/17/1998 21:33:19.56	30232	0,1,2
1998-12-17b	11279	12/17/1998 23:09:19.56	12/18/1998 07:09:19.56	30232	0,1,2
1998-12-18	12368	12/18/1998 08:45:19.56	01/07/1999 05:14:07.56	30232	0,1,2
1999-01-10	12879	01/10/1999 03:38:07.56	02/24/1999 05:14:07.56	30232	0,1,2
1999-10-19	24927	10/19/1999 00:33:35.56	02/07/2000 00:33:35.56	40160	0,2
2000-02-10	17727	02/10/2000 03:45:35.56	04/28/2000 00:33:35.56	40160	0,2
2003-08-24a	29215	08/24/2003 03:37:35.56	08/24/2003 21:13:35.56	80160	2
2003-08-24b	30495	08/24/2003 22:49:35.56	08/25/2003 18:01:35.56	80160	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Akn 564 Total Exposure = 210910 s, Total spectra = 4, Average exposure per spectrum = 52727 s					
1996-12-23	21279	12/23/1996 15:51:11.56	12/24/1996 07:51:11.56	10291	0,1,2
1999-01-01	64400	01/01/1999 13:07:11.56	11/08/1999 23:54:55.56	40158	2
2000-06-09	66032	06/09/2000 21:07:11.56	06/23/2000 00:19:11.56	40158	2
2002-03-02	59199	03/02/2002 19:52:31.56	03/04/2003 19:52:31.56	70144	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Cen A Total Exposure = 194203 s, Total spectra = 39, Average exposure per spectrum = 4979 s					
1996-08-14a	2448	08/14/1996 02:44:15.56	08/14/1996 04:20:15.56	10326	0,1,2
1996-08-14b	3248	08/14/1996 05:56:15.56	08/14/1996 07:32:15.56	10326	0,1,2
1998-08-09a	3296	08/09/1998 01:22:07.56	08/09/1998 02:58:07.56	30240	0,1,2
1998-08-09b	3152	08/09/1998 04:34:07.56	08/09/1998 06:10:07.56	30240	0,1,2
1998-08-09c	2208	08/09/1998 07:46:07.56	08/09/1998 09:22:07.56	30240	0,1,2
1998-08-09d	3088	08/09/1998 22:10:07.56	08/09/1998 23:46:07.56	30240	0,1,2
1998-08-10a	3072	08/10/1998 01:22:07.56	08/10/1998 02:58:07.56	30240	0,1,2
1998-08-10b	3199	08/10/1998 04:34:07.56	08/10/1998 06:10:07.56	30240	0,1,2
1998-08-14a	2896	08/14/1998 02:58:07.56	08/14/1998 04:34:07.56	30240	0,1,2
1998-08-14b	5567	08/14/1998 06:10:07.56	08/14/1998 09:22:07.56	30240	0,1,2
1998-08-14c	4560	08/14/1998 23:46:07.56	08/15/1998 02:58:07.56	30240	0,1,2
1998-08-15	2592	08/15/1998 04:34:07.56	08/15/1998 06:10:07.56	30240	0,1,2
2000-01-23a	3808	01/23/2000 07:39:43.56	01/23/2000 09:15:43.56	40165	0,2
2000-01-23b	2240	01/23/2000 10:51:43.56	01/23/2000 15:39:43.56	40165	0,2
2000-01-23c	2960	01/23/2000 17:15:43.56	01/23/2000 18:51:43.56	40165	0,2
2000-01-23d	3392	01/23/2000 20:27:43.56	01/23/2000 22:03:43.56	40165	0,2
2003-03-07a	4048	03/07/2003 11:58:39.56	03/07/2003 15:10:39.56	70152	2
2003-03-07b	6144	03/07/2003 16:46:39.56	03/07/2003 19:58:39.56	70152	2
2003-03-08a	6624	03/08/2003 00:46:39.56	03/08/2003 03:58:39.56	70152	2
2003-03-08b	3888	03/08/2003 05:34:39.56	03/08/2003 07:10:39.56	70152	2
2003-03-08c	5440	03/08/2003 08:46:39.56	03/08/2003 13:34:39.56	70152	2
2003-03-08d	5600	03/08/2003 15:10:39.56	03/09/2003 02:22:39.56	70152	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2003-03-09a	3856	03/09/2003 03:58:39.56	03/09/2003 05:34:39.56	70152	2
2003-03-09b	6016	03/09/2003 07:10:39.56	03/09/2003 10:22:39.56	70152	2
2003-03-09c	4832	03/09/2003 11:58:39.56	03/09/2003 15:10:39.56	70152	2
2003-03-09d	4704	03/09/2003 16:46:39.56	03/10/2003 07:10:39.56	70152	2
2003-03-10	5344	03/10/2003 11:58:39.56	03/10/2003 15:10:39.56	70152	2
2004-01-02a	6992	01/02/2004 11:58:39.56	01/02/2004 15:10:39.56	70152	2
2004-01-02b	6368	01/02/2004 16:46:39.56	01/02/2004 19:58:39.56	70152	2
2004-01-02c	7295	01/02/2004 21:34:39.56	01/03/2004 03:58:39.56	70152	2
2004-01-03a	9584	01/03/2004 05:34:39.56	01/03/2004 11:58:39.56	70152	2
2004-01-03b	8880	01/03/2004 13:34:39.56	01/03/2004 19:58:39.56	70152	2
2004-01-03c	6656	01/03/2004 21:34:39.56	01/04/2004 02:22:39.56	70152	2
2004-01-04a	7423	01/04/2004 03:58:39.56	01/04/2004 08:46:39.56	70152	2
2004-01-04b	7120	01/04/2004 10:22:39.56	01/04/2004 13:34:39.56	70152	2
2004-01-04c	7200	01/04/2004 15:10:39.56	02/13/2004 11:58:39.56	70152	2
2004-02-13	6096	02/13/2004 13:34:39.56	02/13/2004 16:46:39.56	70152	2
2004-02-14a	6608	02/14/2004 08:46:39.56	02/14/2004 11:58:39.56	70152	2
2004-02-14b	5759	02/14/2004 13:34:39.56	02/14/2004 16:46:39.56	70152	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
Cyg A Total Exposure = 75642 s, Total spectra = 11, Average exposure per spectrum = 6876 s					
1996-04-10a	5184	04/10/1996 12:24:47.56	04/10/1996 17:12:47.56	10337	0,1,2
1996-04-10b	6031	04/10/1996 18:48:47.56	04/10/1996 22:00:47.56	10337	0,1,2
1996-07-14	5615	07/14/1996 20:24:47.56	07/15/1996 01:12:47.56	10337	0,1,2
1996-07-15	6175	07/15/1996 02:48:47.56	07/15/1996 06:00:47.56	10337	0,1,2
1996-09-05a	6799	09/05/1996 07:36:47.56	09/05/1996 12:24:47.56	10337	0,1,2
1996-09-05b	4880	09/05/1996 14:00:47.56	09/05/1996 18:48:47.56	10337	0,1,2
1996-09-05c	5759	09/05/1996 20:24:47.56	12/03/1996 02:48:47.56	10337	0,1,2
1996-12-03a	5775	12/03/1996 04:24:47.56	12/03/1996 07:36:47.56	10337	0,1,2
1996-12-03b	4112	12/03/1996 09:12:47.56	12/03/1996 12:24:47.56	10337	0,1,2
2000-05-20	14400	05/20/2000 15:23:43.56	05/24/2000 13:47:43.56	40168	2
2000-05-24	10912	05/24/2000 15:23:43.56	05/27/2000 18:35:43.56	40168	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
ESO 103-G035 Total Exposure = 122394 s, Total spectra = 6, Average exposure per spectrum = 20399 s					
1997-04-11	19103	04/11/1997 16:48:31.56	04/12/1997 13:36:31.56	20324	0,1,2
1997-04-12	18383	04/12/1997 15:12:31.56	04/13/1997 04:00:31.56	20324	0,1,2
1997-04-13	21391	04/13/1997 05:36:31.56	07/21/1997 20:00:31.56	20324	0,1,2
1997-07-21	17647	07/21/1997 21:36:31.56	07/23/1997 21:36:31.56	20324	0,1,2
1997-07-23	22527	07/23/1997 23:12:31.56	07/27/1997 00:48:31.56	20324	0,1,2
1997-11-13	23343	11/13/1997 21:36:31.56	11/14/1997 12:00:31.56	20324	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Fairall 9 Total Exposure = 387305 s, Total spectra = 12, Average exposure per spectrum = 32275 s					
1996-11-03	15503	11/03/1996 14:26:07.56	12/27/1996 03:14:07.56	20313	0,1,2
1997-01-02	14575	01/02/1997 01:38:07.56	02/13/1997 08:02:07.56	20313	0,1,2
1997-02-16	13759	02/16/1997 06:26:07.56	03/21/1997 04:50:07.56	20313	0,1,2
1997-03-24	20079	03/24/1997 16:02:07.56	05/14/1997 09:38:07.56	20313	0,1,2
1997-05-17	19567	05/17/1997 04:50:07.56	07/25/1997 20:02:23.56	20313	0,1,2
1997-07-28	19615	07/28/1997 21:38:23.56	09/23/1997 08:50:23.56	20313	0,1,2
1997-09-26	18288	09/26/1997 20:02:23.56	11/25/1997 14:26:07.56	20313	0,1,2
2001-03-06	59824	03/06/2001 03:16:47.56	09/01/2001 13:56:31.56	60131	2
2001-09-01	51344	09/01/2001 17:08:31.56	09/14/2001 05:56:31.56	60131	2
2001-09-14	61488	09/14/2001 07:32:31.56	09/23/2001 17:08:31.56	60131	2
2001-09-23	39488	09/23/2001 20:20:31.56	02/27/2002 12:42:23.56	60131	2
2002-03-03	53775	03/03/2002 19:42:39.56	03/01/2003 11:42:39.56	70144	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
IC 4329A					
Total Exposure = 331198 s, Total spectra = 45, Average exposure per spectrum = 7359 s					
1996-08-03a	3488	08/03/1996 18:09:35.56	08/03/1996 19:45:35.56	10313	0,1,2
1996-08-03b	4192	08/03/1996 21:21:35.56	08/05/1996 00:33:35.56	10313	0,1,2
1996-08-05	3344	08/05/1996 02:09:35.56	08/10/1996 06:57:35.56	10313	0,1,2
1996-08-11	5120	08/11/1996 02:09:35.56	08/11/1996 05:21:35.56	10313	0,1,2
1997-08-05	3984	08/05/1997 18:46:23.56	08/07/1997 15:34:23.56	20315	0,1,2
1997-08-08	4336	08/08/1997 15:34:23.56	08/11/1997 01:10:23.56	20315	0,1,2
1997-08-11	5184	08/11/1997 02:46:23.56	08/13/1997 09:10:23.56	20315	0,1,2
1997-08-13	4240	08/13/1997 10:46:23.56	08/16/1997 05:58:23.56	20315	0,1,2
1997-08-17	4192	08/17/1997 10:46:23.56	08/18/1997 15:34:23.56	20315	0,1,2
1997-08-18	4304	08/18/1997 17:10:23.56	08/20/1997 10:46:23.56	20315	0,1,2
1997-08-21	4752	08/21/1997 09:10:23.56	08/22/1997 07:34:23.56	20315	0,1,2
1997-08-23	4176	08/23/1997 09:10:23.56	08/24/1997 07:34:23.56	20315	0,1,2
1997-08-25	3216	08/25/1997 04:22:23.56	08/27/1997 17:10:23.56	20315	0,1,2
1997-08-28	5024	08/28/1997 04:22:23.56	09/02/1997 17:10:23.56	20315	0,1,2
1997-09-03	3552	09/03/1997 21:58:23.56	09/07/1997 20:22:23.56	20315	0,1,2
1997-09-07	3344	09/07/1997 21:58:23.56	09/10/1997 20:22:23.56	20315	0,1,2
1997-09-11	3232	09/11/1997 18:46:23.56	09/13/1997 15:34:23.56	20315	0,1,2
1997-09-14	3840	09/14/1997 15:34:23.56	09/23/1997 20:22:23.56	20315	0,1,2
1997-09-24	4304	09/24/1997 07:34:23.56	10/02/1997 09:10:23.56	20315	0,1,2
2001-01-31	7776	01/31/2001 14:34:39.56	01/31/2001 19:22:39.56	50706	2
2001-08-21	8144	08/21/2001 04:10:23.56	08/22/2001 20:10:23.56	40153	2
2001-08-22	7360	08/22/2001 21:46:23.56	08/25/2001 05:46:23.56	40153	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
2001-08-25	9200	08/25/2001 10:34:23.56	08/26/2001 05:46:23.56	40153	2
2001-08-26a	8576	08/26/2001 07:22:23.56	08/26/2001 12:10:23.56	40153	2
2001-08-26b	7648	08/26/2001 13:46:23.56	08/26/2001 20:10:23.56	40153	2
2003-04-08	10704	04/08/2003 03:33:19.56	06/10/2003 19:33:19.56	80152	2
2003-06-15	9616	06/15/2003 01:57:19.56	07/12/2003 06:45:19.56	80152	2
2003-07-12	10800	07/12/2003 11:33:19.56	07/15/2003 19:54:07.56	80152	2
2003-07-16	11552	07/16/2003 00:42:07.56	07/19/2003 19:54:07.56	80152	2
2003-07-19	12432	07/19/2003 23:06:07.56	07/24/2003 13:14:39.56	80152	2
2003-07-24	11008	07/24/2003 18:02:39.56	07/28/2003 06:45:19.56	80152	2
2003-07-28	10336	07/28/2003 11:33:19.56	08/01/2003 05:30:07.56	80152	2
2003-08-01	10768	08/01/2003 10:18:07.56	08/05/2003 03:54:07.56	80152	2
2003-08-05	10880	08/05/2003 08:42:07.56	08/09/2003 16:42:07.56	80152	2
2003-08-09	11200	08/09/2003 21:30:07.56	08/13/2003 19:33:19.56	80152	2
2003-08-18	10544	08/18/2003 03:33:19.56	12/07/2003 00:21:19.56	80152	2
2004-03-01	11360	03/01/2004 08:38:23.56	04/25/2004 21:26:23.56	90154	2
2004-04-30	9520	04/30/2004 03:50:23.56	06/16/2004 02:14:23.56	90154	2
2004-06-20	9600	06/20/2004 10:14:23.56	08/10/2004 10:14:23.56	90154	2
2004-08-10	10528	08/10/2004 11:50:23.56	12/16/2004 05:26:23.56	90154	2
2004-12-20	8319	12/20/2004 18:14:23.56	02/09/2005 16:38:23.56	90154	2
2005-03-07	9552	03/07/2005 16:00:15.56	04/27/2005 19:12:15.56	91138	2
2005-05-02	8336	05/02/2005 06:24:15.56	06/09/2005 11:12:15.56	91138	2
2005-06-13	7935	06/13/2005 22:24:15.56	07/26/2005 09:36:15.56	91138	2
2005-07-30	9680	07/30/2005 14:24:15.56	09/24/2005 00:00:15.56	91138	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
IRAS 04575-7537 Total Exposure = 40558 s, Total spectra = 2, Average exposure per spectrum = 20279 s					
1996-12-10	18863	12/10/1996 17:40:31.56	05/02/1997 12:52:31.56	20330	0,1,2
1997-05-30	21695	05/30/1997 22:28:31.56	07/13/1997 01:40:31.56	20330	0,1,2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
IRAS 18325-5926 Total Exposure = 218295 s, Total spectra = 9, Average exposure per spectrum = 24255 s					
1996-12-26	20143	12/26/1996 04:51:59.56	12/26/1996 12:51:59.56	10328	0,1,2
1997-12-25a	27119	12/25/1997 02:11:27.56	12/25/1997 18:11:27.56	30229	0,1,2
1997-12-25b	23871	12/25/1997 19:47:27.56	12/26/1997 11:47:27.56	30229	0,1,2
1997-12-26a	19807	12/26/1997 13:23:27.56	12/26/1997 19:47:27.56	30229	0,1,2
1997-12-26b	18543	12/26/1997 21:23:27.56	12/27/1997 06:59:27.56	30229	0,1,2
1998-02-21	21855	02/21/1998 16:43:11.56	02/22/1998 03:55:11.56	30405	0,1,2
1998-02-22a	27807	02/22/1998 05:31:11.56	02/22/1998 19:55:11.56	30405	0,1,2
1998-02-22b	29775	02/22/1998 21:31:11.56	02/23/1998 10:19:11.56	30405	0,1,2
1998-02-23	29375	02/23/1998 11:55:11.56	02/24/1998 03:55:11.56	30405	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
MCG −2-58-22					
Total Exposure = 175049 s, Total spectra = 7, Average exposure per spectrum = 25007 s					
1997-12-15	13231	12/15/1997 23:12:31.56	12/16/1997 05:36:31.56	20320	0,1,2
1997-12-16	14671	12/16/1997 07:12:31.56	12/16/1997 20:00:31.56	20320	0,1,2
1999-05-28	40495	05/28/1999 18:11:43.56	06/07/1999 18:11:43.56	40154	0,2
1999-06-07	32991	06/07/1999 19:47:43.56	07/31/1999 22:59:43.56	40154	0,2
1999-08-01	28239	08/01/1999 16:35:43.56	11/03/1999 06:59:43.56	40154	0,2
1999-11-03	23087	11/03/1999 08:35:43.56	11/04/1999 11:47:43.56	40154	0,2
1999-11-04	22335	11/04/1999 13:23:43.56	11/05/1999 11:47:43.56	40154	0,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
MCG −5-23-16 Total Exposure = 102087 s, Total spectra = 17, Average exposure per spectrum = 6005 s					
1996-04-24a	6527	04/24/1996 00:31:11.56	04/24/1996 03:43:11.56	10307	0,1,2
1996-04-24b	5711	04/24/1996 05:19:11.56	04/24/1996 08:31:11.56	10307	0,1,2
1996-04-24c	5552	04/24/1996 10:07:11.56	07/28/1996 11:43:11.56	10307	0,1,2
1996-07-28a	6671	07/28/1996 13:19:11.56	07/28/1996 19:43:11.56	10307	0,1,2
1996-07-28b	6735	07/28/1996 21:19:11.56	07/29/1996 00:31:11.56	10307	0,1,2
1996-11-27	5184	11/27/1996 16:31:11.56	11/27/1996 19:43:11.56	10307	0,1,2
1996-11-28a	5472	11/28/1996 16:31:11.56	11/28/1996 21:19:11.56	10307	0,1,2
1996-11-28b	5536	11/28/1996 22:55:11.56	11/29/1996 11:43:11.56	10307	0,1,2
1996-11-29a	6831	11/29/1996 13:19:11.56	11/29/1996 18:07:11.56	10307	0,1,2
1996-11-29b	5839	11/29/1996 19:43:11.56	11/29/1996 22:55:11.56	10307	0,1,2
1996-11-30a	6575	11/30/1996 00:31:11.56	11/30/1996 03:43:11.56	10307	0,1,2
1996-11-30b	5567	11/30/1996 05:19:11.56	11/30/1996 08:31:11.56	10307	0,1,2
1996-11-30c	7631	11/30/1996 22:55:11.56	12/01/1996 03:43:11.56	10307	0,1,2
1996-12-01	4560	12/01/1996 05:19:11.56	01/10/1997 06:55:11.56	10307	0,1,2
1997-01-10a	4928	01/10/1997 08:31:11.56	01/10/1997 14:55:11.56	10307	0,1,2
1997-01-10b	2800	01/10/1997 16:31:11.56	01/10/1997 18:07:11.56	10307	0,1,2
2005-12-09	9968	12/09/2005 13:16:47.56	12/09/2005 19:40:47.56	91703	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
MCG −6-30-15 Total Exposure = 1167456 s, Total spectra = 70, Average exposure per spectrum = 16677 s					
1996-08-25	8207	08/25/1996 02:31:11.56	09/06/1996 10:31:11.56	10301	0,1,2
1996-09-15	17279	09/15/1996 15:24:31.56	09/18/1996 05:48:31.56	10299	0,1,2
1996-09-18	7455	09/18/1996 07:24:31.56	09/23/1996 09:00:31.56	10299	0,1,2
1996-09-23	10223	09/23/1996 12:12:31.56	09/25/1996 20:12:31.56	10299	0,1,2
1996-11-24	8799	11/24/1996 21:55:11.56	04/25/1997 21:55:11.56	20319	0,1,2
1997-05-10	9647	05/10/1997 10:43:11.56	12/18/1997 20:19:11.56	20319	0,1,2
1997-08-04a	9151	08/04/1997 03:31:11.56	08/04/1997 08:19:11.56	20310	0,1,2
1997-08-04b	14671	08/04/1997 09:55:11.56	08/04/1997 19:31:11.56	20310	0,1,2
1997-08-04c	9519	08/04/1997 21:07:11.56	08/05/1997 01:55:11.56	20310	0,1,2
1997-08-05a	9023	08/05/1997 03:31:11.56	08/05/1997 08:19:11.56	20310	0,1,2
1997-08-05b	11311	08/05/1997 09:55:11.56	08/05/1997 17:55:11.56	20310	0,1,2
1997-08-05c	11999	08/05/1997 19:31:11.56	08/06/1997 01:55:11.56	20310	0,1,2
1997-08-06a	13087	08/06/1997 03:31:11.56	08/06/1997 11:31:11.56	20310	0,1,2
1997-08-06b	11295	08/06/1997 13:07:11.56	08/06/1997 19:31:11.56	20310	0,1,2
1997-08-06c	9663	08/06/1997 21:07:11.56	08/07/1997 05:07:11.56	20310	0,1,2
1997-08-07a	9807	08/07/1997 06:43:11.56	08/07/1997 13:07:11.56	20310	0,1,2
1997-08-07b	9567	08/07/1997 14:43:11.56	08/07/1997 19:31:11.56	20310	0,1,2
1997-08-07c	11519	08/07/1997 21:07:11.56	08/08/1997 06:43:11.56	20310	0,1,2
1997-08-08a	12495	08/08/1997 08:19:11.56	08/08/1997 16:19:11.56	20310	0,1,2
1997-08-08b	9439	08/08/1997 17:55:11.56	08/08/1997 22:43:11.56	20310	0,1,2
1997-08-09a	11599	08/09/1997 00:19:11.56	08/09/1997 08:19:11.56	20310	0,1,2
1997-08-09b	14943	08/09/1997 09:55:11.56	08/09/1997 17:55:11.56	20310	0,1,2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
1997-08-09c	13711	08/09/1997 19:31:11.56	08/10/1997 05:07:11.56	20310	0,1,2
1997-08-10a	14607	08/10/1997 06:43:11.56	08/10/1997 14:43:11.56	20310	0,1,2
1997-08-10b	13887	08/10/1997 16:19:11.56	08/11/1997 01:55:11.56	20310	0,1,2
1997-08-11a	10015	08/11/1997 03:31:11.56	08/11/1997 09:55:11.56	20310	0,1,2
1997-08-11b	9583	08/11/1997 11:31:11.56	08/11/1997 16:19:11.56	20310	0,1,2
1997-08-11c	10144	08/11/1997 17:55:11.56	08/12/1997 03:31:11.56	20310	0,1,2
1998-08-04	6623	08/04/1998 05:01:51.56	02/02/1999 14:37:51.56	30219	0,1,2
1999-07-19a	16991	07/19/1999 02:56:15.56	07/19/1999 12:32:15.56	40155	0,2
1999-07-19b	12767	07/19/1999 14:08:15.56	07/20/1999 06:08:15.56	40155	0,2
1999-07-20a	13663	07/20/1999 07:44:15.56	07/20/1999 20:32:15.56	40155	0,2
1999-07-20b	14671	07/20/1999 22:08:15.56	07/21/1999 09:20:15.56	40155	0,2
1999-07-21	13023	07/21/1999 10:56:15.56	07/22/1999 04:32:15.56	40155	0,2
1999-07-22a	11503	07/22/1999 06:08:15.56	07/22/1999 15:44:15.56	40155	0,2
1999-07-22b	12415	07/22/1999 17:20:15.56	07/23/1999 06:08:15.56	40155	0,2
1999-07-23a	13104	07/23/1999 07:44:15.56	07/23/1999 22:08:15.56	40155	0,2
1999-07-23b	15920	07/23/1999 23:44:15.56	07/24/1999 09:20:15.56	40155	0,2
1999-07-24	11088	07/24/1999 10:56:15.56	07/25/1999 03:12:31.56	40155	0,2
1999-07-25a	13536	07/25/1999 04:32:15.56	07/25/1999 17:20:15.56	40155	0,2
1999-07-25b	12688	07/25/1999 18:56:15.56	07/26/1999 06:08:15.56	40155	0,2
1999-07-26	12704	07/26/1999 07:44:15.56	07/26/1999 23:44:15.56	40155	0,2
1999-07-27a	14256	07/27/1999 01:20:15.56	07/27/1999 09:20:15.56	40155	0,2
1999-07-27b	17584	07/27/1999 10:56:15.56	07/28/1999 04:48:31.56	40155	0,2
1999-07-28a	12288	07/28/1999 06:24:31.56	07/28/1999 22:08:15.56	40155	0,2
1999-07-28b	13488	07/28/1999 23:44:15.56	07/29/1999 06:24:31.56	40155	0,2
2000-03-19	26719	03/19/2000 16:08:15.56	03/28/2000 10:36:15.56	50153	2
2000-03-28	28384	03/28/2000 21:48:15.56	04/08/2000 05:07:43.56	50153	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2000-04-03	17263	04/03/2000 06:24:31.56	04/06/2000 12:48:31.56	40155	0,2
2000-04-06	15151	04/06/2000 14:24:31.56	04/09/2000 16:00:31.56	40155	0,2
2000-04-08	30368	04/08/2000 08:19:43.56	04/20/2000 00:08:15.56	50153	2
2000-04-20	29200	04/20/2000 03:20:15.56	05/04/2000 08:19:43.56	50153	2
2000-05-16	27312	05/16/2000 09:44:15.56	07/19/2000 01:55:43.56	50153	2
2000-07-10	32815	07/10/2000 03:10:23.56	07/12/2000 09:34:23.56	50161	2
2000-07-12	25439	07/12/2000 11:10:23.56	01/22/2001 01:34:23.56	50161	2
2000-07-26	24607	07/26/2000 21:07:43.56	02/14/2001 06:43:43.56	50153	2
2001-01-22	19743	01/22/2001 03:10:23.56	01/22/2001 12:46:23.56	50161	2
2001-02-22	31872	02/22/2001 13:36:47.56	05/23/2001 20:18:39.56	60133	2
2001-05-25	25520	05/25/2001 18:42:39.56	08/11/2001 00:48:47.56	60133	2
2001-08-13	24080	08/13/2001 00:48:47.56	11/23/2001 21:54:39.56	60133	2
2002-02-07	24656	02/07/2002 10:24:47.56	04/08/2002 00:48:47.56	60133	2
2002-04-18	23727	04/18/2002 03:22:55.56	07/05/2002 08:10:55.56	70142	2
2002-07-07	25328	07/07/2002 17:46:55.56	09/09/2002 06:01:19.56	70142	2
2002-09-11	23696	09/11/2002 17:13:19.56	01/09/2003 08:10:55.56	70142	2
2003-01-11	26639	01/11/2003 01:46:55.56	03/30/2003 11:22:55.56	70142	2
2003-04-01	26223	04/01/2003 04:25:19.56	06/06/2003 14:01:19.56	70142	2
2003-06-08	24911	06/08/2003 11:03:11.56	08/19/2003 01:27:11.56	80154	2
2003-07-19	26847	07/19/2003 02:01:35.56	07/20/2003 10:01:35.56	80153	2
2003-08-20	25872	08/20/2003 07:51:11.56	12/26/2003 15:51:11.56	80154	2
2005-03-07	30127	03/07/2005 16:15:27.56	09/02/2005 22:39:27.56	91140	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
MR 2251-178 Total Exposure = 139736 s, Total spectra = 8, Average exposure per spectrum = 17467 s					
1996-12-09	14639	12/09/1996 04:48:31.56	12/09/1996 22:24:31.56	20335	0,1,2
1996-12-10a	15087	12/10/1996 00:00:31.56	12/10/1996 08:00:31.56	20335	0,1,2
1996-12-10b	15135	12/10/1996 09:36:31.56	12/11/1996 03:12:31.56	20335	0,1,2
1996-12-11	14655	12/11/1996 04:48:31.56	12/12/1996 01:36:31.56	20335	0,1,2
1996-12-12	11215	12/12/1996 03:12:31.56	12/12/1996 09:36:31.56	20335	0,1,2
2004-03-27	24495	03/27/2004 04:57:03.56	08/23/2004 12:57:03.56	90156	2
2004-08-27	22735	08/27/2004 12:57:03.56	01/28/2005 03:21:03.56	90156	2
2005-03-28	21775	03/28/2005 22:42:39.56	08/25/2005 11:30:39.56	91145	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
Mkn 79 Total Exposure = 259600 s, Total spectra = 5, Average exposure per spectrum = 51920 s					
2003-03-22	70784	03/22/2003 09:10:55.56	11/06/2003 10:46:55.56	80154	2
2004-02-28	51056	02/28/2004 15:45:51.56	09/01/2004 13:09:51.56	90160	2
2004-09-03	50752	09/03/2004 19:33:51.56	02/08/2005 11:33:51.56	90160	2
2005-03-04	48496	03/04/2005 10:05:35.56	06/14/2005 05:17:35.56	91140	2
2005-06-14	38512	06/14/2005 06:39:27.56	09/16/2005 00:29:35.56	91140	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
Mkn 110 Total Exposure = 74752 s, Total spectra = 2, Average exposure per spectrum = 37376 s					
2005-03-04	41936	03/04/2005 10:22:23.56	05/29/2005 07:10:23.56	91140	2
2005-08-03	32816	08/03/2005 03:58:23.56	10/02/2005 17:51:27.56	91140	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Mkn 279 Total Exposure = 126076 s, Total spectra = 4, Average exposure per spectrum = 31519 s					
1996-05-22	12079	05/22/1996 00:06:23.56	05/28/1996 16:06:23.56	10326	0,1,2
1996-05-28	17855	05/28/1996 17:42:23.56	05/30/1996 17:42:23.56	10326	0,1,2
1999-07-11	21935	07/11/1999 20:26:23.56	07/14/1999 04:26:23.56	40154	0,2
2002-05-18	74207	05/18/2002 06:46:39.56	05/24/2002 00:22:39.56	70163	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
Mkn 348 Total Exposure = 174203 s, Total spectra = 5, Average exposure per spectrum = 34840 s					
1996-05-24	34015	05/24/1996 00:17:19.56	05/30/1996 03:29:19.56	10326	0,1,2
1996-05-30	48767	05/30/1996 05:05:19.56	06/02/1996 03:29:19.56	10326	0,1,2
1996-06-02	48335	06/02/1996 05:05:19.56	06/06/1996 03:29:19.56	10326	0,1,2
1996-12-29	31807	12/29/1996 09:36:15.56	06/30/1997 00:00:15.56	20330	0,1,2
1997-07-03	11279	07/03/1997 20:48:15.56	07/12/1997 03:12:15.56	20330	0,1,2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
		Mkn 509			
		Total Exposure = 429993 s, Total spectra = 25, Average exposure per spectrum = 17199 s			
1996-05-01	7039	05/01/1996 06:40:31.56	10/20/1996 08:16:31.56	10311	0,1,2
1996-10-22	10143	10/22/1996 19:28:31.56	10/23/1996 01:52:31.56	10311	0,1,2
1996-10-25	6735	10/25/1996 22:40:31.56	10/26/1996 01:52:31.56	10311	0,1,2
1996-10-26	9023	10/26/1996 03:28:31.56	10/28/1996 06:40:31.56	10311	0,1,2
1996-10-28	5488	10/28/1996 08:16:31.56	10/28/1996 11:28:31.56	10311	0,1,2
1996-10-31	8543	10/31/1996 19:28:31.56	11/01/1996 00:16:31.56	10311	0,1,2
1996-11-01	8703	11/01/1996 01:52:31.56	11/04/1996 06:40:31.56	10311	0,1,2
1996-11-04	10191	11/04/1996 08:16:31.56	11/06/1996 14:40:31.56	10311	0,1,2
1996-11-06	9631	11/06/1996 16:16:31.56	11/09/1996 17:52:31.56	10311	0,1,2
1996-11-09	9071	11/09/1996 19:28:31.56	11/13/1996 01:52:31.56	10311	0,1,2
1996-11-13	8943	11/13/1996 03:28:31.56	11/13/1996 08:16:31.56	10311	0,1,2
1996-11-16	11247	11/16/1996 08:16:31.56	11/16/1996 14:40:31.56	10311	0,1,2
2001-04-13a	23663	04/13/2001 04:33:19.56	04/13/2001 22:09:19.56	60134	2
2001-04-13b	19119	04/13/2001 23:45:19.56	04/14/2001 14:09:19.56	60134	2
2003-03-28	24703	03/28/2003 08:02:23.56	05/18/2003 22:26:23.56	80157	2
2003-05-21	24735	05/21/2003 22:26:23.56	07/11/2003 19:14:23.56	80157	2
2003-07-14	25311	07/14/2003 00:02:23.56	09/15/2003 16:02:23.56	80157	2
2003-09-18	27023	09/18/2003 09:38:23.56	11/11/2003 19:14:23.56	80157	2
2004-02-29	25023	02/29/2004 18:38:07.56	04/26/2004 23:26:07.56	90147	2
2004-04-29	27711	04/29/2004 15:26:07.56	06/22/2004 12:14:07.56	90147	2
2004-06-25	26671	06/25/2004 10:38:07.56	08/30/2004 04:14:07.56	90147	2
2004-09-02	26095	09/02/2004 17:02:07.56	10/26/2004 09:02:07.56	90147	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2004-10-29	23760	10/29/2004 07:26:07.56	12/19/2004 21:50:07.56	90147	2
2005-03-04	26895	03/04/2005 05:05:35.56	05/12/2005 03:29:35.56	91129	2
2005-05-15	24527	05/15/2005 16:17:35.56	07/08/2005 19:29:35.56	91129	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
Mkn 766 Total Exposure = 157356 s, Total spectra = 4, Average exposure per spectrum = 39339 s					
2001-05-05	38415	05/05/2001 08:36:47.56	05/08/2001 02:12:47.56	60135	2
2001-05-08	26831	05/08/2001 03:48:47.56	05/10/2001 13:24:47.56	60135	2
2004-03-01	51375	03/01/2004 10:22:23.56	01/23/2005 23:10:23.56	90154	2
2005-05-24	40735	05/24/2005 09:38:39.56	06/03/2005 14:26:39.56	80159	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 2110 Total Exposure = 121638 s, Total spectra = 10, Average exposure per spectrum = 12163 s					
1997-12-07a	13119	12/07/1997 12:22:55.56	12/07/1997 20:22:55.56	30233	0,1,2
1997-12-07b	13695	12/07/1997 21:58:55.56	12/08/1997 17:10:55.56	30233	0,1,2
1997-12-08	12559	12/08/1997 18:46:55.56	12/17/1997 12:22:55.56	30233	0,1,2
1997-12-17	13183	12/17/1997 13:58:55.56	12/18/1997 10:46:55.56	30233	0,1,2
1997-12-18a	12479	12/18/1997 12:22:55.56	12/18/1997 18:46:55.56	30233	0,1,2
1997-12-18b	10991	12/18/1997 20:22:55.56	02/07/1998 15:34:55.56	30233	0,1,2
1998-02-08a	11935	02/08/1998 05:58:55.56	02/08/1998 12:22:55.56	30233	0,1,2
1998-02-09	12239	02/09/1998 12:22:55.56	08/29/1998 23:34:55.56	30233	0,1,2
1998-08-30	10895	08/30/1998 01:10:55.56	08/30/1998 23:34:55.56	30233	0,1,2
1998-08-31	10543	08/31/1998 01:10:55.56	08/31/1998 21:58:55.56	30233	0,1,2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
NGC 3227					
Total Exposure = 709136 s, Total spectra = 29, Average exposure per spectrum = 24452 s					
1996-11-18a	8207	11/18/1996 16:27:43.56	11/18/1996 21:15:43.56	10292	0,1,2
1996-11-18b	8575	11/18/1996 22:51:43.56	11/19/1996 10:03:43.56	10292	0,1,2
1996-11-19a	8767	11/19/1996 11:39:43.56	11/19/1996 16:27:43.56	10292	0,1,2
1996-11-19b	8207	11/19/1996 18:03:43.56	11/19/1996 22:51:43.56	10292	0,1,2
1996-11-20a	10463	11/20/1996 00:27:43.56	11/20/1996 08:27:43.56	10292	0,1,2
1996-11-20b	7567	11/20/1996 10:03:43.56	11/20/1996 14:51:43.56	10292	0,1,2
1996-11-20c	8495	11/20/1996 16:27:43.56	11/20/1996 22:51:43.56	10292	0,1,2
1996-11-21a	10031	11/21/1996 00:27:43.56	11/21/1996 08:27:43.56	10292	0,1,2
1996-11-21b	9647	11/21/1996 10:03:43.56	11/21/1996 16:27:43.56	10292	0,1,2
1996-11-21c	10735	11/21/1996 18:03:43.56	11/22/1996 00:27:43.56	10292	0,1,2
1996-11-22	9135	11/22/1996 02:03:43.56	11/22/1996 08:27:43.56	10292	0,1,2
1999-01-02	26448	01/02/1999 10:45:19.56	04/01/1999 05:03:59.56	40151	2
1999-04-01	25664	04/01/1999 06:39:59.56	04/29/1999 05:57:19.56	40151	2
1999-04-29	36431	04/29/1999 07:33:19.56	07/13/2000 01:09:19.56	40151	2
2000-04-02	38768	04/02/2000 13:10:23.56	04/15/2000 18:06:55.56	50153	2
2000-04-15	78736	04/15/2000 19:42:55.56	05/23/2000 07:39:27.56	50153	2
2000-05-23	41248	05/23/2000 11:34:23.56	06/06/2000 11:42:55.56	50153	2
2001-01-29	64416	01/29/2001 08:33:19.56	10/03/2001 22:57:19.56	60133	2
2001-10-06	31536	10/06/2001 19:45:19.56	01/02/2002 01:16:31.56	60133	2
2002-01-04	32416	01/04/2002 02:52:31.56	04/08/2002 00:33:19.56	60133	2
2002-04-20	29919	04/20/2002 10:40:31.56	07/14/2002 23:28:31.56	70142	2
2003-06-19	28271	06/19/2003 06:48:31.56	11/12/2003 19:36:31.56	80154	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2003-11-12	31168	11/12/2003 21:12:31.56	02/10/2004 04:22:23.56	80154	2
2004-02-10	27104	02/10/2004 05:58:23.56	06/16/2004 22:48:31.56	80154	2
2004-03-19	26015	03/19/2004 08:20:15.56	10/09/2004 17:56:15.56	90160	2
2004-06-17	28736	06/17/2004 00:24:31.56	01/19/2005 12:22:23.56	80154	2
2004-10-13	24495	10/13/2004 19:32:15.56	05/07/2005 05:08:15.56	90160	2
2005-01-23	24144	01/23/2005 10:46:23.56	11/10/2005 23:34:23.56	80154	2
2005-05-11	13792	05/11/2005 03:32:15.56	07/22/2005 08:20:15.56	90160	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 3516					
Total Exposure = 586825 s, Total spectra = 40, Average exposure per spectrum = 14670 s					
1997-03-16	8015	03/16/1997 00:02:55.56	03/24/1997 11:14:55.56	20316	0,1,2
1997-03-25	8335	03/25/1997 14:12:31.56	03/31/1997 22:12:31.56	20316	0,1,2
1997-05-22a	11823	05/22/1997 03:14:55.56	05/22/1997 08:02:55.56	20316	0,1,2
1997-05-22b	11471	05/22/1997 09:38:55.56	05/22/1997 12:50:55.56	20316	0,1,2
1997-05-22c	12863	05/22/1997 14:26:55.56	05/22/1997 20:50:55.56	20316	0,1,2
1997-05-23a	16479	05/23/1997 06:26:55.56	05/23/1997 11:14:55.56	20316	0,1,2
1997-05-23b	10959	05/23/1997 12:50:55.56	05/23/1997 17:38:55.56	20316	0,1,2
1997-05-23c	10207	05/23/1997 19:14:55.56	05/24/1997 01:38:55.56	20316	0,1,2
1997-05-24a	12303	05/24/1997 03:14:55.56	05/24/1997 08:02:55.56	20316	0,1,2
1997-05-24b	11887	05/24/1997 09:38:55.56	05/24/1997 14:26:55.56	20316	0,1,2
1997-05-24c	12303	05/24/1997 16:02:55.56	05/24/1997 22:26:55.56	20316	0,1,2
1997-05-25a	10671	05/25/1997 00:02:55.56	05/25/1997 04:50:55.56	20316	0,1,2
1997-05-25b	16895	05/25/1997 06:26:55.56	05/25/1997 11:14:55.56	20316	0,1,2
1997-05-25c	14335	05/25/1997 12:50:55.56	05/25/1997 20:50:55.56	20316	0,1,2
1997-05-26	13344	05/26/1997 11:00:31.56	06/22/1997 15:38:23.56	20316	0,1,2
1997-08-03	10671	08/03/1997 05:53:3.56	11/05/1997 02:41:3.56	20424	0,1,2
1997-12-30	7183	12/30/1997 12:50:39.56	03/17/1998 09:38:39.56	30223	0,1,2
1998-03-25	9327	03/25/1998 22:26:39.56	05/24/1998 16:02:39.56	30223	0,1,2
1998-04-13a	8479	04/13/1998 08:00:15.56	04/13/1998 11:12:15.56	30224	0,1,2
1998-04-13b	9359	04/13/1998 12:48:15.56	04/13/1998 17:36:15.56	30224	0,1,2
1998-04-13c	7775	04/13/1998 19:12:15.56	04/14/1998 03:12:15.56	30224	0,1,2
1998-04-14a	12431	04/14/1998 04:48:15.56	04/14/1998 09:36:15.56	30224	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
1998-04-14b	10591	04/14/1998 11:12:15.56	04/14/1998 16:00:15.56	30224	0,1,2
1998-04-14c	8063	04/14/1998 17:36:15.56	04/15/1998 00:00:15.56	30224	0,1,2
1998-04-15a	8127	04/15/1998 01:36:15.56	04/15/1998 06:24:15.56	30224	0,1,2
1998-04-15b	7759	04/15/1998 08:00:15.56	04/15/1998 11:12:15.56	30224	0,1,2
1998-04-15c	8591	04/15/1998 12:48:15.56	04/15/1998 17:36:15.56	30224	0,1,2
1998-04-15d	9983	04/15/1998 19:12:15.56	04/16/1998 04:48:15.56	30224	0,1,2
1998-04-16	11391	04/16/1998 06:24:15.56	04/16/1998 11:12:15.56	30224	0,1,2
1998-05-28	11439	05/28/1998 20:50:39.56	08/05/1998 01:38:39.56	30223	0,1,2
1998-08-05	10255	08/05/1998 03:14:39.56	10/08/1998 04:50:39.56	30223	0,1,2
1998-10-12	11263	10/12/1998 08:02:39.56	12/19/1998 12:50:39.56	30223	0,1,2
1999-01-05	19583	01/05/1999 20:03:27.56	04/26/1999 15:15:27.56	40223	0,2
1999-04-30	19103	04/30/1999 23:15:27.56	07/25/1999 10:27:27.56	40223	0,2
1999-07-25	22431	07/25/1999 12:03:27.56	11/08/1999 21:39:27.56	40223	0,2
1999-11-08	25439	11/08/1999 23:15:27.56	02/19/2000 08:51:27.56	40223	0,2
2001-04-10	41983	04/10/2001 08:25:19.56	04/11/2001 00:25:19.56	50159	2
2001-04-11	37999	04/11/2001 02:01:19.56	04/11/2001 18:01:19.56	50159	2
2005-08-22	44591	08/22/2005 21:14:39.56	10/14/2005 00:26:39.56	91703	2
2005-10-14	31119	10/14/2005 05:14:39.56	10/13/2006 10:02:39.56	91703	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 3783 Total Exposure = 473121 s, Total spectra = 29, Average exposure per spectrum = 16314 s					
1996-01-30	10175	01/30/1996 17:20:47.56	01/30/1996 23:44:47.56	10297	0,1,2
1996-01-31	10495	01/31/1996 01:20:47.56	02/03/1996 14:08:47.56	10297	0,1,2
1996-02-03	12367	02/03/1996 15:44:47.56	02/06/1996 14:08:47.56	10297	0,1,2
1999-01-02	8783	01/02/1999 12:30:07.56	03/11/1999 18:54:07.56	40152	0,2
1999-05-01	9775	05/01/1999 23:42:07.56	06/26/1999 12:30:07.56	40152	0,2
1999-06-30	9423	06/30/1999 17:18:07.56	09/06/1999 23:42:07.56	40152	0,2
1999-09-11	8703	09/11/1999 06:06:07.56	11/05/1999 15:42:07.56	40152	0,2
1999-11-09	8879	11/09/1999 23:42:07.56	01/21/2000 12:30:07.56	40152	0,2
2000-01-21	11199	01/21/2000 04:37:19.56	01/21/2000 09:25:19.56	30227	0,2
2000-07-10	17183	07/10/2000 04:08:47.56	11/02/2000 08:56:47.56	50155	2
2000-11-06	18223	11/06/2000 15:20:47.56	03/16/2002 12:08:47.56	50155	2
2001-02-20	22912	02/20/2001 03:05:51.56	02/24/2001 05:54:23.56	60132	2
2001-02-24	22319	02/24/2001 09:06:23.56	02/28/2001 12:18:23.56	60132	2
2001-02-28	21648	02/28/2001 15:30:23.56	03/05/2001 15:30:23.56	60132	2
2001-03-05	21824	03/05/2001 17:06:23.56	03/11/2001 09:29:51.56	60132	2
2001-03-11	17647	03/11/2001 12:41:51.56	06/03/2001 17:29:51.56	60132	2
2001-06-07	18079	06/07/2001 23:53:51.56	09/26/2001 22:17:51.56	60132	2
2004-02-28	17791	02/28/2004 09:03:59.56	04/16/2004 07:27:59.56	90160	2
2004-04-18	18944	04/18/2004 17:03:59.56	06/15/2004 04:42:23.56	90160	2
2004-06-17	16336	06/17/2004 09:30:23.56	08/04/2004 19:06:23.56	90160	2
2004-08-06	15584	08/06/2004 20:42:23.56	09/11/2004 04:15:59.56	90160	2
2004-09-13	16704	09/13/2004 02:39:59.56	10/27/2004 10:39:59.56	90160	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
2004-10-29	15536	10/29/2004 21:51:59.56	12/20/2004 13:51:59.56	90160	2
2004-12-22	16240	12/22/2004 17:03:59.56	02/10/2005 20:42:23.56	90160	2
2005-03-04	22704	03/04/2005 05:54:39.56	04/19/2005 08:15:27.56	91140	2
2005-04-19	22000	04/19/2005 12:18:39.56	06/09/2005 11:27:27.56	91140	2
2005-06-10	19216	06/10/2005 10:42:39.56	07/16/2005 05:54:39.56	91140	2
2005-07-17	18800	07/17/2005 17:51:27.56	08/23/2005 13:03:27.56	91140	2
2005-08-25	23632	08/25/2005 06:39:27.56	10/12/2005 13:54:39.56	91140	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 4051					
Total Exposure = 298906 s, Total spectra = 7, Average exposure per spectrum = 42700 s					
1996-04-23	16143	04/23/1996 11:41:19.56	10/09/1996 03:41:19.56	10301	0,1,2
1996-11-10	21359	11/10/1996 17:51:11.56	12/20/1997 16:15:11.56	20319	0,1,2
1996-12-13	46911	12/13/1996 00:02:23.56	12/15/1996 00:02:23.56	20318	0,1,2
2000-03-23	36991	03/23/2000 23:50:39.56	03/27/2000 07:50:39.56	40149	0,2
2001-03-04	66016	03/04/2001 17:24:15.56	10/14/2001 15:48:15.56	60133	2
2001-05-16	57183	05/16/2001 16:39:43.56	05/20/2001 05:27:43.56	50153	2
2002-03-01	54303	03/01/2002 11:33:51.56	07/29/2002 01:57:51.56	70142	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 4151 Total Exposure = 383132 s, Total spectra = 65, Average exposure per spectrum = 5894 s					
1996-01-20	3280	01/20/1996 19:49:51.56	01/20/1996 21:25:51.56	00022	0,1,2
1996-01-22a	3280	01/22/1996 15:32:47.56	01/22/1996 17:08:47.56	00024	0,1,2
1996-01-22b	3536	01/22/1996 18:44:47.56	01/22/1996 20:20:47.56	00024	0,1,2
1996-06-03	2640	06/03/1996 22:00:15.56	06/03/1996 23:36:15.56	10305	0,1,2
1996-06-04	2144	06/04/1996 22:00:15.56	06/04/1996 23:36:15.56	10305	0,1,2
1996-06-05	1520	06/05/1996 22:00:15.56	06/05/1996 23:36:15.56	10305	0,1,2
1996-06-06	3136	06/06/1996 22:00:15.56	06/06/1996 23:36:15.56	10305	0,1,2
1996-06-07	3168	06/07/1996 22:00:15.56	06/07/1996 23:36:15.56	10305	0,1,2
1996-06-08	1360	06/08/1996 22:00:15.56	06/08/1996 23:36:15.56	10305	0,1,2
1996-06-25	2880	06/25/1996 15:36:15.56	06/25/1996 20:24:15.56	10305	0,1,2
1996-06-26	3199	06/26/1996 15:36:15.56	06/26/1996 20:24:15.56	10305	0,1,2
1996-06-27	4735	06/27/1996 10:48:15.56	06/28/1996 01:12:15.56	10305	0,1,2
1996-06-28	2880	06/28/1996 02:48:15.56	06/29/1996 04:24:15.56	10305	0,1,2
1996-06-29	2992	06/29/1996 07:36:15.56	06/30/1996 01:12:15.56	10305	0,1,2
1996-07-01a	3392	07/01/1996 01:12:15.56	07/01/1996 04:24:15.56	10305	0,1,2
1996-07-01b	4864	07/01/1996 06:00:15.56	07/03/1996 02:48:15.56	10305	0,1,2
1996-07-03	2960	07/03/1996 04:24:15.56	07/04/1996 01:12:15.56	10305	0,1,2
1996-07-04	5200	07/04/1996 02:48:15.56	07/05/1996 14:00:15.56	10305	0,1,2
1996-07-05	4512	07/05/1996 15:36:15.56	07/06/1996 12:24:15.56	10305	0,1,2
1996-07-07	3840	07/07/1996 09:12:15.56	07/07/1996 10:48:15.56	10305	0,1,2
1996-07-08	4864	07/08/1996 12:24:15.56	07/09/1996 06:00:15.56	10305	0,1,2
1996-09-14	2256	09/14/1996 12:42:07.56	09/17/1996 03:06:07.56	10422	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
1996-09-18	2064	09/18/1996 22:18:07.56	09/19/1996 01:30:07.56	10422	0,1,2
1996-09-20	2272	09/20/1996 01:30:07.56	09/24/1996 07:54:07.56	10422	0,1,2
1996-09-25	3088	09/25/1996 22:18:07.56	09/26/1996 17:30:07.56	10422	0,1,2
1996-09-26	2032	09/26/1996 19:06:07.56	09/29/1996 11:06:07.56	10422	0,1,2
1996-09-29	1888	09/29/1996 12:42:07.56	10/02/1996 14:18:07.56	10422	0,1,2
1997-05-01	3120	05/01/1997 08:45:19.56	05/01/1997 19:57:19.56	20323	0,1,2
1997-05-02	2192	05/02/1997 07:09:19.56	05/02/1997 23:09:19.56	20323	0,1,2
1997-05-03a	3248	05/03/1997 10:21:19.56	05/03/1997 21:33:19.56	20323	0,1,2
1997-05-03b	4704	05/03/1997 23:09:19.56	05/04/1997 21:33:19.56	20323	0,1,2
1997-05-05	4400	05/05/1997 10:21:19.56	05/06/1997 08:45:19.56	20323	0,1,2
1997-05-06	2208	05/06/1997 21:33:19.56	05/06/1997 23:09:19.56	20323	0,1,2
1997-05-07	2992	05/07/1997 07:09:19.56	05/07/1997 08:45:19.56	20323	0,1,2
1997-10-20	3600	10/20/1997 03:57:19.56	10/20/1997 05:33:19.56	20323	0,1,2
1999-01-01	3936	01/01/1999 12:32:31.56	01/27/1999 01:20:31.56	40152	0,2
1999-01-27	2816	01/27/1999 02:56:31.56	02/13/1999 04:32:31.56	40152	0,2
1999-02-17	3328	02/17/1999 09:20:31.56	03/10/1999 17:20:31.56	40152	0,2
1999-04-09	4032	04/09/1999 15:44:31.56	04/30/1999 23:44:31.56	40152	0,2
1999-05-05	5680	05/05/1999 04:32:31.56	06/04/1999 04:32:31.56	40152	0,2
1999-06-08	5440	06/08/1999 07:44:31.56	07/16/1999 17:20:31.56	40152	0,2
1999-07-16	4848	07/16/1999 18:56:31.56	08/15/1999 15:44:31.56	40152	0,2
1999-08-19	5136	08/19/1999 20:32:31.56	09/18/1999 15:44:31.56	40152	0,2
1999-09-18	5008	09/18/1999 17:20:31.56	10/27/1999 04:32:31.56	40152	0,2
1999-10-31	4080	10/31/1999 09:20:31.56	12/04/1999 15:44:31.56	40152	0,2
1999-12-08	4320	12/08/1999 20:32:31.56	12/25/1999 20:32:31.56	40152	0,2
1999-12-30	3440	12/30/1999 02:56:31.56	01/20/2000 12:32:31.56	40152	0,2
2000-01-28	3776	01/28/2000 23:44:31.56	02/19/2000 07:44:31.56	40152	0,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2000-03-03	8784	03/03/2000 05:33:19.56	04/19/2000 02:21:19.56	50155	2
2000-06-30	7696	06/30/2000 15:09:19.56	08/08/2000 02:21:19.56	50155	2
2000-08-12	5712	08/12/2000 08:45:19.56	09/28/2000 02:57:51.56	50155	2
2000-09-28	6816	09/28/2000 04:33:51.56	11/14/2000 04:33:51.56	50155	2
2000-11-18	16768	11/18/2000 12:33:51.56	11/26/2000 16:07:43.56	50155	2
2000-11-26	17328	11/26/2000 17:43:43.56	11/30/2000 15:07:59.56	50155	2
2000-11-30	15600	11/30/2000 18:19:59.56	12/03/2000 19:55:59.56	50155	2
2000-12-03	14720	12/03/2000 21:31:59.56	12/06/2000 23:09:19.56	50155	2
2000-12-07	16128	12/07/2000 05:33:19.56	12/10/2000 09:43:43.56	50155	2
2000-12-10	17504	12/10/2000 11:19:43.56	12/13/2000 21:31:59.56	50155	2
2000-12-14	22175	12/14/2000 00:43:59.56	12/17/2000 18:19:59.56	50155	2
2000-12-17	17216	12/17/2000 21:31:59.56	12/20/2000 15:09:19.56	50155	2
2000-12-20	17312	12/20/2000 18:21:19.56	12/23/2000 00:07:43.56	50155	2
2000-12-23	13952	12/23/2000 01:43:43.56	12/24/2000 16:07:43.56	50155	2
2000-12-24	10768	12/24/2000 20:55:43.56	01/12/2001 20:33:51.56	50155	2
2003-05-24	4656	05/24/2003 05:49:19.56	05/26/2003 04:13:19.56	80416	2
2003-05-26	3711	05/26/2003 21:49:19.56	05/29/2003 04:13:19.56	80416	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 4258 Total Exposure = 514987 s, Total spectra = 11, Average exposure per spectrum = 46817 s					
1996-12-03	32223	12/03/1996 13:08:47.56	12/04/1996 05:08:47.56	20326	0,1,2
1996-12-04	29295	12/04/1996 06:44:47.56	02/01/1997 17:56:47.56	20326	0,1,2
1997-02-04	28671	02/04/1997 13:08:47.56	04/08/1997 14:44:47.56	20326	0,1,2
1998-03-03	32415	03/03/1998 02:19:59.56	05/08/1998 18:19:59.56	30236	0,1,2
1998-05-12	36368	05/12/1998 02:19:59.56	08/02/1998 07:09:35.56	30236	0,1,2
1998-08-05	51968	08/05/1998 05:33:35.56	11/23/1998 23:07:59.56	30236	0,1,2
1999-04-02	75344	04/02/1999 05:21:35.56	07/15/1999 21:23:27.56	40161	0,2
1999-05-15	83679	05/15/1999 23:15:27.56	05/18/1999 10:27:27.56	40162	0,2
1999-07-17	57168	07/17/1999 04:21:35.56	10/09/1999 16:33:35.56	40161	0,2
1999-10-11	50512	10/11/1999 16:33:35.56	12/28/1999 11:47:27.56	40161	0,2
1999-12-28	37344	12/28/1999 13:21:35.56	02/14/2000 07:33:35.56	40161	0,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 4388 Total Exposure = 52971 s, Total spectra = 5, Average exposure per spectrum = 10594 s					
1996-03-06a	11791	03/06/1996 14:00:31.56	03/06/1996 20:24:31.56	10320	0,1,2
1996-07-13a	7903	07/13/1996 04:24:31.56	07/13/1996 14:00:31.56	10320	0,1,2
1996-07-13b	11503	07/13/1996 15:36:31.56	11/15/1996 22:00:31.56	10320	0,1,2
1996-11-15	10191	11/15/1996 23:36:31.56	11/16/1996 22:00:31.56	10320	0,1,2
1996-11-16	11583	11/16/1996 23:36:31.56	01/11/1997 17:12:31.56	10320	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 4593					
Total Exposure = 338968 s, Total spectra = 11, Average exposure per spectrum = 30815 s					
2001-06-29a	31103	06/29/2001 00:43:27.56	06/29/2001 19:55:27.56	60134	2
2001-06-29b	28559	06/29/2001 21:31:27.56	07/03/2001 07:07:27.56	60134	2
2002-06-25	30543	06/25/2002 07:00:31.56	06/28/2002 23:00:31.56	70145	2
2002-06-29	33567	06/29/2002 05:24:31.56	07/01/2002 15:00:31.56	70145	2
2002-07-01	27951	07/01/2002 16:36:31.56	07/03/2002 07:00:31.56	70145	2
2002-07-03	35327	07/03/2002 08:36:31.56	07/06/2002 16:36:31.56	70145	2
2002-07-07	29999	07/07/2002 03:48:31.56	07/10/2002 05:24:31.56	70145	2
2004-02-28	33343	02/28/2004 09:30:39.56	05/28/2004 09:30:39.56	90160	2
2004-05-30	29696	05/30/2004 07:54:39.56	08/14/2004 05:08:15.56	90160	2
2004-08-16	26704	08/16/2004 22:44:15.56	12/30/2004 17:56:15.56	90160	2
2004-12-31	32176	12/31/2004 20:42:39.56	05/19/2005 08:20:15.56	90160	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 5506 Total Exposure = 515382 s, Total spectra = 53, Average exposure per spectrum = 9724 s					
1996-06-24	5376	06/24/1996 08:24:47.56	08/10/1996 03:36:47.56	10301	0,1,2
1996-08-10	6815	08/10/1996 13:12:47.56	08/17/1996 00:24:47.56	10301	0,1,2
1996-08-17	5743	08/17/1996 13:12:47.56	08/24/1996 16:24:47.56	10301	0,1,2
1996-08-25	5599	08/25/1996 08:24:47.56	09/06/1996 10:00:47.56	10301	0,1,2
1996-11-27	5136	11/27/1996 15:08:15.56	02/15/1997 13:32:15.56	20319	0,1,2
1997-03-05	5823	03/05/1997 13:32:15.56	07/08/1997 02:20:15.56	20319	0,1,2
1997-06-20	4800	06/20/1997 04:45:03.56	06/20/1997 07:57:03.56	20318	0,1,2
1997-06-22a	6047	06/22/1997 03:09:03.56	06/22/1997 07:57:03.56	20318	0,1,2
1997-06-22b	6207	06/22/1997 09:33:03.56	06/22/1997 12:45:03.56	20318	0,1,2
1997-06-22c	6575	06/22/1997 14:21:03.56	06/24/1997 11:09:03.56	20318	0,1,2
1997-06-24a	5376	06/24/1997 12:45:03.56	06/24/1997 15:57:03.56	20318	0,1,2
1997-06-24b	5599	06/24/1997 17:33:03.56	06/25/1997 09:33:03.56	20318	0,1,2
1997-06-25	4640	06/25/1997 11:09:03.56	06/27/1997 09:33:03.56	20318	0,1,2
1997-06-27	4768	06/27/1997 15:57:03.56	06/29/1997 04:45:03.56	20318	0,1,2
1997-06-29a	6415	06/29/1997 06:21:03.56	06/29/1997 17:33:03.56	20318	0,1,2
1997-06-29b	6063	06/29/1997 19:09:03.56	07/06/1997 12:45:03.56	20318	0,1,2
1997-07-06	4608	07/06/1997 14:21:03.56	07/09/1997 11:09:03.56	20318	0,1,2
1997-07-21	5024	07/21/1997 23:08:15.56	11/25/1997 21:32:15.56	20319	0,1,2
1998-05-27	4240	05/27/1998 00:37:51.56	08/30/1998 05:25:51.56	30219	0,1,2
1998-09-14	4512	09/14/1998 03:49:51.56	12/22/1998 03:49:51.56	30219	0,1,2
2000-03-18	13424	03/18/2000 03:23:11.56	03/21/2000 16:11:11.56	50153	2
2000-03-21	12480	03/21/2000 22:35:11.56	03/25/2000 03:23:11.56	50153	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
2000-03-25	14160	03/25/2000 09:47:11.56	03/29/2000 19:03:59.56	50153	2
2000-03-30	11904	03/30/2000 03:03:59.56	04/03/2000 15:51:59.56	50153	2
2000-04-03	13024	04/03/2000 20:39:59.56	04/09/2000 08:58:39.56	50153	2
2000-04-09	10160	04/09/2000 15:22:39.56	04/14/2000 03:23:11.56	50153	2
2000-04-14	11872	04/14/2000 08:11:11.56	04/20/2000 04:39:59.56	50153	2
2000-04-20	10288	04/20/2000 09:27:59.56	04/24/2000 20:39:59.56	50153	2
2000-04-24	10992	04/24/2000 22:15:59.56	04/28/2000 22:15:59.56	50153	2
2000-04-29	10640	04/29/2000 01:27:59.56	05/03/2000 13:46:39.56	50153	2
2000-05-03	10336	05/03/2000 15:22:39.56	05/07/2000 12:59:11.56	50153	2
2000-05-07	11296	05/07/2000 22:35:11.56	05/12/2000 06:35:11.56	50153	2
2000-05-16	10608	05/16/2000 14:15:59.56	05/20/2000 03:03:59.56	50153	2
2000-05-20	12016	05/20/2000 07:51:59.56	07/19/2000 00:58:39.56	50153	2
2000-07-19	13280	07/19/2000 02:34:39.56	01/17/2001 16:58:39.56	50153	2
2000-12-31	15232	12/31/2000 16:37:03.56	12/03/2001 21:25:03.56	60135	2
2001-01-23	13088	01/23/2001 12:10:39.56	02/26/2001 07:22:39.56	50153	2
2001-03-02	14832	03/02/2001 23:55:11.56	04/07/2001 06:19:11.56	60133	2
2001-04-09	14000	04/09/2001 04:43:11.56	05/17/2001 20:43:11.56	60133	2
2001-05-19	10576	05/19/2001 04:43:11.56	06/16/2001 07:15:27.56	60133	2
2001-06-18	13088	06/18/2001 12:03:27.56	07/24/2001 10:27:27.56	60133	2
2001-07-26	11664	07/26/2001 05:39:27.56	08/31/2001 07:15:27.56	60133	2
2001-09-02	10912	09/02/2001 02:27:27.56	09/26/2001 02:27:27.56	60133	2
2001-11-23	12784	11/23/2001 22:19:11.56	12/28/2001 23:55:11.56	60133	2
2001-12-03	11536	12/03/2001 23:01:03.56	12/04/2001 05:25:03.56	60135	2
2001-12-04a	10624	12/04/2001 07:01:03.56	12/04/2001 13:25:03.56	60135	2
2001-12-04b	13280	12/04/2001 15:01:03.56	12/05/2001 00:37:03.56	60135	2
2001-12-05	14432	12/05/2001 02:13:03.56	12/05/2001 10:13:03.56	60135	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
2002-01-02	13216	01/02/2002 09:31:11.56	02/03/2002 17:31:11.56	60133	2
2002-02-05	12464	02/05/2002 12:43:11.56	03/17/2002 12:03:27.56	60133	2
2002-03-19	11632	03/19/2002 20:03:27.56	05/02/2002 08:51:27.56	60133	2
2004-07-11	16480	07/11/2004 10:09:19.56	07/22/2004 11:45:19.56	90145	2
2004-07-22	9696	07/22/2004 13:21:19.56	08/08/2004 02:09:19.56	90145	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 5548 Total Exposure = 542621 s, Total spectra = 41, Average exposure per spectrum = 13234 s					
1996-05-05	6735	05/05/1996 00:50:07.56	06/29/1996 20:02:07.56	10301	0,1,2
1996-06-30	6799	06/30/1996 13:38:07.56	07/06/1996 12:02:07.56	10301	0,1,2
1996-07-07	7135	07/07/1996 00:50:07.56	07/15/1996 16:50:07.56	10301	0,1,2
1996-07-16	8671	07/16/1996 02:26:07.56	08/27/1996 05:38:07.56	10301	0,1,2
1996-11-12	11519	11/12/1996 01:59:27.56	06/06/1997 03:35:27.56	20319	0,1,2
1997-06-21	9647	06/21/1997 13:11:27.56	11/22/1997 21:11:27.56	20319	0,1,2
1998-05-22	6255	05/22/1998 12:13:03.56	09/14/1998 05:49:03.56	30219	0,1,2
1998-06-15a	7215	06/15/1998 10:59:27.56	06/15/1998 15:47:27.56	30218	0,1,2
1998-06-15b	5647	06/15/1998 17:23:27.56	06/15/1998 22:11:27.56	30218	0,1,2
1998-06-19	8207	06/19/1998 12:40:31.56	06/20/1998 14:16:31.56	30220	0,1,2
1998-06-20a	8415	06/20/1998 15:52:31.56	06/20/1998 20:40:31.56	30220	0,1,2
1998-06-20b	6383	06/20/1998 23:52:31.56	06/21/1998 07:52:31.56	30220	0,1,2
1998-06-21a	6095	06/21/1998 09:28:31.56	06/21/1998 12:40:31.56	30220	0,1,2
1998-06-21b	7455	06/21/1998 14:16:31.56	06/21/1998 19:04:31.56	30220	0,1,2
1998-06-21c	7071	06/21/1998 20:40:31.56	06/22/1998 07:52:31.56	30220	0,1,2
1998-06-22a	6127	06/22/1998 09:28:31.56	06/22/1998 12:40:31.56	30220	0,1,2
1998-06-22b	7567	06/22/1998 14:16:31.56	06/22/1998 19:04:31.56	30220	0,1,2
1998-06-22c	6495	06/22/1998 20:40:31.56	06/23/1998 07:52:31.56	30220	0,1,2
1998-06-24	5967	06/24/1998 03:04:31.56	06/29/1998 22:16:31.56	30220	0,1,2
1998-06-29	8351	06/29/1998 23:52:31.56	07/02/1998 03:04:31.56	30220	0,1,2
1998-07-01a	9599	07/01/1998 02:59:27.56	07/01/1998 09:23:27.56	30218	0,1,2
1998-07-01b	9519	07/01/1998 10:59:27.56	07/07/1998 06:11:27.56	30218	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
1998-07-02	6831	07/02/1998 04:40:31.56	08/16/1998 07:52:31.56	30220	0,1,2
1998-07-07	10335	07/07/1998 07:47:27.56	07/07/1998 12:35:27.56	30218	0,1,2
1998-08-16	7263	08/16/1998 09:28:31.56	08/17/1998 06:16:31.56	30220	0,1,2
1998-08-17	6191	08/17/1998 07:52:31.56	08/17/1998 23:52:31.56	30220	0,1,2
1998-08-18	8575	08/18/1998 01:28:31.56	08/18/1998 06:16:31.56	30220	0,1,2
1999-01-05	11727	01/05/1999 20:42:23.56	03/10/1999 17:30:23.56	40152	0,2
1999-05-13	10383	05/13/1999 19:06:23.56	07/08/1999 04:42:23.56	40152	0,2
1999-07-12	12047	07/12/1999 12:42:23.56	10/10/1999 04:42:23.56	40152	0,2
1999-10-14	11823	10/14/1999 07:54:23.56	12/21/1999 11:06:23.56	40152	0,2
1999-12-25	10575	12/25/1999 20:42:23.56	02/27/2000 22:18:23.56	40152	0,2
2000-10-15	29488	10/15/2000 02:49:35.56	07/03/2001 06:35:43.56	50155	2
2001-01-25	41055	01/25/2001 17:27:27.56	11/16/2001 01:27:27.56	60131	2
2001-07-03	22032	07/03/2001 09:47:43.56	07/07/2001 11:17:19.56	50155	2
2001-07-07	22495	07/07/2001 16:05:19.56	07/11/2001 11:17:19.56	50155	2
2001-07-11	20000	07/11/2001 16:05:19.56	07/14/2001 18:49:35.56	50155	2
2001-07-14	26192	07/14/2001 22:01:35.56	07/19/2001 09:47:43.56	50155	2
2001-07-19	29968	07/19/2001 12:59:43.56	07/25/2001 03:17:19.56	50155	2
2001-07-25	39264	07/25/2001 04:53:19.56	08/02/2001 14:29:19.56	50155	2
2004-03-02	49503	03/02/2004 16:31:11.56	01/05/2005 21:19:11.56	90153	2

Spectrum	**Exposure (s)**	**Start Time (YYYY-MM-DD hh:mm:ss)**	**End Time (YYYY-MM-DD hh:mm:ss)**	**Originating Observation**	**PCUs Used**
NGC 7314					
Total Exposure = 131918 s, Total spectra = 4, Average exposure per spectrum = 32979 s					
1999-09-13	30720	09/13/1999 22:18:23.56	09/16/1999 11:24:15.56	40151	2
1999-09-16	25392	09/16/1999 13:00:15.56	09/17/1999 11:24:15.56	40151	2
2002-07-19	41103	07/19/2002 04:51:27.56	07/20/2002 11:15:27.56	70163	2
2002-07-20	34703	07/20/2002 12:51:27.56	07/22/2002 16:03:27.56	70163	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
NGC 7469 Total Exposure = 574493 s, Total spectra = 37, Average exposure per spectrum = 15526 s					
1996-04-12	11071	04/12/1996 04:13:51.56	04/13/1996 17:01:51.56	10293	0,1,2
1996-04-17	11855	04/17/1996 02:37:51.56	04/18/1996 01:01:51.56	10293	0,1,2
1996-04-18	11775	04/18/1996 09:01:51.56	04/25/1996 18:37:51.56	10293	0,1,2
1996-04-25	16047	04/25/1996 20:13:51.56	04/27/1996 21:49:51.56	10293	0,1,2
1996-04-27	14479	04/27/1996 23:25:51.56	04/28/1996 23:25:51.56	10293	0,1,2
1996-04-30	6815	04/30/1996 20:13:51.56	05/02/1996 01:01:51.56	10293	0,1,2
1996-06-10a	13968	06/10/1996 00:56:47.56	06/10/1996 20:08:47.56	10315	0,1,2
1996-06-10b	14400	06/10/1996 21:44:47.56	06/11/1996 20:08:47.56	10315	0,1,2
1996-06-11	16224	06/11/1996 21:44:47.56	06/12/1996 21:38:39.56	10315	0,1,2
1996-06-12	13983	06/12/1996 23:14:39.56	06/13/1996 21:38:39.56	10315	0,1,2
1996-06-13	13072	06/13/1996 23:14:39.56	06/14/1996 21:09:51.56	10315	0,1,2
1996-06-14	13040	06/14/1996 22:45:51.56	06/15/1996 23:29:19.56	10315	0,1,2
1996-06-16	13312	06/16/1996 00:21:51.56	06/16/1996 23:29:19.56	10315	0,1,2
1996-06-17a	13888	06/17/1996 01:05:19.56	06/17/1996 21:44:47.56	10315	0,1,2
1996-06-17b	18688	06/17/1996 23:20:47.56	06/19/1996 07:14:39.56	10315	0,1,2
1996-06-19	15872	06/19/1996 10:26:39.56	06/20/1996 15:14:39.56	10315	0,1,2
1996-06-20	17776	06/20/1996 16:50:39.56	06/22/1996 00:21:51.56	10315	0,1,2
1996-06-22	16416	06/22/1996 03:33:51.56	06/23/1996 13:53:19.56	10315	0,1,2
1996-06-23	18592	06/23/1996 15:29:19.56	06/24/1996 20:08:47.56	10315	0,1,2
1996-06-24	16655	06/24/1996 21:44:47.56	06/25/1996 21:44:47.56	10315	0,1,2
1996-06-26	18336	06/26/1996 00:56:47.56	06/27/1996 08:50:39.56	10315	0,1,2
1996-06-27	16288	06/27/1996 09:57:51.56	06/28/1996 13:09:51.56	10315	0,1,2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
1996-06-28	17215	06/28/1996 16:21:51.56	06/29/1996 14:45:51.56	10315	0,1,2
1996-06-29	13920	06/29/1996 17:57:51.56	06/30/1996 15:29:19.56	10315	0,1,2
1996-06-30	13919	06/30/1996 17:05:19.56	07/01/1996 13:53:19.56	10315	0,1,2
1996-07-01	12655	07/01/1996 15:29:19.56	07/02/1996 12:17:19.56	10315	0,1,2
1996-07-02	11487	07/02/1996 13:53:19.56	07/03/1996 07:29:19.56	10315	0,1,2
1996-07-03	13072	07/03/1996 09:05:19.56	07/04/1996 02:32:47.56	10315	0,1,2
1996-07-04	14319	07/04/1996 04:08:47.56	07/04/1996 21:44:47.56	10315	0,1,2
1996-07-05a	14559	07/05/1996 00:56:47.56	07/05/1996 21:44:47.56	10315	0,1,2
1996-07-05b	13584	07/05/1996 23:20:47.56	07/06/1996 20:02:39.56	10315	0,1,2
1996-07-06	16159	07/06/1996 21:38:39.56	07/07/1996 20:02:39.56	10315	0,1,2
1996-07-07	19183	07/07/1996 23:14:39.56	07/09/1996 00:50:39.56	10315	0,1,2
1996-07-09	15344	07/09/1996 02:26:39.56	07/10/1996 00:21:51.56	10315	0,1,2
1996-07-10	15583	07/10/1996 01:57:51.56	07/10/1996 22:45:51.56	10315	0,1,2
1996-07-11	17167	07/11/1996 00:21:51.56	07/11/1996 19:33:51.56	10315	0,1,2
2004-04-08	43775	04/08/2004 20:47:43.56	12/29/2004 06:23:43.56	90154	2

Spectrum	Exposure (s)	Start Time (YYYY-MM-DD hh:mm:ss)	End Time (YYYY-MM-DD hh:mm:ss)	Originating Observation	PCUs Used
PKS 0558-504 Total Exposure = 109679 s, Total spectra = 2, Average exposure per spectrum = 54839 s					
1997-10-13	33887	10/13/1997 07:27:27.56	10/14/1997 01:03:27.56	20307	0,1,2
2005-03-04	75792	03/04/2005 09:05:19.56	11/01/2005 21:53:19.56	91128	2

B.2 Spectra Uncorrected for SAA-passage Under-Reporting

Table B.2 lists the spectra which were potentially affected by the under-reported SAA passages which were described in Section 2.2.3. The listed spectra are those spectra having at least one observation which has an SAA passage occurring during the first three hours of the UTC day. This does not include SAA passages which may have occurred during the slew to the source, so the estimated number of potentially affected spectra is a bit of an underestimate. About half of the SAA passages which happened during the first three hours UTC were unreported in the SAA history file, so these spectra will have under-estimated background counts.

Table B.2: Summary of spectra potentially affected by unreported SAA passages.

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
3C 111	4	44%	1997-03-22	3
			1997-03-24	2
			2004-03-01	1
			2004-10-10	1
3C 120	19	32%	1997-12-30	2
			1998-04-30	1
			1999-10-31	2
			2002-11-29	2
			2002-12-21	1
			2002-03-01	4
			2003-02-06	6
			2003-02-08b	1
			2003-04-29	2
			2003-10-09	1
			2003-08-04	1
			2003-08-26	1
			2004-01-11	1
			2004-02-15	2
			2004-03-24	6
			2004-11-28	1
			2005-02-17	5
			2005-03-11	4
			2005-06-24	1
3C 273	20	25%	1996-05-21	1
			1996-07-17a	1
			1997-01-29	1
			2001-07-06	3
			2001-07-24	1

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
			2002-04-07	2
			2002-05-01	1
			2002-05-22	1
			2002-07-09	1
			2003-06-16	5
			2003-06-23	2
			2003-07-07	3
			2004-01-02	6
			2004-02-27	2
			2004-04-07	1
			2004-05-23	3
			2004-07-14	1
			2005-03-04	2
			2005-06-12	1
			2005-07-13	1
3C 382	5	71%	1997-03-28	1
			1997-03-29	1
			1999-04-12a	1
			1999-04-12b	1
			2004-10-27	1
3C 390.3	9	50%	1996-06-07	3
			1996-06-17	6
			1996-06-26	2
			1999-04-29	1
			1999-07-25	2
			1999-09-17	1
			1999-12-28	1
			2000-07-28	3
			2000-10-26	1
4U 0241+61	0	0%	...	...
Akn 120	8	57%	1998-02-24	2
			1998-04-07	1
			1998-12-16b	1
			1998-12-17b	1
			1999-10-19	2
			2000-02-10	3
			2003-08-24a	1
			2003-08-24b	1
Akn 564	3	75%	1996-12-23	2
			1999-01-01	4
			2002-03-02	4
Cen A	5	13%	1998-08-09c	1
			1998-08-09d	2
			1998-08-14c	2
			2000-01-23d	1
			2004-01-03c	2
Cyg A	2	18%	1996-04-10b	1
			1996-07-14	1
ESO 103-G035	2	33%	1997-04-12	2
			1997-11-13	2
Fairall 9	5	42%	1997-01-02	4
			2001-03-06	2
			2001-09-01	4
			2001-09-23	2
			2002-03-03	3

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
IC 4329A	18	40%	1996-08-03b	1
			1996-08-05	1
			1996-08-11	1
			1997-08-05	1
			1997-08-11	2
			2001-08-21	1
			2001-08-22	2
			2001-08-25	1
			2003-08-18	6
			2003-07-12	3
			2003-07-16	3
			2003-07-19	1
			2003-08-09	1
			2004-03-01	1
			2004-06-20	1
			2004-08-10	1
			2005-05-02	2
			2005-06-13	1
IRAS 04575-7537	1	50%	1997-05-30	2
IRAS 18325-5926	6	67%	1997-12-25b	1
			1997-12-26b	1
			1998-02-21	2
			1998-02-22a	2
			1998-02-22b	2
			1998-02-23	1
MCG −2-58-22	2	29%	1999-05-28	4
			1999-11-04	1
MCG −5-23-16	3	18%	1996-04-24c	1
			1996-11-28b	2
			1996-11-30a	1
MCG −6-30-15	34	49%	1996-09-15	2
			1996-09-18	1
			1997-05-10	14
			1997-08-04c	2
			1997-08-05a	2
			1997-08-05c	2
			1997-08-06a	2
			1997-08-06c	1
			1997-08-07c	2
			1997-08-09a	2
			1997-08-09c	2
			1997-08-10b	1
			1997-08-11c	2
			1999-07-19b	2
			1999-07-20b	2
			1999-07-21	2
			1999-07-22b	1
			1999-07-23b	1
			1999-07-24	1
			1999-07-25b	1
			1999-07-27a	1
			1999-07-27b	1
			2000-05-16	4
			2000-07-12	3
			2000-07-26	3
			2000-07-10	2
			2001-01-22	1
			2001-05-25	2

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
			2002-04-18	6
			2002-07-07	2
			2003-04-01	2
			2003-06-08	4
			2003-08-20	4
			2005-03-07	2
Mkn 79	4	80%	2003-03-22	5
			2004-02-28	4
			2004-09-03	3
			2005-06-14	6
Mkn 110	2	100%	2005-03-04	1
			2005-08-03	3
Mkn 279	3	75%	1996-05-22	1
			1999-07-11	1
			2002-05-18	4
Mkn 348	4	80%	1996-05-24	2
			1996-05-30	1
			1996-12-29	3
			1997-07-03	2
Mkn 509	10	40%	1996-10-31	2
			1996-11-01	3
			1996-11-04	1
			1996-11-09	2
			2001-04-13a	1
			2001-04-13b	1
			2003-03-28	1
			2003-09-18	1
			2004-02-29	2
			2005-03-04	1
Mkn 766	1	25%	2004-03-01	5
MR 2251-178	7	88%	1996-12-09	1
			1996-12-10a	1
			1996-12-10b	1
			1996-12-11	2
			1996-12-12	1
			2004-03-27	1
			2004-08-27	3
NGC 2110	3	30%	1998-02-09	1
			1998-08-30	3
			1998-08-31	3
NGC 3783	13	62%	1996-01-31	1
			1996-02-03	1
			1999-06-30	1
			2000-11-06	4
			2001-02-24	1
			2001-03-11	1
			2001-06-07	2
			2004-02-28	4
			2004-04-18	3
			2005-03-04	1
			2005-04-19	4
			2005-07-17	1
			2005-08-25	2
NGC 4593	8	73%	2001-06-29a	1

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
			2001-06-29b	1
			2002-06-25	2
			2002-07-01	1
			2004-02-28	2
			2004-05-30	4
			2004-08-16	1
			2004-12-31	1
NGC 3227	22	26%	1996-11-18b	1
			1996-11-19b	1
			1996-11-20a	1
			1996-11-20c	1
			1996-11-21a	1
			1996-11-21c	2
			1996-11-22	2
			1999-01-02	1
			1999-04-01	5
			1999-04-29	26
			2000-04-02	8
			2000-04-15	11
			2000-05-23	4
			2001-01-29	5
			2002-01-04	1
			2002-04-20	6
			2003-06-19	3
			2004-02-10	7
			2004-03-19	9
			2004-06-17	3
			2005-01-23	2
			2005-05-11	2
NGC 3516	31	61%	1997-03-16	1
			1997-04-01	1
			1997-04-06	2
			1997-04-30	1
			1997-05-12	2
			1997-05-22a	1
			1997-05-22d	1
			1997-05-23a	1
			1997-05-23c	1
			1997-05-24a	1
			1997-05-24c	1
			1997-05-25a	1
			1997-05-25c	1
			1997-05-25d	1
			1997-05-26	1
			1997-06-23	3
			1997-07-05	2
			1997-08-03	1
			1997-12-30	1
			1998-05-28	2
			1998-08-05	1
			1998-10-12	1
			1998-03-25	5
			1998-04-13c	2
			1998-04-15b	2
			1998-04-15d	1
			1998-04-16	1
			1999-04-30	1
			2001-04-10	1
			2005-08-22	1
			2005-10-14	1
NGC 4051	2	29%	2001-03-04	2

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
			2002-03-01	6
NGC 4151	9	14%	1996-06-28	1
			1996-06-29	2
			1996-07-01a	1
			1996-07-01b	1
			1996-09-18	2
			1996-09-25	1
			1999-06-08	1
			2000-03-03	1
			2000-08-12	1
NGC 4258	7	64%	1996-12-03	1
			1996-12-04	1
			1998-05-12	9
			1998-08-05	7
			1999-04-02	17
			1999-07-17	3
			1999-05-15	4
NGC 4388	1	20%	1996-07-13a	1
NGC 5506	19	36%	1996-06-24	1
			1996-08-10	1
			1996-08-17	1
			1998-05-27	1
			1998-09-14	1
			2000-04-20	1
			2000-05-16	2
			2000-05-20	1
			2000-07-19	2
			2000-12-31	9
			2001-05-19	2
			2001-06-18	2
			2001-07-26	1
			2001-09-02	1
			2001-11-23	2
			2001-12-03	1
			2001-12-04b	1
			2001-12-05	1
			2004-07-22	2
NGC 5548	23	56%	1996-05-05	4
			1996-06-30	2
			1996-07-07	2
			1996-11-12	1
			1997-06-21	2
			1998-05-22	6
			1998-07-02	2
			1998-06-20b	1
			1998-06-29	2
			1998-07-01b	1
			1998-08-18	1
			1999-05-13	2
			1999-07-12	1
			1999-10-14	1
			2000-10-15	2
			2001-01-25	20
			2001-07-03	3
			2001-07-07	1
			2001-07-11	3
			2001-07-14	4
			2001-07-19	4
			2001-07-25	2

Galaxy	# of affected spectra	Percentage of specs affected	Spectrum names	SAA Passages in 00-03h UTC[a]
			2004-03-02	6
NGC 7314	0	0%	···	···
NGC 7469	10	27%	1996-04-27	1
			1996-04-30	2
			1996-06-20	1
			1996-06-22	1
			1996-06-23	1
			1996-06-26	1
			1996-06-28	1
			1996-07-01	1
			1996-07-10	1
			1996-07-11	1
PKS 0558-504	2	100%	1997-10-13	2
			2005-03-04	4
Total	327	40%	···	···

[a]Does not include SA passages which may have occurred during the slew to the source.

Appendix C

Spectral Fit Results

In this appendix, we compile the results of the spectral fits of our sample of 39 Seyfert galaxies observed by *RXTE*. We list the best-fit parameters for each spectrum in Section C.1. Next we present a list of statistics for each source in Section C.2. We present correlation plots for selected spectral parameters for each of the Seyfert 1 and Seyfert 2 samples in Section C.3.

C.1 Database of Fitted Parameters

Table C.1 lists the best-fit parameters for each of the AGN spectra fitted to the fixed-σ model as described in Chapter 3. Error bars in the table are 90% errors, or $\Delta\chi^2 = 2.71$ for one interesting parameter. The fixed value for the iron line width, σ, is also given in the header for each galaxy in the table.

Table C.1: Results of spectral fitting. All reported error bars are 90% errors.

				`wabs`	`pexrav`			`gaussian`		
Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		3C 111						$\mathrm{Fe}_K\alpha\sigma = 0.27$		
1997-03-22	0.40 (18.46/46)	$4.08^{+0.61}_{-0.99}$	$(2.24^{+0.35}_{-0.52})E44$	$2.39^{+1.03}_{-1.17}$	$1.77^{+0.07}_{-0.10}$	$0.00^{+0.00}_{-0.17}$	$1.35^{+0.21}_{-0.32}$	$5.98^{+0.48}_{-1.52}$	$3.40^{+2.78}_{-2.59}$	$59.69^{+48.76}_{-46.31}$
1997-03-24	0.41 (18.79/46)	$4.04^{+0.64}_{-1.01}$	$(2.20^{+0.35}_{-0.55})E44$	$2.19^{+1.07}_{-1.18}$	$1.76^{+0.07}_{-0.11}$	$0.00^{+0.00}_{-0.23}$	$1.29^{+0.21}_{-0.33}$	$6.22^{+0.72}_{-1.28}$	$2.68^{+2.40}_{-2.66}$	$52.20^{+46.73}_{-51.80}$
2001-03-14	0.34 (14.22/42)	$7.16^{+1.00}_{-1.58}$	$(3.91^{+0.55}_{-0.86})E44$	$1.43^{+0.94}_{-1.06}$	$1.81^{+0.06}_{-0.10}$	$0.00^{+0.00}_{-0.18}$	$2.37^{+0.33}_{-0.53}$	$5.98^{+0.48}_{-0.54}$	$6.01^{+5.08}_{-4.11}$	$64.95^{+54.71}_{-47.05}$
2001-03-15	0.47 (19.69/42)	$7.07^{+0.95}_{-1.43}$	$(3.86^{+0.52}_{-0.78})E44$	$1.26^{+0.91}_{-1.00}$	$1.77^{+0.06}_{-0.09}$	$0.00^{+0.00}_{-0.15}$	$2.15^{+0.29}_{-0.44}$	$5.97^{+0.29}_{-0.28}$	$9.24^{+4.78}_{-4.22}$	$102.00^{+53.16}_{-50.00}$
2004-03-01	0.45 (18.95/42)	$3.14^{+0.42}_{-0.93}$	$(1.72^{+0.23}_{-0.50})E44$	$0.86^{+0.86}_{-1.36}$	$1.63^{+0.07}_{-0.13}$	$0.00^{+0.00}_{-0.23}$	$0.74^{+0.10}_{-0.22}$	$6.14^{+0.28}_{-0.34}$	$5.29^{+2.70}_{-3.28}$	$139.00^{+70.71}_{-96.00}$
2004-08-04	0.34 (14.27/42)	$5.40^{+0.78}_{-1.61}$	$(2.96^{+0.42}_{-0.88})E44$	$0.73^{+0.73}_{-1.29}$	$1.77^{+0.07}_{-0.14}$	$0.03^{+0.03}_{-0.29}$	$1.55^{+0.22}_{-0.47}$	$6.12^{+0.28}_{-0.33}$	$6.83^{+3.65}_{-3.57}$	$108.00^{+58.39}_{-58.00}$
2004-10-10	0.43 (17.89/42)	$5.94^{+1.06}_{-1.74}$	$(3.25^{+0.58}_{-0.95})E44$	$0.88^{+0.88}_{-1.25}$	$1.78^{+0.10}_{-0.13}$	$0.10^{+0.10}_{-0.29}$	$1.75^{+0.32}_{-0.52}$	$6.03^{+0.32}_{-0.37}$	$7.90^{+4.62}_{-3.80}$	$110.00^{+65.32}_{-55.00}$
2005-03-31	0.48 (20.32/42)	$5.47^{+0.69}_{-1.55}$	$(2.98^{+0.38}_{-0.85})E44$	$1.22^{+0.86}_{-1.28}$	$1.73^{+0.06}_{-0.13}$	$0.00^{+0.00}_{-0.23}$	$1.53^{+0.20}_{-0.44}$	$6.14^{+0.23}_{-0.25}$	$9.28^{+4.28}_{-3.71}$	$140.00^{+66.20}_{-60.00}$
2005-07-20	0.67 (28.87/43)	$4.39^{+0.49}_{-1.17}$	$(2.40^{+0.27}_{-0.64})E44$	$0.46^{+0.46}_{-1.23}$	$1.66^{+0.05}_{-0.12}$	$0.00^{+0.00}_{-0.22}$	$1.04^{+0.12}_{-0.28}$	$6.07^{+0.26}_{-0.27}$	$7.15^{+3.49}_{-3.49}$	$140.00^{+70.97}_{-69.00}$

Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	wabs N_H[e]	pexrav Γ[f]	pexrav R[g]	pexrav Norm.[h]	gaussian Energy[i]	gaussian Norm.[j]	gaussian EW[k]
		3C 120						$Fe_{K}\alpha\sigma = 0.26$		
1996-03-11a	0.51 (28.01/55)	$5.39^{+0.84}_{-1.17}$	$(1.33^{+0.21}_{-0.29})E44$	$0.71^{+0.71}_{-0.91}$	$1.75^{+0.10}_{-0.11}$	$0.28^{+0.23}_{-0.29}$	$1.48^{+0.24}_{-0.33}$	$6.33^{+0.19}_{-0.19}$	$8.17^{+2.88}_{-2.76}$	$137.00^{+50.41}_{-47.00}$
1996-03-11b	0.54 (29.95/55)	$4.96^{+0.55}_{-1.13}$	$(1.23^{+0.14}_{-0.28})E44$	$0.47^{+0.47}_{-0.98}$	$1.66^{+0.07}_{-0.11}$	$0.08^{+0.08}_{-0.24}$	$1.18^{+0.13}_{-0.27}$	$6.22^{+0.21}_{-0.24}$	$8.11^{+2.93}_{-2.69}$	$143.00^{+52.46}_{-52.00}$
1997-01-10	0.39 (17.96/46)	$6.33^{+0.60}_{-1.74}$	$(1.58^{+0.17}_{-0.40})E44$	$0.31^{+0.31}_{-1.09}$	$1.78^{+0.06}_{-0.12}$	$0.09^{+0.09}_{-0.28}$	$1.80^{+0.20}_{-0.47}$	$6.14^{+0.23}_{-0.26}$	$8.54^{+4.01}_{-3.42}$	$120.00^{+57.34}_{-51.00}$
1997-01-15	0.67 (30.60/46)	$5.46^{+1.05}_{-1.62}$	$(1.34^{+0.26}_{-0.40})E44$	$0.82^{+0.82}_{-1.22}$	$1.79^{+0.12}_{-0.14}$	$0.23^{+0.23}_{-0.36}$	$1.59^{+0.31}_{-0.47}$	$6.15^{+0.29}_{-0.26}$	$7.24^{+3.86}_{-3.28}$	$114.00^{+60.68}_{-53.00}$
1997-01-20	0.44 (20.28/46)	$5.68^{+0.69}_{-1.62}$	$(1.39^{+0.17}_{-0.40})E44$	$0.28^{+0.28}_{-1.16}$	$1.82^{+0.08}_{-0.14}$	$0.28^{+0.25}_{-0.38}$	$1.64^{+0.20}_{-0.48}$	$6.17^{+0.21}_{-0.24}$	$8.63^{+3.71}_{-3.21}$	$141.00^{+61.81}_{-51.00}$
1997-01-24	0.53 (24.58/46)	$5.51^{+0.41}_{-1.55}$	$(1.35^{+0.10}_{-0.38})E44$	$0.03^{+0.03}_{-1.18}$	$1.78^{+0.05}_{-0.13}$	$0.11^{+0.11}_{-0.33}$	$1.48^{+0.11}_{-0.42}$	$6.22^{+0.20}_{-0.22}$	$9.44^{+3.51}_{-3.23}$	$163.00^{+62.00}_{-57.00}$
1997-01-28	0.60 (27.77/46)	$5.88^{+0.57}_{-1.76}$	$(1.44^{+0.14}_{-0.43})E44$	$0.12^{+0.12}_{-1.20}$	$1.84^{+0.07}_{-0.14}$	$0.25^{+0.24}_{-0.41}$	$1.74^{+0.17}_{-0.53}$	$6.23^{+0.20}_{-0.22}$	$9.92^{+3.87}_{-3.31}$	$160.00^{+63.76}_{-57.00}$
1997-02-02	0.46 (20.97/46)	$5.63^{+0.47}_{-1.56}$	$(1.38^{+0.12}_{-0.38})E44$	$0.15^{+0.15}_{-1.17}$	$1.78^{+0.05}_{-0.13}$	$0.07^{+0.07}_{-0.32}$	$1.54^{+0.13}_{-0.43}$	$6.25^{+0.21}_{-0.23}$	$8.59^{+3.52}_{-3.27}$	$147.00^{+61.34}_{-54.00}$
1997-02-08	0.53 (24.54/46)	$5.41^{+0.36}_{-1.25}$	$(1.33^{+0.09}_{-0.31})E44$	$0.00^{+0.00}_{-0.97}$	$1.74^{+0.04}_{-0.11}$	$0.07^{+0.07}_{-0.28}$	$1.37^{+0.09}_{-0.32}$	$6.09^{+0.21}_{-0.21}$	$8.54^{+3.26}_{-3.37}$	$145.00^{+57.79}_{-55.00}$
1997-02-11	0.59 (27.02/46)	$5.45^{+0.58}_{-1.50}$	$(1.34^{+0.14}_{-0.37})E44$	$0.44^{+0.44}_{-1.18}$	$1.77^{+0.06}_{-0.13}$	$0.03^{+0.03}_{-0.29}$	$1.50^{+0.16}_{-0.42}$	$6.20^{+0.18}_{-0.21}$	$9.74^{+3.56}_{-3.21}$	$163.00^{+61.00}_{-60.00}$
1997-02-17	0.59 (27.22/46)	$5.41^{+0.45}_{-1.01}$	$(1.33^{+0.11}_{-0.25})E44$	$0.28^{+0.28}_{-0.95}$	$1.72^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.16}$	$1.36^{+0.12}_{-0.26}$	$6.28^{+0.15}_{-0.16}$	$10.25^{+3.18}_{-3.21}$	$178.00^{+58.00}_{-60.00}$
1997-02-22	0.61 (28.09/46)	$4.94^{+0.22}_{-0.80}$	$(1.21^{+0.05}_{-0.20})E44$	$0.00^{+0.00}_{-0.82}$	$1.69^{+0.03}_{-0.07}$	$0.00^{+0.00}_{-0.14}$	$1.15^{+0.05}_{-0.19}$	$6.26^{+0.15}_{-0.16}$	$10.52^{+2.65}_{-2.97}$	$204.00^{+54.00}_{-54.00}$
1997-03-01	0.72 (33.00/46)	$5.66^{+0.34}_{-1.08}$	$(1.39^{+0.08}_{-0.26})E44$	$0.00^{+0.00}_{-0.81}$	$1.74^{+0.04}_{-0.09}$	$0.06^{+0.06}_{-0.25}$	$1.44^{+0.09}_{-0.28}$	$6.23^{+0.18}_{-0.18}$	$9.55^{+2.91}_{-3.24}$	$163.00^{+52.00}_{-52.00}$
1997-12-30	0.47 (21.56/46)	$4.03^{+0.59}_{-1.33}$	$(9.87^{+1.44}_{-3.25})E43$	$0.47^{+0.47}_{-1.34}$	$1.75^{+0.10}_{-0.15}$	$0.20^{+0.20}_{-0.41}$	$1.08^{+0.16}_{-0.36}$	$6.21^{+0.24}_{-0.28}$	$6.28^{+3.09}_{-3.14}$	$140.00^{+70.37}_{-76.00}$
1998-02-13a	0.45 (20.62/46)	$4.62^{+0.76}_{-1.38}$	$(1.13^{+0.19}_{-0.34})E44$	$0.58^{+0.58}_{-1.22}$	$1.81^{+0.11}_{-0.14}$	$0.27^{+0.27}_{-0.41}$	$1.36^{+0.23}_{-0.41}$	$6.33^{+0.24}_{-0.29}$	$7.25^{+3.10}_{-3.13}$	$148.00^{+64.21}_{-66.00}$
1998-02-13b	0.59 (27.13/46)	$4.70^{+0.54}_{-1.43}$	$(1.15^{+0.13}_{-0.35})E44$	$0.31^{+0.31}_{-1.26}$	$1.75^{+0.07}_{-0.14}$	$0.11^{+0.11}_{-0.36}$	$1.24^{+0.14}_{-0.38}$	$6.25^{+0.24}_{-0.29}$	$6.61^{+3.37}_{-3.10}$	$132.00^{+68.46}_{-61.00}$
1998-02-14	0.80 (36.86/46)	$4.91^{+0.69}_{-1.52}$	$(1.20^{+0.17}_{-0.37})E44$	$0.39^{+0.39}_{-1.24}$	$1.82^{+0.09}_{-0.15}$	$0.21^{+0.21}_{-0.41}$	$1.44^{+0.21}_{-0.45}$	$6.24^{+0.23}_{-0.25}$	$6.68^{+3.13}_{-3.09}$	$128.00^{+60.90}_{-60.00}$
1998-02-15	0.54 (24.76/46)	$4.88^{+0.97}_{-1.65}$	$(1.20^{+0.24}_{-0.40})E44$	$0.80^{+0.80}_{-1.34}$	$1.83^{+0.12}_{-0.16}$	$0.21^{+0.21}_{-0.43}$	$1.52^{+0.31}_{-0.52}$	$6.05^{+0.34}_{-0.38}$	$5.84^{+3.96}_{-3.35}$	$101.00^{+68.48}_{-60.00}$
1998-04-30	0.41 (18.86/46)	$5.01^{+0.27}_{-1.39}$	$(1.23^{+0.07}_{-0.34})E44$	$0.04^{+0.04}_{-1.18}$	$1.74^{+0.03}_{-0.13}$	$0.00^{+0.00}_{-0.30}$	$1.28^{+0.07}_{-0.36}$	$6.24^{+0.26}_{-0.29}$	$6.28^{+3.30}_{-3.22}$	$121.00^{+64.40}_{-59.00}$
1998-10-27	0.43 (19.85/46)	$25.71^{+1.24}_{-6.47}$	$(6.31^{+0.30}_{-1.59})E44$	$0.00^{+0.00}_{-1.07}$	$1.75^{+0.03}_{-0.12}$	$0.00^{+0.00}_{-0.28}$	$6.64^{+0.33}_{-1.70}$	$6.23^{+0.16}_{-0.17}$	$49.08^{+15.51}_{-12.79}$	$182.00^{+59.00}_{-49.00}$
1999-01-15	0.58 (26.70/46)	$6.47^{+1.31}_{-1.99}$	$(1.59^{+0.32}_{-0.49})E44$	$0.91^{+0.91}_{-1.28}$	$1.84^{+0.12}_{-0.14}$	$0.19^{+0.19}_{-0.39}$	$2.05^{+0.42}_{-0.64}$	$6.22^{+0.31}_{-0.36}$	$8.65^{+4.87}_{-4.21}$	$118.00^{+65.94}_{-60.00}$
1999-03-30	0.36 (15.29/42)	$5.82^{+0.54}_{-2.09}$	$(1.43^{+0.13}_{-0.51})E44$	$0.32^{+0.32}_{-1.53}$	$1.79^{+0.05}_{-0.16}$	$0.00^{+0.00}_{-0.34}$	$1.68^{+0.16}_{-0.61}$	$5.99^{+0.26}_{-0.30}$	$9.34^{+4.96}_{-3.93}$	$140.00^{+76.33}_{-58.00}$
1999-07-29	0.36 (15.03/42)	$4.43^{+0.29}_{-1.68}$	$(1.09^{+0.07}_{-0.41})E44$	$0.00^{+0.00}_{-1.58}$	$1.71^{+0.04}_{-0.17}$	$0.06^{+0.06}_{-0.39}$	$1.09^{+0.07}_{-0.42}$	$6.18^{+0.27}_{-0.36}$	$7.22^{+3.63}_{-3.50}$	$149.00^{+75.13}_{-70.00}$
1999-10-31	0.46 (19.43/42)	$5.15^{+0.41}_{-1.64}$	$(1.26^{+0.10}_{-0.40})E44$	$0.00^{+0.00}_{-1.36}$	$1.77^{+0.06}_{-0.15}$	$0.18^{+0.18}_{-0.38}$	$1.38^{+0.11}_{-0.45}$	$6.20^{+0.22}_{-0.25}$	$8.35^{+3.67}_{-3.53}$	$150.00^{+67.34}_{-61.00}$
2002-03-01	0.84 (35.20/42)	$4.25^{+0.35}_{-1.28}$	$(1.04^{+0.09}_{-0.31})E44$	$0.04^{+0.04}_{-1.28}$	$1.76^{+0.06}_{-0.14}$	$0.22^{+0.20}_{-0.35}$	$1.13^{+0.09}_{-0.34}$	$6.33^{+0.20}_{-0.23}$	$8.00^{+2.99}_{-2.99}$	$182.00^{+70.00}_{-65.00}$
2002-07-09	0.55 (22.91/42)	$5.24^{+0.39}_{-0.83}$	$(1.29^{+0.10}_{-0.20})E44$	$0.00^{+0.00}_{-0.68}$	$1.75^{+0.05}_{-0.08}$	$0.13^{+0.13}_{-0.24}$	$1.37^{+0.10}_{-0.22}$	$6.27^{+0.19}_{-0.20}$	$9.46^{+2.68}_{-3.36}$	$171.00^{+50.00}_{-63.00}$
2002-09-18	0.62 (26.16/42)	$5.48^{+0.40}_{-0.76}$	$(1.34^{+0.10}_{-0.19})E44$	$0.00^{+0.00}_{-0.57}$	$1.77^{+0.05}_{-0.07}$	$0.14^{+0.14}_{-0.24}$	$1.47^{+0.11}_{-0.21}$	$6.14^{+0.25}_{-0.26}$	$6.82^{+2.80}_{-3.44}$	$112.00^{+44.51}_{-59.00}$
2002-11-29	0.41 (17.35/42)	$5.25^{+0.41}_{-1.68}$	$(1.29^{+0.10}_{-0.41})E44$	$0.00^{+0.00}_{-1.30}$	$1.83^{+0.06}_{-0.15}$	$0.38^{+0.24}_{-0.45}$	$1.52^{+0.12}_{-0.49}$	$6.20^{+0.20}_{-0.23}$	$9.57^{+3.75}_{-3.39}$	$170.00^{+68.00}_{-62.00}$
2002-12-13	0.57 (23.96/42)	$5.19^{+0.88}_{-1.56}$	$(1.27^{+0.22}_{-0.38})E44$	$0.59^{+0.59}_{-1.23}$	$1.86^{+0.11}_{-0.15}$	$0.46^{+0.32}_{-0.47}$	$1.67^{+0.29}_{-0.51}$	$6.40^{+0.28}_{-0.36}$	$6.86^{+3.36}_{-3.34}$	$123.00^{+59.50}_{-61.00}$
2002-12-15	0.63 (26.28/42)	$5.50^{+0.41}_{-0.72}$	$(1.35^{+0.10}_{-0.18})E44$	$0.00^{+0.00}_{-0.53}$	$1.80^{+0.05}_{-0.07}$	$0.20^{+0.20}_{-0.26}$	$1.54^{+0.12}_{-0.21}$	$6.20^{+0.21}_{-0.24}$	$8.93^{+2.73}_{-3.40}$	$152.00^{+45.00}_{-59.00}$
2002-12-16a	0.50 (20.80/42)	$5.75^{+0.70}_{-1.77}$	$(1.41^{+0.17}_{-0.44})E44$	$0.25^{+0.25}_{-1.26}$	$1.86^{+0.08}_{-0.15}$	$0.40^{+0.27}_{-0.44}$	$1.79^{+0.22}_{-0.56}$	$6.16^{+0.32}_{-0.43}$	$5.89^{+3.81}_{-3.49}$	$93.46^{+60.90}_{-54.54}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2002-12-16b	0.71 (29.70/42)	$5.34^{+0.99}_{-1.54}$	$(1.31^{+0.24}_{-0.38})E44$	$0.77^{+0.77}_{-1.22}$	$1.87^{+0.12}_{-0.14}$	$0.30^{+0.29}_{-0.39}$	$1.78^{+0.33}_{-0.52}$	$6.30^{+0.30}_{-0.35}$	$6.41^{+3.58}_{-3.45}$	$108.00^{+59.61}_{-60.00}$
2002-12-18	0.77 (32.24/42)	$5.19^{+0.41}_{-1.30}$	$(1.27^{+0.10}_{-0.32})E44$	$0.00^{+0.00}_{-1.03}$	$1.80^{+0.06}_{-0.12}$	$0.24^{+0.22}_{-0.34}$	$1.47^{+0.12}_{-0.37}$	$6.01^{+0.25}_{-0.25}$	$7.62^{+3.42}_{-3.41}$	$130.00^{+58.75}_{-56.00}$
2002-12-19	0.71 (29.98/42)	$4.77^{+0.49}_{-1.65}$	$(1.17^{+0.12}_{-0.40})E44$	$0.11^{+0.11}_{-1.40}$	$1.84^{+0.07}_{-0.16}$	$0.31^{+0.26}_{-0.45}$	$1.42^{+0.15}_{-0.50}$	$6.08^{+0.23}_{-0.26}$	$8.42^{+4.01}_{-3.33}$	$160.00^{+78.09}_{-61.00}$
2002-12-20	0.78 (32.60/42)	$5.77^{+0.27}_{-1.66}$	$(1.41^{+0.07}_{-0.41})E44$	$0.00^{+0.00}_{-1.22}$	$1.73^{+0.02}_{-0.13}$	$0.00^{+0.00}_{-0.28}$	$1.49^{+0.07}_{-0.43}$	$5.99^{+0.26}_{-0.32}$	$8.32^{+4.24}_{-3.53}$	$127.00^{+65.70}_{-51.00}$
2002-12-21	0.55 (23.21/42)	$6.34^{+0.41}_{-1.17}$	$(1.56^{+0.10}_{-0.29})E44$	$0.00^{+0.00}_{-0.78}$	$1.78^{+0.04}_{-0.09}$	$0.08^{+0.08}_{-0.23}$	$1.76^{+0.11}_{-0.33}$	$5.87^{+0.24}_{-0.24}$	$8.86^{+3.63}_{-3.71}$	$118.00^{+48.00}_{-47.00}$
2003-02-06	0.49 (20.53/42)	$5.24^{+0.75}_{-1.44}$	$(1.28^{+0.18}_{-0.35})E44$	$0.45^{+0.45}_{-1.19}$	$1.83^{+0.09}_{-0.13}$	$0.22^{+0.22}_{-0.35}$	$1.60^{+0.23}_{-0.45}$	$6.36^{+0.27}_{-0.33}$	$6.69^{+3.44}_{-3.42}$	$120.00^{+62.16}_{-62.00}$
2003-02-08a	0.54 (22.56/42)	$5.82^{+0.42}_{-0.97}$	$(1.43^{+0.10}_{-0.24})E44$	$0.00^{+0.00}_{-0.71}$	$1.81^{+0.05}_{-0.08}$	$0.19^{+0.19}_{-0.25}$	$1.68^{+0.12}_{-0.29}$	$6.09^{+0.30}_{-0.31}$	$7.03^{+3.01}_{-3.48}$	$110.00^{+46.70}_{-52.00}$
2003-02-08b	0.57 (23.81/42)	$5.59^{+0.65}_{-1.60}$	$(1.37^{+0.16}_{-0.39})E44$	$0.25^{+0.25}_{-1.22}$	$1.81^{+0.08}_{-0.13}$	$0.27^{+0.24}_{-0.36}$	$1.63^{+0.19}_{-0.47}$	$6.22^{+0.25}_{-0.27}$	$7.82^{+3.79}_{-3.49}$	$127.00^{+62.45}_{-60.00}$
2003-04-29	0.28 (11.94/42)	$4.92^{+0.39}_{-1.02}$	$(1.21^{+0.10}_{-0.24})E44$	$0.00^{+0.00}_{-0.86}$	$1.75^{+0.06}_{-0.10}$	$0.33^{+0.25}_{-0.31}$	$1.26^{+0.11}_{-0.26}$	$6.26^{+0.23}_{-0.23}$	$8.12^{+2.91}_{-3.51}$	$154.00^{+57.11}_{-64.00}$
2003-08-04	0.54 (22.60/42)	$4.94^{+0.37}_{-1.36}$	$(1.21^{+0.09}_{-0.33})E44$	$0.00^{+0.00}_{-1.17}$	$1.79^{+0.05}_{-0.13}$	$0.14^{+0.14}_{-0.32}$	$1.36^{+0.10}_{-0.38}$	$6.15^{+0.22}_{-0.23}$	$7.55^{+3.34}_{-3.25}$	$143.00^{+66.09}_{-59.00}$
2003-08-26	0.60 (25.29/42)	$5.21^{+0.52}_{-1.42}$	$(1.28^{+0.13}_{-0.35})E44$	$0.24^{+0.24}_{-1.18}$	$1.84^{+0.06}_{-0.13}$	$0.10^{+0.10}_{-0.31}$	$1.60^{+0.16}_{-0.44}$	$6.20^{+0.20}_{-0.23}$	$8.40^{+3.45}_{-3.25}$	$151.00^{+63.15}_{-62.00}$
2003-09-07	0.54 (22.69/42)	$4.45^{+0.93}_{-1.34}$	$(1.09^{+0.23}_{-0.33})E44$	$1.24^{+1.24}_{-1.28}$	$1.85^{+0.12}_{-0.14}$	$0.16^{+0.16}_{-0.38}$	$1.51^{+0.32}_{-0.46}$	$6.36^{+0.32}_{-0.38}$	$5.34^{+3.16}_{-3.30}$	$107.00^{+63.71}_{-70.00}$
2003-10-09	0.56 (23.66/42)	$4.15^{+0.47}_{-1.36}$	$(1.02^{+0.12}_{-0.33})E44$	$0.18^{+0.18}_{-1.31}$	$1.80^{+0.08}_{-0.16}$	$0.40^{+0.28}_{-0.48}$	$1.17^{+0.13}_{-0.39}$	$6.41^{+0.30}_{-0.48}$	$5.76^{+2.84}_{-3.12}$	$136.00^{+66.14}_{-72.00}$
2003-11-28	0.65 (27.30/42)	$4.76^{+0.54}_{-1.47}$	$(1.17^{+0.13}_{-0.36})E44$	$0.20^{+0.20}_{-1.27}$	$1.81^{+0.08}_{-0.15}$	$0.39^{+0.27}_{-0.44}$	$1.35^{+0.15}_{-0.42}$	$6.35^{+0.26}_{-0.32}$	$6.98^{+3.22}_{-3.27}$	$140.00^{+65.57}_{-65.00}$
2004-01-11	0.76 (32.12/42)	$5.30^{+1.13}_{-1.58}$	$(1.30^{+0.28}_{-0.39})E44$	$0.94^{+0.94}_{-1.19}$	$1.92^{+0.13}_{-0.15}$	$0.48^{+0.34}_{-0.49}$	$1.90^{+0.41}_{-0.57}$	$6.35^{+0.26}_{-0.33}$	$6.91^{+3.48}_{-3.44}$	$120.00^{+61.21}_{-62.00}$
2004-02-15	0.88 (37.12/42)	$4.64^{+0.67}_{-1.59}$	$(1.14^{+0.16}_{-0.39})E44$	$0.37^{+0.37}_{-1.38}$	$1.84^{+0.09}_{-0.16}$	$0.29^{+0.29}_{-0.45}$	$1.42^{+0.21}_{-0.49}$	$6.03^{+0.26}_{-0.31}$	$6.68^{+3.72}_{-3.30}$	$125.00^{+70.98}_{-62.00}$
2004-03-24	0.36 (15.10/42)	$4.64^{+0.32}_{-0.99}$	$(1.14^{+0.08}_{-0.24})E44$	$0.00^{+0.00}_{-0.90}$	$1.75^{+0.05}_{-0.10}$	$0.09^{+0.09}_{-0.27}$	$1.22^{+0.09}_{-0.26}$	$6.08^{+0.22}_{-0.23}$	$7.55^{+2.83}_{-3.29}$	$148.00^{+57.66}_{-62.00}$
2004-06-24	0.40 (16.84/42)	$4.82^{+0.38}_{-1.10}$	$(1.18^{+0.09}_{-0.27})E44$	$0.00^{+0.00}_{-0.94}$	$1.80^{+0.06}_{-0.11}$	$0.22^{+0.22}_{-0.32}$	$1.34^{+0.11}_{-0.31}$	$6.01^{+0.21}_{-0.21}$	$8.16^{+3.05}_{-3.32}$	$152.00^{+59.78}_{-58.00}$
2004-07-23	0.58 (24.40/42)	$4.84^{+0.37}_{-1.09}$	$(1.19^{+0.09}_{-0.27})E44$	$0.00^{+0.00}_{-0.94}$	$1.80^{+0.06}_{-0.11}$	$0.18^{+0.18}_{-0.30}$	$1.36^{+0.11}_{-0.31}$	$6.07^{+0.19}_{-0.19}$	$8.45^{+3.02}_{-3.27}$	$157.00^{+57.00}_{-62.00}$
2004-08-29	0.37 (15.50/42)	$5.13^{+0.56}_{-1.44}$	$(1.26^{+0.14}_{-0.35})E44$	$0.23^{+0.23}_{-1.19}$	$1.80^{+0.07}_{-0.13}$	$0.16^{+0.16}_{-0.34}$	$1.46^{+0.16}_{-0.41}$	$6.39^{+0.28}_{-0.32}$	$7.22^{+3.42}_{-3.34}$	$136.00^{+65.26}_{-61.00}$
2004-09-30	0.51 (21.34/42)	$5.85^{+0.35}_{-0.95}$	$(1.43^{+0.09}_{-0.23})E44$	$0.00^{+0.00}_{-0.69}$	$1.77^{+0.04}_{-0.08}$	$0.06^{+0.06}_{-0.22}$	$1.57^{+0.10}_{-0.26}$	$6.06^{+0.21}_{-0.20}$	$9.31^{+3.06}_{-3.51}$	$142.00^{+45.77}_{-56.00}$
2004-10-29	0.55 (23.13/42)	$5.62^{+0.42}_{-1.26}$	$(1.38^{+0.10}_{-0.31})E44$	$0.00^{+0.00}_{-0.96}$	$1.81^{+0.05}_{-0.11}$	$0.25^{+0.21}_{-0.31}$	$1.58^{+0.12}_{-0.36}$	$6.23^{+0.21}_{-0.22}$	$8.03^{+3.25}_{-3.40}$	$137.00^{+57.55}_{-55.00}$
2004-11-28	0.66 (27.75/42)	$5.52^{+0.42}_{-0.93}$	$(1.35^{+0.10}_{-0.23})E44$	$0.00^{+0.00}_{-0.68}$	$1.82^{+0.06}_{-0.09}$	$0.31^{+0.23}_{-0.29}$	$1.59^{+0.12}_{-0.27}$	$6.19^{+0.23}_{-0.23}$	$7.88^{+2.84}_{-3.40}$	$134.00^{+47.40}_{-55.00}$
2005-01-06	0.38 (16.14/42)	$4.68^{+0.26}_{-1.46}$	$(1.15^{+0.06}_{-0.36})E44$	$0.03^{+0.03}_{-1.33}$	$1.69^{+0.03}_{-0.14}$	$0.02^{+0.02}_{-0.31}$	$1.12^{+0.06}_{-0.36}$	$6.13^{+0.17}_{-0.19}$	$10.38^{+3.55}_{-3.32}$	$200.00^{+71.00}_{-67.00}$
2005-02-17	0.44 (18.62/42)	$4.51^{+0.36}_{-1.10}$	$(1.10^{+0.09}_{-0.27})E44$	$0.00^{+0.00}_{-1.05}$	$1.73^{+0.05}_{-0.11}$	$0.12^{+0.12}_{-0.29}$	$1.14^{+0.09}_{-0.28}$	$6.22^{+0.27}_{-0.28}$	$6.34^{+2.94}_{-3.35}$	$130.00^{+60.80}_{-70.00}$
2005-03-11	0.57 (23.93/42)	$4.63^{+0.31}_{-1.00}$	$(1.14^{+0.08}_{-0.24})E44$	$0.00^{+0.00}_{-0.89}$	$1.74^{+0.05}_{-0.10}$	$0.09^{+0.09}_{-0.27}$	$1.18^{+0.08}_{-0.26}$	$6.10^{+0.19}_{-0.19}$	$9.04^{+2.85}_{-3.28}$	$178.00^{+59.00}_{-61.00}$
2005-06-24	0.51 (21.90/43)	$5.55^{+0.40}_{-1.04}$	$(1.36^{+0.10}_{-0.25})E44$	$0.00^{+0.00}_{-0.78}$	$1.80^{+0.05}_{-0.09}$	$0.20^{+0.20}_{-0.27}$	$1.55^{+0.11}_{-0.30}$	$6.09^{+0.18}_{-0.19}$	$10.47^{+3.06}_{-3.42}$	$174.00^{+54.00}_{-53.00}$
2005-07-23	0.42 (18.03/43)	$5.46^{+0.44}_{-0.81}$	$(1.34^{+0.11}_{-0.20})E44$	$0.00^{+0.00}_{-0.57}$	$1.86^{+0.06}_{-0.08}$	$0.52^{+0.27}_{-0.34}$	$1.63^{+0.13}_{-0.25}$	$6.20^{+0.24}_{-0.25}$	$7.41^{+2.74}_{-3.39}$	$127.00^{+45.79}_{-60.00}$
2005-08-25	0.41 (17.64/43)	$5.94^{+0.40}_{-0.89}$	$(1.47^{+0.11}_{-0.21})E44$	$0.00^{+0.00}_{-0.57}$	$1.83^{+0.05}_{-0.08}$	$0.24^{+0.21}_{-0.26}$	$1.74^{+0.13}_{-0.25}$	$6.21^{+0.22}_{-0.23}$	$8.44^{+2.87}_{-3.48}$	$134.00^{+44.07}_{-57.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		3C 273						$\mathrm{Fe}_K \alpha \sigma = 0.10$		
1996-05-21	0.70 (32.69/47)	$7.62^{+0.54}_{-1.45}$	$(4.79^{+0.50}_{-0.70})E45$	$1.15^{+0.60}_{-0.26}$	$1.64^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.10}$	$1.88^{+0.20}_{-0.27}$	$5.80^{+0.30}_{-1.70}$	$3.21^{+3.21}_{-4.14}$	$30.87^{+30.87}_{-40.69}$
1996-07-16	0.42 (19.87/47)	$7.54^{+0.81}_{-0.96}$	$(4.59^{+0.49}_{-0.59})E45$	$0.81^{+0.59}_{-0.58}$	$1.66^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$1.79^{+0.19}_{-0.23}$	$5.50^{+0.00}_{-2.00}$	$1.53^{+1.53}_{-3.63}$	$14.58^{+14.58}_{-35.30}$
1996-07-17a	0.55 (25.71/47)	$7.59^{+0.82}_{-1.14}$	$(4.61^{+0.50}_{-0.69})E45$	$0.60^{+0.60}_{-0.63}$	$1.63^{+0.05}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$1.67^{+0.18}_{-0.25}$	$5.50^{+0.00}_{-0.39}$	$5.44^{+4.61}_{-3.77}$	$52.60^{+44.72}_{-37.83}$
1996-07-17b	0.66 (30.87/47)	$7.72^{+0.84}_{-1.60}$	$(4.68^{+0.51}_{-0.97})E45$	$1.25^{+0.60}_{-0.78}$	$1.69^{+0.05}_{-0.10}$	$0.00^{+0.00}_{-0.19}$	$1.99^{+0.22}_{-0.41}$	$5.50^{+0.00}_{-2.00}$	$1.93^{+1.93}_{-3.85}$	$17.32^{+17.32}_{-35.24}$
1996-07-17c	0.50 (23.30/47)	$8.00^{+0.75}_{-1.08}$	$(4.85^{+0.46}_{-0.66})E45$	$0.79^{+0.52}_{-0.57}$	$1.63^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.09}$	$1.80^{+0.17}_{-0.24}$	$5.50^{+0.00}_{-0.35}$	$5.11^{+4.27}_{-3.62}$	$46.03^{+38.58}_{-33.71}$
1996-07-18a	0.51 (23.81/47)	$8.14^{+0.83}_{-1.10}$	$(4.93^{+0.50}_{-0.66})E45$	$1.03^{+0.57}_{-0.60}$	$1.63^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$1.87^{+0.19}_{-0.25}$	$5.56^{+0.06}_{-0.50}$	$5.19^{+3.81}_{-3.96}$	$45.90^{+33.75}_{-35.78}$
1996-07-18b	0.66 (30.90/47)	$8.43^{+0.91}_{-1.18}$	$(5.11^{+0.55}_{-0.72})E45$	$0.83^{+0.60}_{-0.63}$	$1.64^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.09}$	$1.92^{+0.21}_{-0.27}$	$5.70^{+0.20}_{-1.80}$	$4.36^{+4.36}_{-3.92}$	$39.65^{+39.65}_{-35.96}$
1996-11-03	0.78 (35.91/46)	$17.99^{+1.71}_{-1.95}$	$(1.09^{+0.10}_{-0.12})E46$	$0.82^{+0.62}_{-0.60}$	$1.65^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.06}$	$4.36^{+0.42}_{-0.47}$	$5.50^{+0.00}_{-2.00}$	$2.76^{+2.76}_{-7.32}$	$10.65^{+10.65}_{-28.51}$
1996-12-02	0.52 (23.82/46)	$32.19^{+3.07}_{-6.77}$	$(1.94^{+0.18}_{-0.41})E46$	$0.56^{+0.56}_{-0.96}$	$1.57^{+0.04}_{-0.10}$	$0.00^{+0.00}_{-0.14}$	$6.74^{+0.65}_{-1.42}$	$5.86^{+0.36}_{-1.64}$	$11.24^{+11.24}_{-12.19}$	$27.36^{+27.36}_{-30.32}$
1996-12-25	0.67 (30.90/46)	$16.34^{+1.58}_{-2.59}$	$(9.84^{+0.95}_{-1.56})E45$	$0.74^{+0.69}_{-0.72}$	$1.60^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.13}$	$3.64^{+0.35}_{-0.58}$	$6.11^{+0.61}_{-1.39}$	$0.00^{+0.00}_{-5.98}$	$0.00^{+0.00}_{-31.79}$
1997-01-01	0.55 (25.09/46)	$87.01^{+8.63}_{-13.14}$	$(5.26^{+0.52}_{-0.79})E46$	$0.63^{+0.63}_{-0.74}$	$1.63^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.09}$	$20.08^{+2.00}_{-3.04}$	$5.65^{+0.15}_{-1.85}$	$27.16^{+27.16}_{-35.06}$	$22.97^{+22.97}_{-30.51}$
1997-01-07	0.60 (27.40/46)	$13.61^{+1.21}_{-1.68}$	$(8.22^{+0.73}_{-1.01})E45$	$0.54^{+0.54}_{-0.65}$	$1.60^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$2.97^{+0.27}_{-0.37}$	$6.34^{+0.84}_{-1.16}$	$1.43^{+1.43}_{-4.94}$	$9.42^{+9.42}_{-31.37}$
1997-01-13	0.72 (33.34/46)	$12.97^{+1.27}_{-2.16}$	$(7.82^{+0.76}_{-1.30})E45$	$0.58^{+0.58}_{-0.79}$	$1.60^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.12}$	$2.83^{+0.28}_{-0.47}$	$5.50^{+0.00}_{-2.00}$	$3.46^{+3.46}_{-5.60}$	$18.77^{+18.77}_{-30.60}$
1997-01-16	0.41 (19.04/46)	$29.60^{+2.20}_{-4.69}$	$(1.79^{+0.13}_{-0.28})E46$	$0.29^{+0.29}_{-0.79}$	$1.58^{+0.03}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$6.09^{+0.46}_{-0.97}$	$6.07^{+0.57}_{-0.66}$	$14.89^{+13.83}_{-11.74}$	$43.04^{+39.96}_{-33.57}$
1997-01-21	0.56 (25.87/46)	$14.41^{+1.48}_{-2.03}$	$(8.64^{+0.89}_{-1.22})E45$	$1.24^{+0.70}_{-0.74}$	$1.60^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.09}$	$3.30^{+0.34}_{-0.47}$	$6.18^{+0.68}_{-1.32}$	$4.67^{+4.67}_{-5.43}$	$26.35^{+26.35}_{-31.41}$
1997-01-26	0.49 (22.68/46)	$14.02^{+1.12}_{-1.45}$	$(8.39^{+0.67}_{-0.87})E45$	$1.49^{+0.57}_{-0.58}$	$1.60^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.08}$	$3.32^{+0.27}_{-0.34}$	$7.50^{+2.00}_{-0.00}$	$1.84^{+1.84}_{-5.29}$	$14.18^{+14.18}_{-41.13}$
1997-01-29	0.85 (39.25/46)	$13.41^{+1.43}_{-1.49}$	$(8.07^{+0.86}_{-0.90})E45$	$1.44^{+0.71}_{-0.60}$	$1.66^{+0.05}_{-0.05}$	$0.00^{+0.00}_{-0.08}$	$3.48^{+0.37}_{-0.39}$	$5.80^{+0.30}_{-1.70}$	$0.28^{+0.28}_{-5.70}$	$1.51^{+1.51}_{-28.14}$
1997-02-02	0.57 (26.09/46)	$36.73^{+3.09}_{-3.72}$	$(2.22^{+0.19}_{-0.22})E46$	$1.29^{+0.58}_{-0.59}$	$1.67^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.07}$	$9.51^{+0.80}_{-0.97}$	$7.50^{+2.00}_{-0.00}$	$10.98^{+10.98}_{-11.33}$	$33.76^{+33.76}_{-35.22}$
1997-02-10	0.83 (38.08/46)	$15.91^{+1.84}_{-2.88}$	$(9.59^{+1.10}_{-1.73})E45$	$0.61^{+0.61}_{-0.81}$	$1.58^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$3.39^{+0.39}_{-0.61}$	$5.50^{+0.00}_{-2.00}$	$2.27^{+2.27}_{-7.51}$	$9.99^{+9.99}_{-33.87}$
1997-03-29	0.47 (21.84/46)	$8.73^{+0.54}_{-1.52}$	$(5.27^{+0.33}_{-0.92})E45$	$0.15^{+0.15}_{-0.85}$	$1.55^{+0.03}_{-0.08}$	$0.00^{+0.00}_{-0.10}$	$1.70^{+0.11}_{-0.30}$	$5.74^{+0.24}_{-0.41}$	$6.24^{+4.79}_{-4.08}$	$55.51^{+42.67}_{-37.41}$
1997-06-03	0.44 (20.38/46)	$6.34^{+0.55}_{-1.17}$	$(3.82^{+0.33}_{-0.71})E45$	$0.33^{+0.33}_{-0.91}$	$1.56^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$1.27^{+0.11}_{-0.24}$	$5.95^{+0.45}_{-1.55}$	$2.61^{+2.61}_{-2.89}$	$33.45^{+33.45}_{-37.43}$
1997-08-12	0.57 (26.44/46)	$7.76^{+0.91}_{-1.81}$	$(4.68^{+0.55}_{-1.09})E45$	$0.68^{+0.68}_{-1.04}$	$1.61^{+0.05}_{-0.10}$	$0.00^{+0.00}_{-0.15}$	$1.74^{+0.21}_{-0.41}$	$5.70^{+0.20}_{-1.80}$	$3.84^{+3.84}_{-3.71}$	$37.05^{+37.05}_{-36.16}$
1998-06-24	0.52 (23.72/46)	$11.66^{+1.83}_{-2.43}$	$(7.05^{+1.11}_{-1.47})E45$	$0.83^{+0.83}_{-0.93}$	$1.67^{+0.08}_{-0.10}$	$0.07^{+0.07}_{-0.17}$	$2.88^{+0.45}_{-0.60}$	$6.10^{+0.60}_{-1.40}$	$3.05^{+3.05}_{-4.25}$	$21.72^{+21.72}_{-29.79}$
1998-06-25	0.57 (26.40/46)	$11.92^{+1.23}_{-1.86}$	$(7.22^{+0.74}_{-1.12})E45$	$0.83^{+0.66}_{-0.70}$	$1.66^{+0.05}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$2.94^{+0.30}_{-0.46}$	$5.50^{+0.00}_{-2.00}$	$6.03^{+6.03}_{-4.84}$	$35.20^{+35.20}_{-28.52}$
1999-01-04	0.76 (34.88/46)	$8.96^{+0.63}_{-1.55}$	$(5.40^{+0.38}_{-0.93})E45$	$0.32^{+0.32}_{-0.82}$	$1.56^{+0.03}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$1.79^{+0.13}_{-0.31}$	$6.11^{+0.59}_{-0.88}$	$4.43^{+3.86}_{-3.24}$	$42.02^{+36.50}_{-31.05}$
1999-01-19a	0.43 (19.92/46)	$8.03^{+0.80}_{-1.49}$	$(4.81^{+0.48}_{-0.89})E45$	$0.83^{+0.33}_{-0.88}$	$1.55^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.05}$	$1.64^{+0.16}_{-0.31}$	$5.64^{+0.14}_{-1.86}$	$2.67^{+2.67}_{-3.93}$	$23.81^{+23.81}_{-35.35}$
1999-01-19b	0.58 (26.72/46)	$8.35^{+0.87}_{-1.19}$	$(5.01^{+0.52}_{-0.71})E45$	$0.63^{+0.63}_{-0.79}$	$1.53^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$1.64^{+0.17}_{-0.23}$	$6.10^{+0.60}_{-1.40}$	$2.60^{+2.60}_{-3.52}$	$25.62^{+25.62}_{-34.97}$
1999-01-26	0.47 (21.44/46)	$8.38^{+0.94}_{-1.35}$	$(5.01^{+0.56}_{-0.81})E45$	$1.11^{+0.73}_{-0.77}$	$1.57^{+0.05}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$1.83^{+0.21}_{-0.29}$	$5.50^{+0.00}_{-2.00}$	$1.62^{+1.62}_{-4.16}$	$13.02^{+13.02}_{-33.97}$
1999-02-01	0.38 (17.61/46)	$6.81^{+1.38}_{-1.31}$	$(4.09^{+0.83}_{-0.79})E45$	$1.34^{+1.13}_{-0.83}$	$1.65^{+0.11}_{-0.10}$	$0.11^{+0.11}_{-0.20}$	$1.68^{+0.34}_{-0.29}$	$7.15^{+1.65}_{-0.35}$	$1.39^{+1.39}_{-2.83}$	$21.17^{+21.17}_{-33.92}$
2000-01-16	0.46 (19.23/42)	$14.13^{+2.70}_{-3.35}$	$(8.60^{+1.64}_{-2.03})E45$	$1.28^{+0.65}_{-0.95}$	$1.81^{+0.08}_{-0.10}$	$0.12^{+0.12}_{-0.07}$	$4.58^{+0.88}_{-1.09}$	$6.01^{+0.46}_{-0.57}$	$9.62^{+8.07}_{-7.92}$	$54.33^{+45.57}_{-43.70}$
2000-01-26	0.63 (26.47/42)	$11.49^{+1.40}_{-2.35}$	$(6.92^{+0.84}_{-1.41})E45$	$1.10^{+0.85}_{-1.00}$	$1.64^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.12}$	$2.84^{+0.35}_{-0.58}$	$5.80^{+0.30}_{-1.70}$	$5.16^{+5.16}_{-5.45}$	$32.94^{+32.94}_{-35.12}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2000-02-23a	0.53 (22.43/42)	$13.92^{+2.02}_{-2.77}$	$(8.45^{+1.23}_{-1.68})E45$	$0.99^{+0.90}_{-0.91}$	$1.74^{+0.07}_{-0.10}$	$0.06^{+0.06}_{-0.19}$	$3.97^{+0.58}_{-0.79}$	$6.93^{+1.43}_{-0.57}$	$4.73^{+4.73}_{-5.72}$	$34.64^{+34.64}_{-39.44}$
2000-02-23b	0.63 (26.31/42)	$13.74^{+2.96}_{-2.51}$	$(8.34^{+1.80}_{-1.53})E45$	$1.08^{+1.08}_{-0.80}$	$1.77^{+0.12}_{-0.09}$	$0.11^{+0.11}_{-0.20}$	$4.09^{+0.88}_{-0.75}$	$7.50^{+2.00}_{-0.00}$	$2.72^{+2.72}_{-5.45}$	$23.19^{+23.19}_{-46.88}$
2000-02-24	0.78 (32.73/42)	$13.32^{+0.88}_{-2.27}$	$(8.11^{+0.53}_{-1.38})E45$	$0.21^{+0.21}_{-0.85}$	$1.68^{+0.03}_{-0.08}$	$0.00^{+0.00}_{-0.10}$	$3.26^{+0.22}_{-0.56}$	$5.71^{+0.21}_{-0.62}$	$8.34^{+7.03}_{-5.78}$	$48.56^{+41.12}_{-34.11}$
2000-02-26a	0.98 (41.33/42)	$12.23^{+1.09}_{-2.28}$	$(7.44^{+0.66}_{-1.39})E45$	$0.64^{+0.63}_{-0.85}$	$1.73^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.16}$	$3.34^{+0.30}_{-0.62}$	$7.03^{+1.53}_{-0.47}$	$3.37^{+3.37}_{-4.52}$	$29.42^{+29.42}_{-39.84}$
2000-02-26b	0.50 (20.84/42)	$12.22^{+1.18}_{-2.34}$	$(7.44^{+0.72}_{-1.43})E45$	$0.50^{+0.50}_{-0.92}$	$1.72^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.11}$	$3.24^{+0.31}_{-0.62}$	$5.58^{+0.08}_{-1.92}$	$6.60^{+5.36}_{-5.42}$	$39.18^{+31.86}_{-32.51}$
2000-02-28	0.54 (22.76/42)	$11.57^{+1.83}_{-2.20}$	$(7.04^{+1.11}_{-1.34})E45$	$1.11^{+0.84}_{-0.82}$	$1.81^{+0.09}_{-0.10}$	$0.17^{+0.17}_{-0.23}$	$3.65^{+0.58}_{-0.70}$	$7.50^{+2.00}_{-0.00}$	$3.33^{+3.33}_{-4.40}$	$34.24^{+34.24}_{-45.60}$
2001-03-02	0.34 (14.17/42)	$7.16^{+0.88}_{-2.60}$	$(4.35^{+0.54}_{-1.58})E45$	$0.60^{+0.60}_{-1.47}$	$1.70^{+0.06}_{-0.16}$	$0.01^{+0.01}_{-0.26}$	$1.85^{+0.23}_{-0.68}$	$5.51^{+0.01}_{-1.99}$	$5.32^{+5.32}_{-3.83}$	$52.25^{+52.25}_{-38.07}$
2001-03-29	0.47 (19.53/42)	$8.13^{+1.79}_{-2.01}$	$(4.92^{+1.08}_{-1.22})E45$	$1.16^{+1.16}_{-1.07}$	$1.76^{+0.13}_{-0.12}$	$0.17^{+0.17}_{-0.26}$	$2.38^{+0.53}_{-0.59}$	$6.46^{+0.96}_{-1.04}$	$3.47^{+3.47}_{-3.54}$	$38.43^{+38.43}_{-36.82}$
2001-04-23	0.51 (21.50/42)	$9.15^{+0.96}_{-2.07}$	$(5.58^{+0.59}_{-1.26})E45$	$0.53^{+0.53}_{-1.01}$	$1.73^{+0.05}_{-0.10}$	$0.00^{+0.00}_{-0.16}$	$2.46^{+0.26}_{-0.56}$	$5.64^{+0.14}_{-0.44}$	$6.99^{+5.67}_{-4.65}$	$56.80^{+46.42}_{-39.97}$
2001-05-23	0.56 (23.52/42)	$11.18^{+0.71}_{-2.55}$	$(6.82^{+0.43}_{-1.56})E45$	$0.17^{+0.17}_{-1.03}$	$1.70^{+0.03}_{-0.10}$	$0.00^{+0.00}_{-0.15}$	$2.80^{+0.18}_{-0.64}$	$5.66^{+0.16}_{-1.84}$	$6.44^{+4.92}_{-4.91}$	$43.88^{+34.25}_{-33.84}$
2001-06-13	1.06 (44.58/42)	$12.77^{+1.83}_{-2.91}$	$(7.78^{+1.11}_{-1.77})E45$	$0.71^{+0.71}_{-1.03}$	$1.76^{+0.07}_{-0.10}$	$0.06^{+0.06}_{-0.17}$	$3.65^{+0.53}_{-0.83}$	$6.04^{+0.54}_{-1.46}$	$6.20^{+6.20}_{-4.71}$	$40.06^{+40.06}_{-28.76}$
2001-07-06	0.38 (16.05/42)	$12.60^{+0.89}_{-3.56}$	$(7.68^{+0.54}_{-2.16})E45$	$0.25^{+0.25}_{-1.22}$	$1.69^{+0.03}_{-0.12}$	$0.00^{+0.00}_{-0.18}$	$3.13^{+0.22}_{-0.89}$	$5.65^{+0.15}_{-0.50}$	$9.87^{+8.71}_{-5.98}$	$59.32^{+52.46}_{-37.47}$
2001-07-24	0.51 (21.60/42)	$12.60^{+0.65}_{-3.57}$	$(7.69^{+0.40}_{-2.18})E45$	$0.08^{+0.08}_{-1.23}$	$1.70^{+0.03}_{-0.14}$	$0.00^{+0.00}_{-0.20}$	$3.13^{+0.16}_{-0.89}$	$5.50^{+0.01}_{-2.00}$	$6.02^{+6.02}_{-5.71}$	$34.97^{+34.97}_{-33.51}$
2001-08-14	0.53 (22.16/42)	$9.86^{+1.57}_{-1.78}$	$(5.98^{+0.95}_{-1.08})E45$	$0.75^{+0.75}_{-0.77}$	$1.73^{+0.10}_{-0.09}$	$0.14^{+0.14}_{-0.21}$	$2.71^{+0.43}_{-0.49}$	$7.50^{+2.00}_{-0.00}$	$1.36^{+1.36}_{-3.86}$	$16.37^{+16.37}_{-47.01}$
2001-11-03	0.71 (30.02/42)	$11.75^{+1.93}_{-3.26}$	$(7.12^{+1.17}_{-1.98})E45$	$0.93^{+0.93}_{-1.19}$	$1.72^{+0.08}_{-0.13}$	$0.06^{+0.06}_{-0.21}$	$3.22^{+0.53}_{-0.90}$	$5.73^{+0.23}_{-1.77}$	$4.74^{+4.74}_{-5.14}$	$29.53^{+29.53}_{-32.34}$
2001-11-24	0.85 (35.64/42)	$12.75^{+1.02}_{-2.56}$	$(7.74^{+0.62}_{-1.55})E45$	$0.27^{+0.27}_{-0.89}$	$1.66^{+0.04}_{-0.09}$	$0.03^{+0.03}_{-0.15}$	$3.00^{+0.24}_{-0.60}$	$6.38^{+0.88}_{-1.12}$	$4.25^{+4.25}_{-4.74}$	$30.57^{+30.57}_{-33.50}$
2002-01-14	0.49 (20.50/42)	$11.44^{+0.69}_{-1.96}$	$(7.00^{+0.42}_{-1.19})E45$	$0.00^{+0.00}_{-0.71}$	$1.72^{+0.04}_{-0.08}$	$0.07^{+0.07}_{-0.15}$	$2.89^{+0.18}_{-0.50}$	$5.50^{+0.00}_{-0.25}$	$11.57^{+5.91}_{-5.47}$	$74.96^{+39.11}_{-36.04}$
2002-02-01	0.48 (20.31/42)	$12.86^{+0.60}_{-4.13}$	$(7.84^{+0.37}_{-2.52})E45$	$0.00^{+0.00}_{-1.30}$	$1.68^{+0.03}_{-0.14}$	$0.02^{+0.02}_{-0.22}$	$3.05^{+0.14}_{-0.99}$	$5.50^{+0.00}_{-0.31}$	$12.64^{+9.69}_{-5.98}$	$72.53^{+56.53}_{-35.47}$
2002-02-16	0.49 (20.66/42)	$11.54^{+0.94}_{-2.29}$	$(7.03^{+0.57}_{-1.40})E45$	$0.30^{+0.30}_{-0.92}$	$1.70^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.13}$	$2.92^{+0.24}_{-0.58}$	$5.58^{+0.08}_{-1.92}$	$5.90^{+5.90}_{-5.80}$	$37.63^{+37.63}_{-37.36}$
2002-03-04	0.47 (19.83/42)	$12.06^{+1.04}_{-3.51}$	$(7.35^{+0.63}_{-2.14})E45$	$0.41^{+0.41}_{-1.25}$	$1.72^{+0.04}_{-0.13}$	$0.00^{+0.00}_{-0.19}$	$3.16^{+0.27}_{-0.93}$	$5.55^{+0.05}_{-0.45}$	$10.05^{+8.85}_{-6.19}$	$61.13^{+54.22}_{-39.87}$
2002-03-24	0.78 (32.73/42)	$11.65^{+0.85}_{-1.30}$	$(7.08^{+0.52}_{-0.79})E45$	$1.05^{+0.53}_{-0.53}$	$1.75^{+0.03}_{-0.05}$	$0.00^{+0.00}_{-0.09}$	$3.41^{+0.25}_{-0.38}$	$7.50^{+2.00}_{-0.00}$	$2.14^{+2.14}_{-3.41}$	$21.57^{+21.57}_{-34.57}$
2002-04-07	0.62 (25.93/42)	$9.24^{+1.24}_{-1.98}$	$(5.65^{+0.76}_{-1.21})E45$	$0.79^{+0.79}_{-0.88}$	$1.80^{+0.07}_{-0.11}$	$0.06^{+0.06}_{-0.24}$	$2.85^{+0.39}_{-0.61}$	$7.50^{+0.26}_{-0.00}$	$4.49^{+3.50}_{-3.77}$	$59.56^{+46.54}_{-51.44}$
2002-04-10	0.65 (27.30/42)	$9.56^{+1.16}_{-1.92}$	$(5.84^{+0.71}_{-1.17})E45$	$0.83^{+0.80}_{-0.94}$	$1.78^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$2.88^{+0.35}_{-0.58}$	$5.71^{+0.21}_{-0.54}$	$8.19^{+5.81}_{-5.17}$	$64.29^{+45.25}_{-45.71}$
2002-04-15	0.46 (19.29/42)	$8.75^{+0.28}_{-1.60}$	$(5.35^{+0.17}_{-0.98})E45$	$0.83^{+0.33}_{-0.90}$	$1.81^{+0.04}_{-0.10}$	$0.00^{+0.00}_{-0.06}$	$2.75^{+0.09}_{-0.50}$	$5.89^{+0.39}_{-1.61}$	$2.77^{+2.77}_{-3.90}$	$24.88^{+24.88}_{-35.39}$
2002-05-01	0.54 (22.64/42)	$10.78^{+0.48}_{-1.71}$	$(6.61^{+0.29}_{-1.05})E45$	$0.02^{+0.02}_{-0.78}$	$1.74^{+0.02}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$2.84^{+0.13}_{-0.45}$	$5.90^{+0.38}_{-0.39}$	$7.12^{+5.22}_{-4.77}$	$55.17^{+40.38}_{-37.56}$
2002-05-22	0.54 (22.69/42)	$12.13^{+1.04}_{-2.02}$	$(7.40^{+0.63}_{-1.23})E45$	$0.36^{+0.36}_{-0.82}$	$1.72^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$3.16^{+0.27}_{-0.53}$	$5.62^{+0.12}_{-0.36}$	$9.95^{+6.83}_{-6.74}$	$61.83^{+42.89}_{-44.17}$
2002-06-12	0.62 (25.85/42)	$9.12^{+0.63}_{-2.41}$	$(5.58^{+0.39}_{-1.47})E45$	$0.65^{+0.54}_{-1.14}$	$1.79^{+0.04}_{-0.12}$	$0.00^{+0.00}_{-0.23}$	$2.74^{+0.19}_{-0.73}$	$5.50^{+0.00}_{-2.00}$	$3.80^{+3.80}_{-4.50}$	$29.41^{+29.41}_{-35.22}$
2002-07-09	0.81 (34.03/42)	$8.63^{+0.90}_{-1.96}$	$(5.27^{+0.55}_{-1.20})E45$	$0.48^{+0.48}_{-1.01}$	$1.75^{+0.05}_{-0.10}$	$0.00^{+0.00}_{-0.16}$	$2.39^{+0.25}_{-0.55}$	$5.50^{+0.00}_{-2.00}$	$3.57^{+3.57}_{-5.00}$	$29.44^{+29.44}_{-42.21}$
2003-05-09	0.60 (25.25/42)	$10.42^{+0.81}_{-3.10}$	$(6.43^{+0.54}_{-1.86})E45$	$0.26^{+0.26}_{-1.19}$	$1.76^{+0.04}_{-0.13}$	$0.02^{+0.02}_{-0.22}$	$2.88^{+0.24}_{-0.84}$	$5.78^{+0.28}_{-0.49}$	$8.23^{+6.67}_{-5.42}$	$63.37^{+51.24}_{-43.63}$
2003-05-30	0.38 (15.87/42)	$11.61^{+0.69}_{-2.75}$	$(7.13^{+0.42}_{-1.68})E45$	$0.16^{+0.16}_{-1.04}$	$1.77^{+0.03}_{-0.10}$	$0.00^{+0.00}_{-0.07}$	$3.21^{+0.19}_{-0.76}$	$6.02^{+0.52}_{-1.48}$	$5.22^{+5.22}_{-4.34}$	$39.27^{+39.27}_{-32.92}$
2003-06-16	0.62 (25.90/42)	$14.25^{+1.18}_{-3.86}$	$(8.76^{+0.72}_{-2.37})E45$	$0.12^{+0.12}_{-1.03}$	$1.79^{+0.05}_{-0.12}$	$0.13^{+0.13}_{-0.07}$	$4.01^{+0.33}_{-1.09}$	$5.91^{+0.41}_{-0.59}$	$9.99^{+8.71}_{-5.66}$	$60.16^{+52.56}_{-32.75}$
2003-06-23	0.58 (24.30/42)	$13.85^{+0.58}_{-4.18}$	$(8.54^{+0.36}_{-2.58})E45$	$0.01^{+0.01}_{-1.09}$	$1.82^{+0.02}_{-0.10}$	$0.03^{+0.03}_{-0.06}$	$4.05^{+0.17}_{-1.23}$	$5.63^{+0.13}_{-1.27}$	$9.91^{+8.99}_{-5.81}$	$56.83^{+50.60}_{-33.68}$
2003-07-07	0.63 (26.45/42)	$12.86^{+0.90}_{-3.18}$	$(7.89^{+0.55}_{-1.95})E45$	$0.14^{+0.14}_{-1.05}$	$1.76^{+0.04}_{-0.11}$	$0.03^{+0.03}_{-0.19}$	$3.47^{+0.24}_{-0.86}$	$5.94^{+0.27}_{-0.37}$	$9.68^{+6.98}_{-5.69}$	$64.29^{+46.45}_{-38.71}$
2003-07-21	0.53 (22.21/42)	$11.08^{+1.69}_{-2.78}$	$(6.76^{+1.03}_{-1.70})E45$	$0.60^{+0.60}_{-1.07}$	$1.76^{+0.09}_{-0.12}$	$0.10^{+0.10}_{-0.07}$	$3.11^{+0.48}_{-0.79}$	$5.77^{+0.27}_{-1.73}$	$5.78^{+5.78}_{-4.73}$	$40.66^{+40.66}_{-33.75}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2003-07-25	0.44 (18.60/42)	$9.04^{+1.09}_{-2.52}$	$(5.55^{+0.67}_{-1.54})E45$	$0.37^{+0.37}_{-1.11}$	$1.80^{+0.07}_{-0.13}$	$0.11^{+0.11}_{-0.08}$	$2.66^{+0.32}_{-0.74}$	$5.85^{+0.35}_{-1.65}$	$3.05^{+3.05}_{-3.91}$	$27.65^{+27.65}_{-35.65}$
2003-08-23	0.68 (28.66/42)	$12.19^{+1.00}_{-2.50}$	$(7.44^{+0.61}_{-1.53})E45$	$0.25^{+0.25}_{-0.93}$	$1.72^{+0.04}_{-0.10}$	$0.03^{+0.03}_{-0.06}$	$3.14^{+0.26}_{-0.65}$	$6.30^{+0.80}_{-1.20}$	$3.00^{+3.00}_{-4.89}$	$22.53^{+22.53}_{-37.52}$
2003-11-14	0.48 (19.96/42)	$12.15^{+0.36}_{-1.70}$	$(7.41^{+0.22}_{-1.04})E45$	$0.62^{+0.29}_{-0.73}$	$1.75^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.04}$	$3.43^{+0.10}_{-0.48}$	$5.95^{+0.45}_{-1.55}$	$3.83^{+3.83}_{-4.79}$	$25.77^{+25.77}_{-32.41}$
2004-01-02	0.46 (19.19/42)	$7.97^{+1.19}_{-2.58}$	$(4.88^{+0.73}_{-1.58})E45$	$0.56^{+0.56}_{-1.28}$	$1.79^{+0.08}_{-0.15}$	$0.08^{+0.08}_{-0.29}$	$2.37^{+0.35}_{-0.77}$	$5.50^{+0.00}_{-2.00}$	$3.01^{+3.01}_{-5.45}$	$26.93^{+26.93}_{-50.54}$
2004-02-27	0.68 (28.68/42)	$10.40^{+0.87}_{-2.06}$	$(6.35^{+0.53}_{-1.26})E45$	$0.38^{+0.35}_{-0.86}$	$1.72^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.06}$	$2.72^{+0.23}_{-0.54}$	$6.09^{+0.51}_{-0.51}$	$6.88^{+5.49}_{-4.87}$	$57.52^{+45.96}_{-40.22}$
2004-04-07	0.57 (23.88/42)	$10.02^{+0.80}_{-1.82}$	$(6.11^{+0.49}_{-1.11})E45$	$0.30^{+0.30}_{-0.79}$	$1.70^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.12}$	$2.53^{+0.20}_{-0.46}$	$5.75^{+0.26}_{-1.75}$	$5.40^{+4.37}_{-4.73}$	$42.79^{+34.62}_{-36.05}$
2004-05-23	0.59 (24.64/42)	$20.89^{+0.95}_{-4.29}$	$(1.28^{+0.06}_{-0.26})E46$	$0.01^{+0.01}_{-0.94}$	$1.69^{+0.02}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$5.01^{+0.23}_{-1.04}$	$5.63^{+0.14}_{-0.28}$	$22.00^{+12.63}_{-10.92}$	$82.08^{+48.20}_{-41.92}$
2004-07-14	0.35 (14.67/42)	$9.07^{+1.16}_{-1.76}$	$(5.50^{+0.70}_{-1.06})E45$	$1.17^{+0.64}_{-0.77}$	$1.74^{+0.06}_{-0.06}$	$0.09^{+0.09}_{-0.19}$	$2.59^{+0.33}_{-0.50}$	$6.82^{+1.32}_{-0.68}$	$3.47^{+3.47}_{-2.87}$	$37.68^{+37.68}_{-29.90}$
2004-10-29	0.52 (21.69/42)	$12.83^{+1.23}_{-2.60}$	$(7.78^{+0.75}_{-1.57})E45$	$1.35^{+0.48}_{-0.84}$	$1.78^{+0.06}_{-0.10}$	$0.15^{+0.15}_{-0.17}$	$3.97^{+0.38}_{-0.80}$	$7.48^{+1.98}_{-0.02}$	$1.33^{+1.33}_{-4.73}$	$12.02^{+12.02}_{-31.85}$
2004-12-03	0.68 (28.48/42)	$13.96^{+1.23}_{-2.00}$	$(8.50^{+0.75}_{-1.22})E45$	$0.42^{+0.38}_{-0.74}$	$1.69^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.05}$	$3.53^{+0.31}_{-0.51}$	$6.28^{+0.78}_{-1.22}$	$3.59^{+3.59}_{-5.97}$	$23.12^{+23.12}_{-36.81}$
2004-12-21	0.58 (24.49/42)	$12.43^{+1.17}_{-2.15}$	$(7.60^{+0.71}_{-1.31})E45$	$0.47^{+0.32}_{-0.81}$	$1.76^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.06}$	$3.48^{+0.33}_{-0.60}$	$6.08^{+0.58}_{-1.42}$	$3.69^{+3.69}_{-4.79}$	$25.77^{+25.77}_{-33.66}$
2004-12-30	0.48 (20.14/42)	$11.63^{+0.54}_{-2.76}$	$(7.15^{+0.33}_{-1.69})E45$	$0.00^{+0.00}_{-0.91}$	$1.77^{+0.03}_{-0.11}$	$0.03^{+0.03}_{-0.19}$	$3.15^{+0.15}_{-0.75}$	$5.72^{+0.22}_{-0.74}$	$6.97^{+6.74}_{-4.66}$	$48.29^{+46.67}_{-34.68}$
2005-03-04	0.50 (21.11/42)	$7.58^{+0.54}_{-1.98}$	$(4.62^{+0.33}_{-1.20})E45$	$0.00^{+0.00}_{-1.07}$	$1.67^{+0.05}_{-0.12}$	$0.10^{+0.10}_{-0.22}$	$1.76^{+0.13}_{-0.46}$	$5.73^{+0.23}_{-0.55}$	$5.91^{+4.81}_{-3.90}$	$61.64^{+50.32}_{-41.36}$
2005-04-24	0.72 (30.27/42)	$9.60^{+0.64}_{-1.72}$	$(5.83^{+0.39}_{-1.05})E45$	$0.20^{+0.20}_{-0.84}$	$1.64^{+0.03}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$2.17^{+0.15}_{-0.39}$	$5.66^{+0.16}_{-1.84}$	$5.21^{+4.52}_{-4.43}$	$41.12^{+35.65}_{-35.28}$
2005-06-12	0.51 (22.13/43)	$12.58^{+0.31}_{-1.72}$	$(7.63^{+0.19}_{-1.04})E45$	$0.28^{+0.28}_{-0.72}$	$1.64^{+0.02}_{-0.02}$	$0.00^{+0.00}_{-0.04}$	$2.88^{+0.07}_{-0.40}$	$5.80^{+0.30}_{-1.70}$	$6.74^{+6.58}_{-5.32}$	$42.18^{+41.19}_{-33.72}$
2005-07-13	0.53 (22.65/43)	$13.19^{+0.63}_{-2.19}$	$(8.04^{+0.39}_{-1.33})E45$	$0.00^{+0.00}_{-0.67}$	$1.67^{+0.03}_{-0.06}$	$0.03^{+0.03}_{-0.05}$	$3.07^{+0.15}_{-0.51}$	$6.05^{+0.55}_{-1.45}$	$5.62^{+5.62}_{-4.90}$	$36.85^{+36.85}_{-32.49}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		3C 382					$\mathrm{Fe}_K\alpha\sigma = 0.32$			
1997-03-28	0.50 (22.78/46)	$4.27^{+0.17}_{-1.56}$	$(3.35^{+0.18}_{-1.15})E44$	$0.00^{+0.00}_{-1.36}$	$1.75^{+0.03}_{-0.15}$	$0.01^{+0.01}_{-0.34}$	$1.12^{+0.06}_{-0.39}$	$5.89^{+0.21}_{-0.23}$	$8.27^{+3.67}_{-3.12}$	$165.00^{+75.76}_{-64.00}$
1997-03-29	0.42 (19.46/46)	$4.43^{+0.66}_{-1.52}$	$(3.43^{+0.51}_{-1.18})E44$	$0.41^{+0.41}_{-1.37}$	$1.83^{+0.09}_{-0.16}$	$0.21^{+0.21}_{-0.41}$	$1.33^{+0.20}_{-0.46}$	$6.03^{+0.32}_{-0.39}$	$5.62^{+3.70}_{-3.17}$	$111.00^{+73.01}_{-63.00}$
1999-04-11	0.46 (19.21/42)	$5.72^{+0.42}_{-1.75}$	$(4.42^{+0.32}_{-1.35})E44$	$0.17^{+0.17}_{-1.36}$	$1.79^{+0.04}_{-0.13}$	$0.00^{+0.00}_{-0.26}$	$1.64^{+0.12}_{-0.51}$	$5.98^{+0.36}_{-0.41}$	$6.41^{+4.50}_{-3.70}$	$96.18^{+67.43}_{-53.82}$
1999-04-12a	0.56 (23.40/42)	$5.54^{+0.31}_{-1.97}$	$(4.28^{+0.24}_{-1.52})E44$	$0.03^{+0.03}_{-1.52}$	$1.77^{+0.03}_{-0.16}$	$0.00^{+0.00}_{-0.31}$	$1.50^{+0.09}_{-0.54}$	$6.02^{+0.24}_{-0.30}$	$9.34^{+4.70}_{-3.75}$	$150.00^{+77.72}_{-57.00}$
1999-04-12b	0.59 (24.62/42)	$5.46^{+1.19}_{-2.17}$	$(4.22^{+0.92}_{-1.68})E44$	$0.92^{+0.92}_{-1.62}$	$1.88^{+0.13}_{-0.18}$	$0.22^{+0.22}_{-0.46}$	$1.88^{+0.41}_{-0.76}$	$6.06^{+0.42}_{-0.58}$	$6.33^{+5.08}_{-3.83}$	$96.40^{+77.13}_{-61.60}$
2004-10-27	0.52 (21.91/42)	$5.41^{+0.23}_{-0.88}$	$(4.21^{+0.20}_{-0.65})E44$	$0.00^{+0.00}_{-0.75}$	$1.76^{+0.03}_{-0.07}$	$0.00^{+0.00}_{-0.15}$	$1.46^{+0.07}_{-0.23}$	$6.02^{+0.26}_{-0.27}$	$8.19^{+3.27}_{-3.56}$	$134.00^{+52.87}_{-56.00}$
2004-10-28	0.76 (31.98/42)	$5.04^{+0.39}_{-1.38}$	$(3.90^{+0.30}_{-1.07})E44$	$0.00^{+0.00}_{-1.14}$	$1.77^{+0.06}_{-0.13}$	$0.19^{+0.19}_{-0.32}$	$1.34^{+0.11}_{-0.37}$	$6.05^{+0.25}_{-0.28}$	$7.74^{+3.66}_{-3.47}$	$136.00^{+65.21}_{-63.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		3C 390.3					$Fe_K\alpha\sigma = 0.17$			
1996-05-17	0.50 (23.62/47)	$3.62^{+0.44}_{-0.58}$	$(2.65^{+0.32}_{-0.42})E44$	$0.72^{+0.72}_{-0.75}$	$1.74^{+0.06}_{-0.07}$	$0.00^{+0.00}_{-0.13}$	$1.00^{+0.12}_{-0.16}$	$6.13^{+0.29}_{-0.28}$	$4.45^{+2.34}_{-2.66}$	$105.00^{+55.29}_{-63.00}$
1996-05-23	0.57 (26.92/47)	$2.85^{+0.43}_{-0.55}$	$(2.08^{+0.31}_{-0.40})E44$	$1.16^{+0.87}_{-0.89}$	$1.75^{+0.07}_{-0.08}$	$0.00^{+0.00}_{-0.15}$	$0.83^{+0.13}_{-0.16}$	$6.11^{+0.29}_{-0.31}$	$3.92^{+2.17}_{-2.77}$	$114.00^{+63.56}_{-82.00}$
1996-05-31	0.64 (30.07/47)	$2.66^{+0.42}_{-0.67}$	$(1.94^{+0.31}_{-0.49})E44$	$1.27^{+0.91}_{-1.01}$	$1.72^{+0.08}_{-0.12}$	$0.00^{+0.00}_{-0.25}$	$0.74^{+0.12}_{-0.19}$	$5.92^{+0.41}_{-0.40}$	$3.11^{+2.29}_{-2.86}$	$90.51^{+67.42}_{-85.49}$
1996-06-07	0.41 (19.16/47)	$1.88^{+0.34}_{-0.50}$	$(1.36^{+0.25}_{-0.36})E44$	$1.15^{+1.10}_{-1.14}$	$1.66^{+0.09}_{-0.12}$	$0.00^{+0.00}_{-0.23}$	$0.47^{+0.09}_{-0.13}$	$6.08^{+0.27}_{-0.27}$	$3.99^{+1.82}_{-3.29}$	$173.00^{+82.15}_{-156.00}$
1996-06-17	0.59 (27.74/47)	$1.64^{+0.32}_{-0.52}$	$(1.19^{+0.23}_{-0.38})E44$	$1.44^{+1.17}_{-1.27}$	$1.66^{+0.09}_{-0.14}$	$0.00^{+0.00}_{-0.29}$	$0.42^{+0.08}_{-0.14}$	$6.03^{+0.29}_{-0.27}$	$3.34^{+1.75}_{-3.42}$	$158.00^{+85.39}_{-179.00}$
1996-06-26	0.37 (17.55/47)	$1.76^{+0.32}_{-0.41}$	$(1.28^{+0.24}_{-0.30})E44$	$1.27^{+1.10}_{-1.13}$	$1.70^{+0.09}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$0.47^{+0.09}_{-0.11}$	$6.13^{+0.25}_{-0.25}$	$3.70^{+1.70}_{-3.27}$	$171.00^{+80.00}_{-164.00}$
1999-04-29	0.42 (17.67/42)	$2.29^{+0.17}_{-0.82}$	$(1.64^{+0.12}_{-0.59})E44$	$0.00^{+0.00}_{-1.59}$	$1.65^{+0.04}_{-0.15}$	$0.00^{+0.00}_{-0.32}$	$0.52^{+0.04}_{-0.19}$	$6.01^{+0.43}_{-0.42}$	$3.04^{+2.06}_{-3.65}$	$115.00^{+78.54}_{-132.00}$
1999-07-25	0.61 (25.47/42)	$3.46^{+0.46}_{-1.46}$	$(2.48^{+0.33}_{-1.04})E44$	$0.67^{+0.67}_{-1.75}$	$1.73^{+0.07}_{-0.18}$	$0.00^{+0.00}_{-0.40}$	$0.95^{+0.13}_{-0.40}$	$6.12^{+0.48}_{-0.55}$	$4.07^{+3.04}_{-3.39}$	$100.00^{+74.74}_{-86.00}$
1999-09-17	0.52 (21.71/42)	$3.27^{+0.23}_{-1.21}$	$(2.35^{+0.16}_{-0.87})E44$	$0.00^{+0.00}_{-1.58}$	$1.69^{+0.04}_{-0.16}$	$0.04^{+0.04}_{-0.35}$	$0.78^{+0.06}_{-0.29}$	$5.99^{+0.28}_{-0.30}$	$4.43^{+2.77}_{-3.31}$	$118.00^{+76.14}_{-86.00}$
1999-11-13	0.59 (24.76/42)	$4.24^{+0.56}_{-1.61}$	$(3.05^{+0.41}_{-1.16})E44$	$0.39^{+0.39}_{-1.56}$	$1.84^{+0.08}_{-0.17}$	$0.11^{+0.11}_{-0.43}$	$1.33^{+0.18}_{-0.51}$	$6.09^{+0.59}_{-1.41}$	$3.05^{+2.27}_{-2.71}$	$63.71^{+47.47}_{-57.29}$
1999-12-28	0.44 (18.44/42)	$3.38^{+0.62}_{-1.38}$	$(2.42^{+0.44}_{-0.99})E44$	$0.93^{+0.93}_{-1.72}$	$1.75^{+0.10}_{-0.18}$	$0.06^{+0.06}_{-0.41}$	$0.96^{+0.18}_{-0.40}$	$6.11^{+0.32}_{-0.40}$	$4.72^{+3.11}_{-3.43}$	$117.00^{+78.51}_{-90.00}$
2000-03-03	0.51 (21.31/42)	$4.44^{+0.45}_{-1.54}$	$(3.19^{+0.33}_{-1.10})E44$	$0.17^{+0.17}_{-1.47}$	$1.74^{+0.06}_{-0.15}$	$0.10^{+0.10}_{-0.35}$	$1.17^{+0.12}_{-0.41}$	$6.07^{+0.29}_{-0.36}$	$5.37^{+3.18}_{-3.30}$	$107.00^{+64.49}_{-64.00}$
2000-07-28	0.54 (22.57/42)	$3.36^{+0.61}_{-1.36}$	$(2.40^{+0.43}_{-0.98})E44$	$0.61^{+0.61}_{-1.67}$	$1.74^{+0.12}_{-0.18}$	$0.25^{+0.25}_{-0.46}$	$0.90^{+0.16}_{-0.37}$	$6.07^{+0.41}_{-0.57}$	$3.69^{+3.17}_{-3.29}$	$92.93^{+80.15}_{-81.07}$
2000-10-26	0.43 (18.13/42)	$4.83^{+0.29}_{-1.42}$	$(3.47^{+0.21}_{-1.02})E44$	$0.00^{+0.00}_{-1.26}$	$1.73^{+0.04}_{-0.13}$	$0.04^{+0.04}_{-0.29}$	$1.25^{+0.07}_{-0.37}$	$6.07^{+0.27}_{-0.32}$	$5.63^{+3.27}_{-3.28}$	$105.00^{+61.79}_{-58.00}$
2000-12-19	0.53 (22.11/42)	$3.28^{+0.28}_{-1.11}$	$(2.35^{+0.20}_{-0.80})E44$	$0.00^{+0.00}_{-1.35}$	$1.64^{+0.06}_{-0.15}$	$0.10^{+0.10}_{-0.37}$	$0.72^{+0.06}_{-0.25}$	$5.94^{+0.32}_{-0.35}$	$4.31^{+2.76}_{-3.55}$	$110.00^{+71.33}_{-89.00}$
2005-01-12a	0.60 (25.40/42)	$5.41^{+0.36}_{-0.90}$	$(3.92^{+0.28}_{-0.62})E44$	$0.00^{+0.00}_{-0.66}$	$1.76^{+0.05}_{-0.08}$	$0.15^{+0.15}_{-0.23}$	$1.45^{+0.11}_{-0.23}$	$6.06^{+0.23}_{-0.23}$	$7.04^{+2.73}_{-3.30}$	$115.00^{+44.16}_{-55.00}$
2005-01-12b	0.60 (25.12/42)	$5.46^{+0.26}_{-1.08}$	$(3.92^{+0.19}_{-0.77})E44$	$0.00^{+0.00}_{-0.91}$	$1.71^{+0.03}_{-0.09}$	$0.00^{+0.00}_{-0.17}$	$1.36^{+0.07}_{-0.27}$	$5.93^{+0.34}_{-0.35}$	$5.60^{+3.28}_{-3.31}$	$88.12^{+51.82}_{-49.88}$
2005-01-13	0.68 (28.42/42)	$5.53^{+0.26}_{-0.83}$	$(3.97^{+0.18}_{-0.60})E44$	$0.00^{+0.00}_{-0.82}$	$1.74^{+0.02}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$1.44^{+0.07}_{-0.22}$	$6.05^{+0.36}_{-0.40}$	$4.14^{+3.10}_{-3.23}$	$66.25^{+49.49}_{-49.75}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		4U 0241+61						$\mathrm{Fe}_K\alpha\sigma = 0.12$		
1997-10-12	0.47 (21.48/46)	$3.11^{+0.81}_{-1.19}$	$(1.37^{+0.36}_{-0.51})E44$	$2.16^{+1.49}_{-1.49}$	$1.83^{+0.16}_{-0.17}$	$0.41^{+0.37}_{-0.55}$	$1.06^{+0.29}_{-0.40}$	$6.20^{+0.16}_{-0.19}$	$6.76^{+2.55}_{-3.20}$	$171.00^{+67.00}_{-95.00}$
1997-10-30	0.44 (20.36/46)	$3.06^{+0.56}_{-1.20}$	$(1.34^{+0.25}_{-0.52})E44$	$0.76^{+0.76}_{-1.58}$	$1.67^{+0.11}_{-0.18}$	$0.15^{+0.15}_{-0.45}$	$0.73^{+0.14}_{-0.29}$	$6.23^{+0.16}_{-0.19}$	$7.18^{+2.50}_{-3.22}$	$208.00^{+79.00}_{-99.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Akn 120						$Fe_K \alpha \sigma = 0.26$		
1998-02-24	0.31 (14.32/46)	$4.15^{+0.50}_{-1.42}$	$(9.76^{+1.16}_{-3.34})E43$	$0.17^{+0.17}_{-1.31}$	$1.96^{+0.09}_{-0.17}$	$0.39^{+0.35}_{-0.58}$	$1.47^{+0.18}_{-0.52}$	$6.27^{+0.16}_{-0.17}$	$10.28^{+3.16}_{-3.07}$	$245.00^{+78.00}_{-78.00}$
1998-04-07	0.53 (24.56/46)	$3.04^{+0.32}_{-0.91}$	$(7.14^{+0.75}_{-2.15})E43$	$0.00^{+0.00}_{-1.17}$	$1.91^{+0.09}_{-0.15}$	$0.43^{+0.38}_{-0.57}$	$0.98^{+0.11}_{-0.30}$	$6.30^{+0.16}_{-0.16}$	$8.23^{+2.11}_{-3.11}$	$268.00^{+70.00}_{-107.00}$
1998-09-15	0.54 (24.75/46)	$2.98^{+0.30}_{-0.70}$	$(7.00^{+0.71}_{-1.65})E43$	$0.00^{+0.00}_{-0.89}$	$1.90^{+0.08}_{-0.13}$	$0.35^{+0.35}_{-0.51}$	$0.95^{+0.10}_{-0.23}$	$6.34^{+0.13}_{-0.13}$	$9.38^{+1.83}_{-3.08}$	$321.00^{+67.00}_{-102.00}$
1998-12-02	0.38 (17.60/46)	$3.83^{+0.93}_{-1.29}$	$(8.97^{+2.18}_{-3.01})E43$	$1.30^{+1.25}_{-1.24}$	$2.11^{+0.16}_{-0.18}$	$0.75^{+0.51}_{-0.81}$	$1.85^{+0.46}_{-0.64}$	$6.48^{+0.18}_{-0.21}$	$9.04^{+2.66}_{-3.05}$	$227.00^{+68.00}_{-90.00}$
1998-12-16a	0.39 (17.93/46)	$3.88^{+0.32}_{-1.26}$	$(9.14^{+0.75}_{-2.96})E43$	$0.00^{+0.00}_{-1.22}$	$1.94^{+0.07}_{-0.16}$	$0.33^{+0.30}_{-0.54}$	$1.32^{+0.11}_{-0.44}$	$6.24^{+0.14}_{-0.15}$	$10.23^{+2.64}_{-2.91}$	$264.00^{+75.00}_{-70.00}$
1998-12-16b	0.66 (30.46/46)	$3.98^{+0.87}_{-1.16}$	$(9.32^{+2.03}_{-2.72})E43$	$1.13^{+1.12}_{-1.12}$	$2.13^{+0.14}_{-0.15}$	$0.81^{+0.44}_{-0.65}$	$1.94^{+0.43}_{-0.58}$	$6.35^{+0.15}_{-0.17}$	$9.33^{+2.59}_{-2.76}$	$224.00^{+64.00}_{-70.00}$
1998-12-17a	0.34 (15.41/46)	$3.66^{+0.71}_{-1.41}$	$(8.60^{+1.67}_{-3.30})E43$	$0.58^{+0.58}_{-1.36}$	$2.04^{+0.14}_{-0.20}$	$0.72^{+0.51}_{-0.85}$	$1.50^{+0.30}_{-0.59}$	$6.27^{+0.17}_{-0.21}$	$8.81^{+2.83}_{-3.01}$	$230.00^{+77.00}_{-82.00}$
1998-12-17b	0.34 (15.80/46)	$4.29^{+0.35}_{-1.32}$	$(1.01^{+0.08}_{-0.31})E44$	$0.01^{+0.01}_{-1.21}$	$1.90^{+0.06}_{-0.15}$	$0.18^{+0.18}_{-0.45}$	$1.38^{+0.12}_{-0.43}$	$6.38^{+0.16}_{-0.18}$	$9.77^{+2.70}_{-2.96}$	$232.00^{+66.00}_{-74.00}$
1998-12-18	0.82 (37.59/46)	$3.63^{+0.88}_{-1.19}$	$(8.49^{+2.06}_{-2.77})E43$	$1.42^{+1.22}_{-1.18}$	$2.13^{+0.16}_{-0.17}$	$1.04^{+0.56}_{-0.87}$	$1.80^{+0.45}_{-0.60}$	$6.39^{+0.18}_{-0.21}$	$7.30^{+2.56}_{-2.85}$	$184.00^{+66.00}_{-83.00}$
1999-01-10	0.45 (20.50/46)	$3.44^{+0.81}_{-1.22}$	$(8.04^{+1.90}_{-2.84})E43$	$1.11^{+1.11}_{-1.34}$	$2.00^{+0.16}_{-0.18}$	$0.54^{+0.45}_{-0.70}$	$1.41^{+0.34}_{-0.51}$	$6.39^{+0.17}_{-0.20}$	$8.68^{+2.59}_{-3.09}$	$236.00^{+73.00}_{-100.00}$
1999-10-19	0.40 (16.98/42)	$2.59^{+0.32}_{-1.28}$	$(5.98^{+0.75}_{-2.95})E43$	$0.05^{+0.05}_{-1.86}$	$1.89^{+0.10}_{-0.23}$	$0.54^{+0.42}_{-0.88}$	$0.80^{+0.10}_{-0.41}$	$6.35^{+0.18}_{-0.23}$	$6.92^{+2.35}_{-3.48}$	$264.00^{+95.00}_{-132.00}$
2000-02-10	0.70 (29.35/42)	$3.52^{+0.39}_{-1.43}$	$(8.13^{+0.89}_{-3.30})E43$	$0.00^{+0.00}_{-1.52}$	$2.02^{+0.09}_{-0.20}$	$0.75^{+0.45}_{-0.88}$	$1.32^{+0.15}_{-0.55}$	$6.33^{+0.20}_{-0.24}$	$7.76^{+2.72}_{-3.29}$	$225.00^{+82.00}_{-92.00}$
2003-08-24a	0.45 (19.10/42)	$4.54^{+1.01}_{-1.50}$	$(1.06^{+0.24}_{-0.34})E44$	$0.98^{+0.98}_{-1.21}$	$2.15^{+0.15}_{-0.17}$	$0.87^{+0.51}_{-0.79}$	$2.29^{+0.53}_{-0.75}$	$6.38^{+0.21}_{-0.24}$	$7.70^{+3.05}_{-3.17}$	$163.00^{+65.73}_{-71.00}$
2003-08-24b	0.67 (28.05/42)	$4.69^{+0.89}_{-1.43}$	$(1.08^{+0.21}_{-0.33})E44$	$0.67^{+0.67}_{-1.20}$	$2.08^{+0.13}_{-0.15}$	$0.63^{+0.42}_{-0.60}$	$2.08^{+0.40}_{-0.65}$	$6.28^{+0.17}_{-0.20}$	$9.12^{+3.17}_{-3.11}$	$188.00^{+67.00}_{-66.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Akn 564						$\mathrm{Fe}_K\alpha\sigma = 0.48$		
1996-12-23	0.42 (19.34/46)	$2.21^{+0.63}_{-1.86}$	$(3.16^{+0.90}_{-2.66})E43$	$1.93^{+1.67}_{-1.69}$	$2.70^{+0.16}_{-0.46}$	$0.06^{+0.06}_{-2.84}$	$2.92^{+0.83}_{-2.48}$	$6.35^{+0.69}_{-1.15}$	$2.33^{+2.22}_{-2.40}$	$119.00^{+112.83}_{-117.00}$
1999-01-01	0.56 (25.61/46)	$2.23^{+0.47}_{-0.39}$	$(3.25^{+0.68}_{-0.57})E43$	$0.00^{+0.00}_{-0.62}$	$3.04^{+0.20}_{-0.14}$	$1.10^{+0.58}_{-2.04}$	$3.46^{+0.74}_{-0.62}$	$6.12^{+0.40}_{-1.29}$	$3.84^{+1.85}_{-1.66}$	$243.00^{+106.00}_{-110.00}$
2000-06-09	0.47 (19.55/42)	$1.97^{+0.78}_{-1.62}$	$(2.78^{+1.11}_{-2.28})E43$	$2.55^{+1.47}_{-1.28}$	$3.00^{+0.32}_{-0.47}$	$1.38^{+0.90}_{-3.62}$	$3.95^{+1.60}_{-3.30}$	$6.70^{+0.53}_{-0.80}$	$2.97^{+1.79}_{-2.19}$	$194.00^{+111.94}_{-122.00}$
2002-03-02	0.51 (21.41/42)	$1.98^{+0.30}_{-1.25}$	$(2.79^{+0.42}_{-1.77})E43$	$0.35^{+0.35}_{-2.05}$	$2.61^{+0.09}_{-0.30}$	$0.00^{+0.00}_{-1.26}$	$1.90^{+0.30}_{-1.23}$	$6.08^{+0.36}_{-0.47}$	$4.21^{+2.42}_{-2.10}$	$251.00^{+144.00}_{-123.00}$

				wabs		pexrav			gaussian	
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Cen A						$\mathrm{Fe}_K\alpha\sigma = 0.10$		
1996-08-14a	0.67 (31.56/47)	$17.70^{+1.47}_{-2.12}$	$(3.88^{+0.32}_{-0.46})E41$	$11.95^{+0.61}_{-0.67}$	$1.87^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.10}$	$10.95^{+0.93}_{-1.34}$	$6.44^{+0.10}_{-0.10}$	$52.08^{+10.98}_{-10.39}$	$158.00^{+36.00}_{-33.00}$
1996-08-14b	1.16 (54.58/47)	$17.44^{+1.32}_{-1.45}$	$(3.82^{+0.29}_{-0.32})E41$	$12.68^{+0.57}_{-0.57}$	$1.89^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.04}$	$11.47^{+0.89}_{-0.97}$	$6.50^{+0.10}_{-0.10}$	$46.22^{+9.72}_{-9.53}$	$142.00^{+32.00}_{-27.00}$
1998-08-09a	0.71 (32.79/46)	$17.97^{+1.47}_{-1.63}$	$(3.94^{+0.32}_{-0.36})E41$	$10.38^{+0.64}_{-0.66}$	$1.86^{+0.03}_{-0.04}$	$0.00^{+0.00}_{-0.04}$	$10.28^{+0.86}_{-0.95}$	$6.45^{+0.11}_{-0.11}$	$42.99^{+9.67}_{-9.27}$	$135.00^{+32.00}_{-32.00}$
1998-08-09b	0.81 (37.11/46)	$17.82^{+1.52}_{-1.76}$	$(3.90^{+0.33}_{-0.38})E41$	$10.67^{+0.67}_{-0.67}$	$1.87^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.06}$	$10.45^{+0.91}_{-1.05}$	$6.46^{+0.12}_{-0.12}$	$44.37^{+9.87}_{-9.51}$	$139.00^{+32.00}_{-33.00}$
1998-08-09c	0.92 (42.22/46)	$17.57^{+1.73}_{-1.92}$	$(3.85^{+0.38}_{-0.42})E41$	$10.86^{+0.77}_{-0.78}$	$1.88^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$10.55^{+1.06}_{-1.18}$	$6.39^{+0.11}_{-0.11}$	$47.38^{+11.25}_{-10.61}$	$146.00^{+33.00}_{-36.00}$
1998-08-09d	0.52 (23.87/46)	$17.11^{+1.46}_{-1.65}$	$(3.75^{+0.32}_{-0.36})E41$	$11.03^{+0.68}_{-0.69}$	$1.88^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$10.38^{+0.90}_{-1.02}$	$6.46^{+0.12}_{-0.12}$	$38.12^{+9.64}_{-9.30}$	$123.00^{+32.72}_{-32.00}$
1998-08-10a	0.68 (31.21/46)	$17.44^{+1.48}_{-1.63}$	$(3.82^{+0.33}_{-0.36})E41$	$11.42^{+0.67}_{-0.68}$	$1.91^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$11.31^{+0.98}_{-1.07}$	$6.57^{+0.15}_{-0.16}$	$35.02^{+9.47}_{-9.35}$	$112.00^{+29.40}_{-32.00}$
1998-08-10b	0.57 (26.17/46)	$18.09^{+1.53}_{-1.70}$	$(3.96^{+0.33}_{-0.37})E41$	$11.02^{+0.66}_{-0.68}$	$1.88^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$10.99^{+0.95}_{-1.05}$	$6.46^{+0.12}_{-0.13}$	$40.39^{+10.12}_{-9.68}$	$123.00^{+32.10}_{-32.00}$
1998-08-14a	0.46 (21.21/46)	$15.74^{+1.47}_{-1.63}$	$(3.45^{+0.32}_{-0.36})E41$	$11.22^{+0.73}_{-0.75}$	$1.90^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$9.92^{+0.95}_{-1.05}$	$6.51^{+0.11}_{-0.12}$	$41.03^{+9.36}_{-8.94}$	$147.00^{+35.00}_{-35.00}$
1998-08-14b	0.65 (30.00/46)	$14.97^{+1.20}_{-1.30}$	$(3.28^{+0.26}_{-0.28})E41$	$10.70^{+0.64}_{-0.64}$	$1.85^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.04}$	$8.49^{+0.70}_{-0.76}$	$6.46^{+0.08}_{-0.08}$	$51.05^{+7.80}_{-7.45}$	$192.00^{+32.00}_{-31.00}$
1998-08-14c	0.58 (26.84/46)	$16.62^{+1.30}_{-1.44}$	$(3.64^{+0.28}_{-0.32})E41$	$10.93^{+0.62}_{-0.62}$	$1.86^{+0.03}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$9.80^{+0.78}_{-0.87}$	$6.47^{+0.10}_{-0.11}$	$40.93^{+8.66}_{-8.30}$	$136.00^{+27.00}_{-30.00}$
1998-08-15	0.75 (34.43/46)	$16.22^{+1.55}_{-2.30}$	$(3.55^{+0.34}_{-0.50})E41$	$10.67^{+0.75}_{-0.84}$	$1.86^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.12}$	$9.26^{+0.91}_{-1.35}$	$6.50^{+0.10}_{-0.10}$	$50.90^{+9.82}_{-9.31}$	$181.00^{+38.00}_{-31.00}$
2000-01-23a	0.65 (27.33/42)	$27.51^{+2.12}_{-2.40}$	$(6.03^{+0.46}_{-0.53})E41$	$10.77^{+0.64}_{-0.64}$	$1.85^{+0.03}_{-0.04}$	$0.00^{+0.00}_{-0.04}$	$15.70^{+1.23}_{-1.39}$	$6.48^{+0.14}_{-0.14}$	$48.76^{+14.23}_{-13.89}$	$98.04^{+27.83}_{-29.96}$
2000-01-23b	0.83 (34.90/42)	$28.04^{+4.01}_{-5.77}$	$(6.14^{+0.88}_{-1.26})E41$	$10.77^{+1.02}_{-1.10}$	$1.88^{+0.07}_{-0.09}$	$0.06^{+0.06}_{-0.17}$	$16.97^{+2.46}_{-3.55}$	$6.25^{+0.18}_{-0.20}$	$51.64^{+21.61}_{-18.27}$	$96.88^{+42.34}_{-34.12}$
2000-01-23c	0.58 (24.33/42)	$26.80^{+2.30}_{-3.08}$	$(5.87^{+0.50}_{-0.68})E41$	$10.78^{+0.70}_{-0.74}$	$1.86^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.08}$	$15.72^{+1.37}_{-1.84}$	$6.42^{+0.14}_{-0.15}$	$52.19^{+15.24}_{-14.84}$	$108.00^{+32.73}_{-29.00}$
2000-01-23d	0.53 (22.08/42)	$26.97^{+2.22}_{-3.15}$	$(5.91^{+0.49}_{-0.69})E41$	$10.80^{+0.68}_{-0.74}$	$1.85^{+0.03}_{-0.05}$	$0.00^{+0.00}_{-0.08}$	$15.55^{+1.30}_{-1.85}$	$6.42^{+0.13}_{-0.14}$	$53.77^{+14.91}_{-14.48}$	$110.00^{+31.48}_{-29.00}$
2003-03-07a	1.03 (43.19/42)	$32.17^{+2.76}_{-4.12}$	$(7.05^{+0.60}_{-0.90})E41$	$15.42^{+0.73}_{-0.81}$	$1.85^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$21.49^{+1.87}_{-2.80}$	$6.13^{+0.16}_{-0.16}$	$74.01^{+23.93}_{-23.01}$	$98.20^{+31.40}_{-32.80}$
2003-03-07b	0.90 (37.93/42)	$32.27^{+2.38}_{-5.03}$	$(7.07^{+0.52}_{-1.10})E41$	$15.18^{+0.63}_{-0.91}$	$1.83^{+0.03}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$20.77^{+1.56}_{-3.30}$	$6.21^{+0.14}_{-0.13}$	$72.51^{+23.84}_{-20.07}$	$99.13^{+32.68}_{-28.87}$
2003-03-08a	0.78 (32.94/42)	$31.19^{+2.89}_{-5.52}$	$(6.83^{+0.63}_{-1.21})E41$	$15.39^{+0.74}_{-1.01}$	$1.84^{+0.04}_{-0.08}$	$0.02^{+0.02}_{-0.12}$	$20.53^{+1.93}_{-3.70}$	$6.23^{+0.14}_{-0.14}$	$72.78^{+25.44}_{-19.51}$	$102.00^{+35.79}_{-30.00}$
2003-03-08b	1.33 (55.98/42)	$31.46^{+2.76}_{-5.40}$	$(6.89^{+0.60}_{-1.18})E41$	$15.13^{+0.74}_{-0.99}$	$1.84^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$20.69^{+1.84}_{-3.59}$	$6.18^{+0.24}_{-0.22}$	$51.28^{+25.62}_{-22.55}$	$71.67^{+36.76}_{-30.33}$
2003-03-08c	0.76 (31.92/42)	$31.67^{+2.74}_{-5.86}$	$(6.94^{+0.60}_{-1.28})E41$	$14.67^{+0.71}_{-1.05}$	$1.81^{+0.04}_{-0.08}$	$0.01^{+0.01}_{-0.13}$	$19.40^{+1.71}_{-3.64}$	$6.21^{+0.18}_{-0.19}$	$61.30^{+25.86}_{-20.52}$	$86.59^{+36.84}_{-30.41}$
2003-03-08d	0.89 (37.28/42)	$32.67^{+4.33}_{-6.02}$	$(7.15^{+0.95}_{-1.32})E41$	$15.18^{+0.95}_{-1.03}$	$1.84^{+0.06}_{-0.08}$	$0.06^{+0.06}_{-0.13}$	$21.33^{+2.87}_{-3.99}$	$6.16^{+0.16}_{-0.16}$	$65.59^{+27.26}_{-22.66}$	$88.30^{+38.30}_{-30.70}$
2003-03-09a	1.04 (43.61/42)	$32.09^{+2.71}_{-6.71}$	$(7.03^{+0.59}_{-1.47})E41$	$14.61^{+0.72}_{-1.16}$	$1.78^{+0.03}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$18.58^{+1.60}_{-3.96}$	$6.18^{+0.15}_{-0.15}$	$78.60^{+29.30}_{-22.20}$	$110.00^{+43.18}_{-34.00}$
2003-03-09b	0.78 (32.83/42)	$31.40^{+2.22}_{-5.16}$	$(6.88^{+0.48}_{-1.13})E41$	$14.93^{+0.61}_{-0.96}$	$1.82^{+0.03}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$19.84^{+1.42}_{-3.31}$	$6.26^{+0.15}_{-0.16}$	$60.26^{+23.72}_{-19.30}$	$87.28^{+35.80}_{-29.72}$
2003-03-09c	0.67 (28.30/42)	$32.83^{+3.84}_{-6.05}$	$(7.19^{+0.84}_{-1.32})E41$	$15.13^{+0.88}_{-1.04}$	$1.84^{+0.05}_{-0.08}$	$0.04^{+0.04}_{-0.13}$	$21.60^{+2.56}_{-4.04}$	$6.33^{+0.17}_{-0.20}$	$56.29^{+25.46}_{-21.73}$	$79.26^{+37.14}_{-29.74}$
2003-03-09d	0.40 (16.69/42)	$32.95^{+2.63}_{-3.87}$	$(7.22^{+0.58}_{-0.85})E41$	$15.12^{+0.68}_{-0.76}$	$1.82^{+0.03}_{-0.05}$	$0.00^{+0.00}_{-0.07}$	$20.97^{+1.70}_{-2.50}$	$6.18^{+0.15}_{-0.15}$	$67.37^{+22.61}_{-21.88}$	$90.23^{+31.36}_{-30.77}$
2003-03-10	0.82 (34.56/42)	$33.19^{+3.47}_{-6.05}$	$(7.27^{+0.76}_{-1.33})E41$	$15.58^{+0.82}_{-1.03}$	$1.86^{+0.05}_{-0.08}$	$0.03^{+0.03}_{-0.13}$	$22.96^{+2.43}_{-4.24}$	$6.24^{+0.20}_{-0.20}$	$51.74^{+25.63}_{-22.31}$	$69.21^{+35.33}_{-29.18}$
2004-01-02a	0.65 (27.10/42)	$19.78^{+1.75}_{-3.07}$	$(4.33^{+0.38}_{-0.67})E41$	$16.92^{+0.80}_{-0.98}$	$1.81^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$12.86^{+1.18}_{-2.06}$	$6.30^{+0.09}_{-0.09}$	$76.71^{+15.45}_{-14.04}$	$168.00^{+34.00}_{-34.00}$
2004-01-02b	0.71 (29.97/42)	$18.49^{+1.79}_{-2.18}$	$(4.05^{+0.39}_{-0.48})E41$	$17.76^{+0.86}_{-0.89}$	$1.85^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.06}$	$13.16^{+1.31}_{-1.59}$	$6.33^{+0.11}_{-0.11}$	$61.00^{+14.73}_{-13.89}$	$142.00^{+36.00}_{-36.00}$
2004-01-02c	0.68 (28.76/42)	$17.39^{+1.64}_{-2.14}$	$(3.81^{+0.36}_{-0.47})E41$	$16.63^{+0.84}_{-0.88}$	$1.81^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.07}$	$11.12^{+1.08}_{-1.41}$	$6.32^{+0.10}_{-0.10}$	$67.79^{+13.27}_{-12.57}$	$175.00^{+37.00}_{-31.00}$
2004-01-03a	0.82 (34.53/42)	$17.19^{+1.50}_{-1.76}$	$(3.76^{+0.33}_{-0.39})E41$	$17.57^{+0.77}_{-0.81}$	$1.83^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$11.84^{+1.06}_{-1.25}$	$6.30^{+0.08}_{-0.08}$	$71.53^{+12.68}_{-11.99}$	$177.00^{+33.00}_{-33.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2004-01-03b	0.78 (32.83/42)	$17.50^{+1.55}_{-2.25}$	$(3.83^{+0.34}_{-0.49})E41$	$17.49^{+0.79}_{-0.88}$	$1.83^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$12.04^{+1.10}_{-1.59}$	$6.38^{+0.10}_{-0.10}$	$65.22^{+12.76}_{-12.10}$	$163.00^{+34.00}_{-33.00}$
2004-01-03c	0.85 (35.67/42)	$18.29^{+1.71}_{-2.88}$	$(4.01^{+0.38}_{-0.63})E41$	$17.07^{+0.84}_{-1.02}$	$1.79^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$11.38^{+1.10}_{-1.85}$	$6.38^{+0.09}_{-0.09}$	$77.82^{+14.30}_{-13.17}$	$189.00^{+38.00}_{-36.00}$
2004-01-04a	0.69 (28.78/42)	$18.62^{+1.68}_{-3.24}$	$(4.08^{+0.37}_{-0.71})E41$	$17.83^{+0.82}_{-1.08}$	$1.82^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.12}$	$12.57^{+1.17}_{-2.25}$	$6.35^{+0.11}_{-0.11}$	$68.38^{+15.39}_{-13.44}$	$159.00^{+39.00}_{-34.00}$
2004-01-04b	0.86 (36.18/42)	$18.80^{+1.71}_{-2.02}$	$(4.12^{+0.37}_{-0.44})E41$	$17.43^{+0.82}_{-0.84}$	$1.81^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$12.39^{+1.16}_{-1.37}$	$6.37^{+0.08}_{-0.08}$	$74.72^{+13.92}_{-13.29}$	$174.00^{+35.00}_{-35.00}$
2004-01-04c	0.69 (28.79/42)	$19.47^{+1.74}_{-3.30}$	$(4.27^{+0.38}_{-0.72})E41$	$16.69^{+0.79}_{-1.03}$	$1.84^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.12}$	$13.33^{+1.22}_{-2.31}$	$6.41^{+0.11}_{-0.12}$	$60.58^{+15.13}_{-13.34}$	$142.00^{+38.00}_{-30.00}$
2004-02-13	0.50 (20.89/42)	$19.98^{+1.92}_{-4.21}$	$(4.38^{+0.42}_{-0.92})E41$	$15.67^{+0.82}_{-1.21}$	$1.83^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.15}$	$13.06^{+1.28}_{-2.82}$	$6.25^{+0.12}_{-0.12}$	$63.35^{+18.65}_{-14.53}$	$142.00^{+45.07}_{-36.00}$
2004-02-14a	0.70 (29.39/42)	$21.29^{+1.84}_{-3.87}$	$(4.66^{+0.40}_{-0.85})E41$	$15.46^{+0.76}_{-1.06}$	$1.79^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.12}$	$12.82^{+1.14}_{-2.39}$	$6.30^{+0.10}_{-0.10}$	$72.00^{+17.31}_{-14.38}$	$153.00^{+37.00}_{-33.00}$
2004-02-14b	0.72 (30.15/42)	$22.41^{+2.09}_{-4.59}$	$(4.91^{+0.46}_{-1.01})E41$	$15.48^{+0.80}_{-1.18}$	$1.79^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.14}$	$13.33^{+1.27}_{-2.80}$	$6.31^{+0.11}_{-0.12}$	$68.94^{+19.79}_{-15.49}$	$139.00^{+40.91}_{-34.00}$

Spectrum[a]	χ^{2}_{ν} [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	wabs	pexrav			gaussian		
				N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Cyg A						$Fe_{K}\alpha\sigma = 0.14$		
1996-04-10a	0.82 (42.07/51)	$10.12^{+0.90}_{-1.16}$	$(7.33^{+0.65}_{-0.84})E44$	$3.20^{+0.57}_{-0.67}$	$1.94^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.05}$	$4.48^{+0.42}_{-0.54}$	$6.18^{+0.05}_{-0.05}$	$51.71^{+5.13}_{-4.66}$	$401.00^{+46.00}_{-42.00}$
1996-04-10b	0.85 (43.38/51)	$10.15^{+1.20}_{-1.73}$	$(7.35^{+0.87}_{-1.25})E44$	$3.35^{+0.70}_{-0.76}$	$1.97^{+0.06}_{-0.09}$	$0.04^{+0.04}_{-0.20}$	$4.78^{+0.59}_{-0.85}$	$6.17^{+0.05}_{-0.05}$	$51.46^{+5.09}_{-5.00}$	$395.00^{+46.00}_{-47.00}$
1996-07-14	0.90 (42.52/47)	$10.21^{+0.89}_{-0.99}$	$(7.36^{+0.64}_{-0.71})E44$	$3.88^{+0.54}_{-0.55}$	$1.92^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.04}$	$4.56^{+0.42}_{-0.46}$	$6.28^{+0.05}_{-0.05}$	$49.12^{+4.99}_{-4.97}$	$368.00^{+42.00}_{-43.00}$
1996-07-15	0.65 (30.54/47)	$10.10^{+0.85}_{-0.94}$	$(7.27^{+0.61}_{-0.68})E44$	$4.16^{+0.52}_{-0.53}$	$1.93^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$4.68^{+0.41}_{-0.46}$	$6.25^{+0.05}_{-0.05}$	$47.95^{+4.94}_{-4.90}$	$357.00^{+41.00}_{-42.00}$
1996-09-05a	0.78 (36.74/47)	$10.18^{+0.85}_{-0.94}$	$(7.33^{+0.61}_{-0.67})E44$	$4.02^{+0.52}_{-0.52}$	$1.92^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.05}$	$4.59^{+0.40}_{-0.44}$	$6.24^{+0.05}_{-0.05}$	$48.37^{+4.88}_{-4.84}$	$360.00^{+41.00}_{-31.00}$
1996-09-05b	0.82 (38.35/47)	$10.18^{+0.95}_{-1.06}$	$(7.34^{+0.68}_{-0.76})E44$	$4.12^{+0.57}_{-0.58}$	$1.93^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.07}$	$4.76^{+0.46}_{-0.52}$	$6.28^{+0.06}_{-0.06}$	$44.76^{+5.28}_{-5.25}$	$331.00^{+44.00}_{-44.00}$
1996-09-05c	0.46 (21.85/47)	$9.84^{+0.86}_{-0.95}$	$(7.10^{+0.62}_{-0.69})E44$	$3.81^{+0.54}_{-0.55}$	$1.92^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.06}$	$4.37^{+0.40}_{-0.44}$	$6.30^{+0.05}_{-0.05}$	$48.64^{+4.81}_{-4.78}$	$380.00^{+43.00}_{-43.00}$
1996-12-03a	0.74 (34.14/46)	$9.70^{+0.99}_{-1.25}$	$(6.98^{+0.74}_{-0.86})E44$	$4.10^{+0.74}_{-0.76}$	$1.97^{+0.05}_{-0.05}$	$0.00^{+0.00}_{-0.09}$	$4.77^{+0.53}_{-0.62}$	$6.30^{+0.06}_{-0.06}$	$45.60^{+4.98}_{-4.91}$	$358.00^{+37.00}_{-45.00}$
1996-12-03b	0.68 (31.29/46)	$9.83^{+1.12}_{-1.29}$	$(7.05^{+0.80}_{-0.92})E44$	$4.05^{+0.81}_{-0.82}$	$1.96^{+0.05}_{-0.05}$	$0.00^{+0.00}_{-0.06}$	$4.72^{+0.56}_{-0.65}$	$6.26^{+0.06}_{-0.06}$	$47.06^{+5.48}_{-5.41}$	$366.00^{+49.00}_{-50.00}$
2000-05-20	0.84 (35.13/42)	$8.72^{+1.17}_{-1.24}$	$(6.29^{+0.85}_{-0.89})E44$	$3.85^{+0.91}_{-0.93}$	$2.19^{+0.06}_{-0.06}$	$0.00^{+0.00}_{-0.07}$	$6.05^{+0.81}_{-0.95}$	$6.32^{+0.06}_{-0.06}$	$43.46^{+4.91}_{-4.82}$	$416.00^{+55.00}_{-42.00}$
2000-05-24	0.64 (26.88/42)	$8.69^{+1.30}_{-1.38}$	$(6.26^{+0.93}_{-0.99})E44$	$3.81^{+1.00}_{-1.02}$	$2.17^{+0.07}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$5.85^{+0.87}_{-1.04}$	$6.24^{+0.06}_{-0.07}$	$45.78^{+5.48}_{-5.36}$	$428.00^{+60.00}_{-47.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		ESO 103-G035						$\mathrm{Fe}_K\alpha\sigma = 0.12$		
1997-04-11	0.49 (22.53/46)	$2.90^{+1.54}_{-0.57}$	$(7.82^{+2.77}_{-5.04})E42$	$23.71^{+2.83}_{-3.17}$	$2.16^{+0.23}_{-0.28}$	$1.33^{+0.68}_{-1.28}$	$2.75^{+1.01}_{-1.83}$	$6.20^{+0.16}_{-0.19}$	$10.61^{+5.70}_{-6.93}$	$171.00^{+97.86}_{-148.00}$
1997-04-12	0.29 (13.30/46)	$2.87^{+1.51}_{-0.54}$	$(8.06^{+2.99}_{-4.60})E42$	$23.84^{+2.98}_{-2.89}$	$2.17^{+0.25}_{-0.26}$	$1.40^{+0.75}_{-1.24}$	$2.91^{+1.11}_{-1.71}$	$6.36^{+0.16}_{-0.21}$	$9.79^{+4.98}_{-6.62}$	$160.00^{+86.57}_{-136.00}$
1997-04-13	0.61 (28.06/46)	$2.77^{+0.83}_{-1.78}$	$(6.92^{+3.24}_{-6.42})E42$	$23.31^{+4.24}_{-4.18}$	$1.99^{+0.32}_{-0.35}$	$0.64^{+0.61}_{-1.17}$	$1.88^{+0.92}_{-1.82}$	$6.27^{+0.15}_{-0.19}$	$10.56^{+5.80}_{-7.38}$	$204.00^{+121.88}_{-204.00}$
1997-07-21	0.39 (18.13/46)	$2.99^{+1.60}_{-0.62}$	$(8.25^{+3.11}_{-5.13})E42$	$24.36^{+3.23}_{-3.25}$	$2.07^{+0.24}_{-0.25}$	$0.71^{+0.50}_{-0.81}$	$2.65^{+1.03}_{-1.70}$	$6.37^{+0.17}_{-0.21}$	$10.00^{+5.15}_{-7.00}$	$160.00^{+87.95}_{-142.00}$
1997-07-23	0.39 (17.81/46)	$2.76^{+1.51}_{-0.57}$	$(7.60^{+2.97}_{-4.72})E42$	$24.76^{+3.22}_{-3.09}$	$2.15^{+0.26}_{-0.27}$	$1.24^{+0.71}_{-1.19}$	$2.73^{+1.10}_{-1.75}$	$6.32^{+0.16}_{-0.21}$	$8.99^{+5.17}_{-6.66}$	$152.00^{+92.09}_{-144.00}$
1997-11-13	0.59 (27.11/46)	$2.40^{+1.34}_{-0.46}$	$(6.61^{+2.68}_{-3.98})E42$	$24.39^{+3.28}_{-3.05}$	$2.21^{+0.29}_{-0.29}$	$2.06^{+1.10}_{-2.01}$	$2.44^{+1.02}_{-1.52}$	$6.36^{+0.16}_{-0.22}$	$8.64^{+4.64}_{-7.14}$	$168.00^{+96.09}_{-184.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Fairall 9					Fe$_K\alpha\sigma = 0.15$			
1996-11-03	0.41 (18.84/46)	$2.79^{+0.34}_{-1.00}$	$(1.43^{+0.19}_{-0.49})E44$	$0.67^{+0.67}_{-1.40}$	$1.86^{+0.07}_{-0.16}$	$0.00^{+0.00}_{-0.41}$	$0.92^{+0.13}_{-0.32}$	$6.27^{+0.20}_{-0.23}$	$4.94^{+2.08}_{-3.07}$	$165.00^{+70.85}_{-106.00}$
1997-01-02	0.47 (21.44/46)	$3.26^{+0.63}_{-1.23}$	$(1.64^{+0.32}_{-0.62})E44$	$0.61^{+0.61}_{-1.40}$	$2.01^{+0.14}_{-0.19}$	$0.45^{+0.44}_{-0.71}$	$1.29^{+0.26}_{-0.50}$	$6.31^{+0.19}_{-0.22}$	$6.30^{+2.28}_{-2.95}$	$188.00^{+70.00}_{-98.00}$
1997-02-16	0.45 (20.60/46)	$3.20^{+0.23}_{-1.15}$	$(1.62^{+0.11}_{-0.58})E44$	$0.00^{+0.00}_{-1.40}$	$1.86^{+0.05}_{-0.17}$	$0.06^{+0.06}_{-0.48}$	$0.98^{+0.07}_{-0.36}$	$6.18^{+0.16}_{-0.18}$	$7.21^{+2.25}_{-3.04}$	$222.00^{+72.00}_{-90.00}$
1997-03-24	0.37 (16.99/46)	$2.30^{+0.16}_{-0.73}$	$(1.16^{+0.08}_{-0.37})E44$	$0.00^{+0.00}_{-1.27}$	$1.76^{+0.04}_{-0.15}$	$0.01^{+0.01}_{-0.42}$	$0.60^{+0.04}_{-0.19}$	$6.32^{+0.18}_{-0.19}$	$4.99^{+1.60}_{-3.25}$	$217.00^{+74.00}_{-141.00}$
1997-05-17	0.44 (20.20/46)	$2.32^{+0.19}_{-0.73}$	$(1.17^{+0.10}_{-0.37})E44$	$0.00^{+0.00}_{-1.25}$	$1.75^{+0.05}_{-0.15}$	$0.07^{+0.07}_{-0.44}$	$0.59^{+0.05}_{-0.19}$	$6.29^{+0.18}_{-0.18}$	$4.95^{+1.62}_{-3.30}$	$207.00^{+68.00}_{-146.00}$
1997-07-28	0.46 (20.95/46)	$2.33^{+0.16}_{-0.57}$	$(1.18^{+0.08}_{-0.29})E44$	$0.00^{+0.00}_{-1.19}$	$1.80^{+0.04}_{-0.11}$	$0.00^{+0.00}_{-0.25}$	$0.65^{+0.04}_{-0.16}$	$6.28^{+0.15}_{-0.15}$	$5.90^{+1.66}_{-3.22}$	$252.00^{+76.00}_{-146.00}$
1997-09-26	0.85 (39.08/46)	$2.48^{+0.25}_{-0.75}$	$(1.25^{+0.13}_{-0.38})E44$	$0.00^{+0.00}_{-1.23}$	$1.84^{+0.08}_{-0.15}$	$0.30^{+0.30}_{-0.45}$	$0.71^{+0.07}_{-0.22}$	$6.33^{+0.14}_{-0.14}$	$6.39^{+1.57}_{-2.93}$	$262.00^{+71.00}_{-117.00}$
2001-03-06	0.37 (15.60/42)	$2.11^{+0.32}_{-1.05}$	$(1.06^{+0.16}_{-0.53})E44$	$0.45^{+0.45}_{-1.92}$	$1.88^{+0.09}_{-0.22}$	$0.12^{+0.12}_{-0.63}$	$0.70^{+0.11}_{-0.35}$	$6.21^{+0.26}_{-0.32}$	$3.75^{+2.05}_{-3.42}$	$163.00^{+91.38}_{-154.00}$
2001-09-01	0.49 (20.71/42)	$2.53^{+0.19}_{-0.96}$	$(1.28^{+0.10}_{-0.49})E44$	$0.00^{+0.00}_{-1.39}$	$1.87^{+0.05}_{-0.18}$	$0.07^{+0.07}_{-0.55}$	$0.79^{+0.06}_{-0.31}$	$6.16^{+0.21}_{-0.24}$	$5.28^{+1.96}_{-3.29}$	$201.00^{+77.00}_{-122.00}$
2001-09-14	0.39 (16.23/42)	$2.09^{+0.24}_{-0.71}$	$(1.06^{+0.12}_{-0.36})E44$	$0.00^{+0.00}_{-1.30}$	$1.88^{+0.09}_{-0.16}$	$0.25^{+0.25}_{-0.55}$	$0.66^{+0.08}_{-0.23}$	$6.04^{+0.23}_{-0.24}$	$3.99^{+1.71}_{-3.46}$	$173.00^{+75.38}_{-149.00}$
2001-09-23	0.66 (27.77/42)	$2.53^{+0.53}_{-1.20}$	$(1.28^{+0.27}_{-0.60})E44$	$0.62^{+0.62}_{-1.74}$	$2.00^{+0.14}_{-0.22}$	$0.36^{+0.36}_{-0.82}$	$1.01^{+0.21}_{-0.48}$	$6.30^{+0.26}_{-0.39}$	$4.20^{+2.20}_{-3.38}$	$157.00^{+82.05}_{-131.00}$
2002-03-03	0.48 (20.36/42)	$2.18^{+0.20}_{-0.64}$	$(1.10^{+0.10}_{-0.32})E44$	$0.00^{+0.00}_{-1.21}$	$1.84^{+0.06}_{-0.14}$	$0.08^{+0.08}_{-0.42}$	$0.66^{+0.06}_{-0.20}$	$6.12^{+0.20}_{-0.19}$	$4.78^{+1.67}_{-2.79}$	$204.00^{+72.00}_{-117.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		IC 4329A					$\mathrm{Fe}_K\alpha\sigma = 0.23$			
1996-08-03a	4.36 (204.88/47)	$14.71^{+1.77}_{-2.21}$	$(8.41^{+1.01}_{-1.26})E43$	$0.86^{+0.58}_{-0.59}$	$1.81^{+0.06}_{-0.07}$	$0.08^{+0.08}_{-0.19}$	$4.55^{+0.55}_{-0.69}$	$6.39^{+0.19}_{-0.21}$	$18.55^{+6.04}_{-5.94}$	$116.00^{+37.49}_{-39.00}$
1996-08-03b	0.77 (36.42/47)	$14.34^{+1.80}_{-2.12}$	$(8.20^{+1.03}_{-1.21})E43$	$0.95^{+0.57}_{-0.58}$	$1.82^{+0.07}_{-0.07}$	$0.17^{+0.16}_{-0.20}$	$4.52^{+0.58}_{-0.68}$	$6.34^{+0.16}_{-0.17}$	$20.94^{+6.69}_{-5.62}$	$133.00^{+44.08}_{-35.00}$
1996-08-05	0.64 (30.12/47)	$13.03^{+1.68}_{-2.12}$	$(7.45^{+0.96}_{-1.21})E43$	$0.67^{+0.63}_{-0.64}$	$1.73^{+0.07}_{-0.08}$	$0.09^{+0.09}_{-0.20}$	$3.49^{+0.46}_{-0.58}$	$6.40^{+0.17}_{-0.19}$	$19.00^{+5.76}_{-5.51}$	$133.00^{+39.90}_{-42.00}$
1996-08-11	0.76 (35.68/47)	$11.35^{+1.56}_{-1.84}$	$(6.48^{+0.89}_{-1.05})E43$	$0.94^{+0.62}_{-0.63}$	$1.75^{+0.08}_{-0.08}$	$0.29^{+0.19}_{-0.23}$	$3.15^{+0.44}_{-0.52}$	$6.36^{+0.14}_{-0.15}$	$18.43^{+5.12}_{-4.70}$	$144.00^{+42.00}_{-40.00}$
1997-08-05	0.74 (34.02/46)	$12.56^{+1.82}_{-2.58}$	$(7.19^{+1.04}_{-1.48})E43$	$0.58^{+0.58}_{-0.90}$	$1.81^{+0.09}_{-0.10}$	$0.21^{+0.21}_{-0.26}$	$3.77^{+0.56}_{-0.79}$	$6.41^{+0.14}_{-0.16}$	$23.02^{+5.99}_{-5.19}$	$176.00^{+49.00}_{-40.00}$
1997-08-08	0.58 (26.61/46)	$11.36^{+0.59}_{-2.17}$	$(6.51^{+0.34}_{-1.24})E43$	$0.00^{+0.00}_{-0.82}$	$1.74^{+0.04}_{-0.09}$	$0.11^{+0.11}_{-0.23}$	$2.91^{+0.15}_{-0.56}$	$6.36^{+0.13}_{-0.15}$	$20.31^{+5.18}_{-4.68}$	$174.00^{+47.00}_{-41.00}$
1997-08-11	0.58 (26.78/46)	$9.66^{+1.70}_{-2.06}$	$(5.51^{+0.97}_{-1.18})E43$	$1.70^{+0.91}_{-0.89}$	$1.91^{+0.10}_{-0.11}$	$0.68^{+0.30}_{-0.39}$	$3.60^{+0.64}_{-0.78}$	$6.47^{+0.20}_{-0.23}$	$11.88^{+5.00}_{-4.61}$	$107.00^{+45.01}_{-46.00}$
1997-08-13	0.70 (32.05/46)	$11.40^{+0.82}_{-2.35}$	$(6.53^{+0.47}_{-1.35})E43$	$0.12^{+0.12}_{-0.91}$	$1.75^{+0.04}_{-0.10}$	$0.08^{+0.08}_{-0.23}$	$2.99^{+0.22}_{-0.63}$	$6.34^{+0.15}_{-0.16}$	$19.55^{+5.58}_{-4.73}$	$165.00^{+50.00}_{-42.00}$
1997-08-17	0.54 (25.05/46)	$12.01^{+1.92}_{-2.48}$	$(6.87^{+1.10}_{-1.42})E43$	$0.71^{+0.71}_{-0.89}$	$1.83^{+0.09}_{-0.10}$	$0.30^{+0.22}_{-0.28}$	$3.72^{+0.60}_{-0.78}$	$6.39^{+0.15}_{-0.17}$	$19.12^{+6.28}_{-4.96}$	$147.00^{+48.22}_{-43.00}$
1997-08-18	0.49 (22.62/46)	$14.34^{+2.27}_{-2.70}$	$(8.20^{+1.30}_{-1.55})E43$	$0.88^{+0.83}_{-0.82}$	$1.86^{+0.09}_{-0.09}$	$0.28^{+0.20}_{-0.24}$	$4.78^{+0.77}_{-0.91}$	$6.29^{+0.24}_{-0.30}$	$14.27^{+7.00}_{-5.82}$	$89.07^{+43.79}_{-35.93}$
1997-08-21	0.72 (33.15/46)	$13.99^{+2.12}_{-2.55}$	$(8.00^{+1.21}_{-1.46})E43$	$0.98^{+0.80}_{-0.80}$	$1.89^{+0.09}_{-0.09}$	$0.33^{+0.20}_{-0.25}$	$4.92^{+0.76}_{-0.91}$	$6.40^{+0.21}_{-0.24}$	$14.52^{+6.03}_{-5.65}$	$94.96^{+39.43}_{-40.04}$
1997-08-23	0.63 (28.90/46)	$14.80^{+1.04}_{-2.73}$	$(8.48^{+0.59}_{-1.56})E43$	$0.10^{+0.10}_{-0.81}$	$1.80^{+0.04}_{-0.09}$	$0.18^{+0.15}_{-0.22}$	$4.18^{+0.30}_{-0.78}$	$6.31^{+0.16}_{-0.18}$	$21.05^{+6.52}_{-5.43}$	$135.00^{+41.74}_{-37.00}$
1997-08-25	0.67 (30.99/46)	$13.77^{+2.38}_{-2.91}$	$(7.87^{+1.36}_{-1.66})E43$	$1.26^{+0.90}_{-0.89}$	$1.91^{+0.10}_{-0.10}$	$0.42^{+0.24}_{-0.31}$	$5.04^{+0.88}_{-1.08}$	$6.33^{+0.24}_{-0.29}$	$15.10^{+6.93}_{-6.30}$	$98.07^{+45.27}_{-40.93}$
1997-08-28	0.47 (21.78/46)	$11.41^{+1.85}_{-2.23}$	$(6.52^{+1.06}_{-1.27})E43$	$0.98^{+0.86}_{-0.86}$	$1.82^{+0.09}_{-0.09}$	$0.28^{+0.20}_{-0.25}$	$3.59^{+0.59}_{-0.71}$	$6.40^{+0.17}_{-0.19}$	$17.73^{+5.41}_{-4.77}$	$141.00^{+43.46}_{-42.00}$
1997-09-03	0.38 (17.69/46)	$14.61^{+2.05}_{-2.76}$	$(8.36^{+1.17}_{-1.58})E43$	$0.57^{+0.57}_{-0.83}$	$1.86^{+0.08}_{-0.09}$	$0.26^{+0.20}_{-0.25}$	$4.70^{+0.67}_{-0.90}$	$6.43^{+0.19}_{-0.21}$	$18.03^{+6.29}_{-5.84}$	$119.00^{+41.28}_{-38.00}$
1997-09-07	0.51 (23.42/46)	$14.21^{+1.53}_{-2.97}$	$(8.14^{+0.88}_{-1.70})E43$	$0.31^{+0.31}_{-0.92}$	$1.80^{+0.07}_{-0.10}$	$0.14^{+0.14}_{-0.24}$	$4.09^{+0.45}_{-0.86}$	$6.24^{+0.16}_{-0.18}$	$20.96^{+6.61}_{-6.02}$	$138.00^{+46.31}_{-38.00}$
1997-09-11	0.74 (33.86/46)	$14.53^{+2.23}_{-2.85}$	$(8.31^{+1.28}_{-1.63})E43$	$0.70^{+0.70}_{-0.86}$	$1.83^{+0.09}_{-0.09}$	$0.18^{+0.18}_{-0.24}$	$4.53^{+0.71}_{-0.90}$	$6.43^{+0.16}_{-0.18}$	$21.58^{+6.69}_{-5.91}$	$142.00^{+46.55}_{-38.00}$
1997-09-14	0.60 (27.79/46)	$12.05^{+0.99}_{-2.44}$	$(6.90^{+0.57}_{-1.40})E43$	$0.16^{+0.16}_{-0.90}$	$1.75^{+0.05}_{-0.10}$	$0.11^{+0.11}_{-0.23}$	$3.18^{+0.27}_{-0.66}$	$6.37^{+0.16}_{-0.18}$	$17.54^{+5.78}_{-5.04}$	$139.00^{+45.84}_{-42.00}$
1997-09-24	0.67 (30.64/46)	$10.96^{+1.88}_{-2.30}$	$(6.26^{+1.07}_{-1.31})E43$	$1.20^{+0.92}_{-0.92}$	$1.81^{+0.10}_{-0.10}$	$0.26^{+0.22}_{-0.28}$	$3.44^{+0.60}_{-0.73}$	$6.42^{+0.18}_{-0.20}$	$15.63^{+5.58}_{-5.10}$	$129.00^{+48.08}_{-43.00}$
2001-01-31	0.61 (25.60/42)	$18.88^{+3.38}_{-4.17}$	$(1.07^{+0.19}_{-0.24})E44$	$1.36^{+0.98}_{-0.98}$	$1.95^{+0.10}_{-0.11}$	$0.36^{+0.23}_{-0.29}$	$7.51^{+1.36}_{-1.68}$	$6.23^{+0.24}_{-0.28}$	$19.74^{+9.69}_{-8.83}$	$89.15^{+42.90}_{-42.85}$
2001-08-21	0.52 (21.72/42)	$17.41^{+3.06}_{-3.93}$	$(9.90^{+1.74}_{-2.23})E43$	$0.97^{+0.95}_{-0.98}$	$1.94^{+0.10}_{-0.11}$	$0.38^{+0.24}_{-0.31}$	$6.55^{+1.17}_{-1.50}$	$6.30^{+0.16}_{-0.18}$	$26.80^{+8.95}_{-7.51}$	$139.00^{+46.87}_{-44.00}$
2001-08-22	0.61 (25.75/42)	$17.69^{+2.88}_{-3.83}$	$(1.01^{+0.16}_{-0.22})E44$	$0.74^{+0.74}_{-0.97}$	$1.89^{+0.09}_{-0.10}$	$0.25^{+0.21}_{-0.27}$	$6.07^{+1.00}_{-1.34}$	$6.34^{+0.17}_{-0.19}$	$27.31^{+8.44}_{-7.69}$	$145.00^{+45.28}_{-41.00}$
2001-08-25	0.72 (30.21/42)	$16.28^{+2.18}_{-3.50}$	$(9.25^{+1.24}_{-1.99})E43$	$0.50^{+0.50}_{-0.97}$	$1.83^{+0.08}_{-0.10}$	$0.22^{+0.19}_{-0.24}$	$4.98^{+0.68}_{-1.08}$	$6.26^{+0.18}_{-0.21}$	$22.24^{+7.68}_{-6.94}$	$125.00^{+43.32}_{-40.00}$
2001-08-26a	0.67 (28.32/42)	$16.70^{+2.99}_{-3.70}$	$(9.49^{+1.70}_{-2.10})E43$	$1.26^{+0.97}_{-0.97}$	$1.91^{+0.10}_{-0.10}$	$0.41^{+0.23}_{-0.30}$	$6.12^{+1.11}_{-1.37}$	$6.24^{+0.19}_{-0.22}$	$21.93^{+8.83}_{-7.63}$	$115.00^{+48.79}_{-39.00}$
2001-08-26b	0.49 (20.77/42)	$17.45^{+2.15}_{-3.82}$	$(9.92^{+1.22}_{-2.17})E43$	$0.41^{+0.41}_{-0.98}$	$1.84^{+0.07}_{-0.10}$	$0.22^{+0.19}_{-0.26}$	$5.44^{+0.68}_{-1.21}$	$6.30^{+0.18}_{-0.21}$	$23.81^{+8.14}_{-7.34}$	$127.00^{+43.94}_{-42.00}$
2003-04-08	0.54 (22.73/42)	$12.43^{+0.70}_{-2.51}$	$(7.06^{+0.40}_{-1.43})E43$	$0.00^{+0.00}_{-0.91}$	$1.73^{+0.04}_{-0.10}$	$0.08^{+0.08}_{-0.21}$	$3.17^{+0.18}_{-0.65}$	$6.17^{+0.15}_{-0.16}$	$22.63^{+6.37}_{-5.64}$	$168.00^{+50.00}_{-39.00}$
2003-06-15	0.62 (26.21/42)	$13.82^{+0.63}_{-3.07}$	$(7.91^{+0.41}_{-1.69})E43$	$0.00^{+0.00}_{-0.93}$	$1.76^{+0.04}_{-0.10}$	$0.19^{+0.14}_{-0.24}$	$3.65^{+0.19}_{-0.80}$	$6.20^{+0.13}_{-0.14}$	$27.28^{+7.48}_{-5.96}$	$183.00^{+51.00}_{-41.00}$
2003-07-12	0.58 (24.22/42)	$12.41^{+0.75}_{-2.81}$	$(7.05^{+0.42}_{-1.60})E43$	$0.00^{+0.00}_{-1.00}$	$1.75^{+0.04}_{-0.11}$	$0.26^{+0.16}_{-0.27}$	$3.18^{+0.19}_{-0.73}$	$6.29^{+0.15}_{-0.16}$	$23.84^{+6.56}_{-5.45}$	$182.00^{+51.00}_{-43.00}$
2003-07-16	0.55 (22.91/42)	$12.13^{+1.28}_{-2.89}$	$(6.89^{+0.73}_{-1.64})E43$	$0.25^{+0.25}_{-1.04}$	$1.78^{+0.07}_{-0.11}$	$0.41^{+0.22}_{-0.32}$	$3.29^{+0.36}_{-0.80}$	$6.27^{+0.14}_{-0.15}$	$23.94^{+7.22}_{-5.51}$	$183.00^{+59.00}_{-46.00}$
2003-07-19	0.71 (29.65/42)	$10.73^{+1.14}_{-2.57}$	$(6.10^{+0.65}_{-1.46})E43$	$0.25^{+0.25}_{-1.04}$	$1.76^{+0.07}_{-0.12}$	$0.40^{+0.22}_{-0.32}$	$2.85^{+0.31}_{-0.70}$	$6.29^{+0.14}_{-0.15}$	$19.59^{+5.65}_{-4.97}$	$169.00^{+50.00}_{-45.00}$
2003-07-24	0.50 (21.11/42)	$11.98^{+0.68}_{-2.50}$	$(6.81^{+0.39}_{-1.42})E43$	$0.00^{+0.00}_{-0.88}$	$1.76^{+0.04}_{-0.10}$	$0.31^{+0.16}_{-0.28}$	$3.14^{+0.18}_{-0.67}$	$6.27^{+0.16}_{-0.17}$	$19.85^{+5.93}_{-5.39}$	$157.00^{+47.00}_{-44.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2003-07-28	0.98 (41.19/42)	$12.81^{+0.76}_{-2.40}$	$(7.28^{+0.43}_{-1.37})E43$	$0.00^{+0.00}_{-0.84}$	$1.78^{+0.04}_{-0.09}$	$0.16^{+0.15}_{-0.22}$	$3.46^{+0.21}_{-0.66}$	$6.12^{+0.14}_{-0.14}$	$25.97^{+6.34}_{-5.82}$	$186.00^{+46.00}_{-43.00}$
2003-08-01	0.66 (27.75/42)	$12.07^{+2.07}_{-2.86}$	$(6.86^{+1.18}_{-1.62})E43$	$0.76^{+0.76}_{-1.02}$	$1.86^{+0.10}_{-0.12}$	$0.48^{+0.26}_{-0.34}$	$3.87^{+0.68}_{-0.93}$	$6.24^{+0.15}_{-0.17}$	$21.97^{+6.19}_{-5.70}$	$165.00^{+51.00}_{-42.00}$
2003-08-05	0.67 (28.28/42)	$12.16^{+1.17}_{-2.88}$	$(6.92^{+0.67}_{-1.64})E43$	$0.20^{+0.20}_{-1.02}$	$1.83^{+0.06}_{-0.11}$	$0.35^{+0.21}_{-0.31}$	$3.61^{+0.35}_{-0.87}$	$6.23^{+0.15}_{-0.16}$	$20.67^{+6.71}_{-5.45}$	$157.00^{+52.00}_{-44.00}$
2003-08-09	0.39 (16.23/42)	$12.37^{+1.47}_{-2.75}$	$(7.04^{+0.83}_{-1.56})E43$	$0.36^{+0.36}_{-0.98}$	$1.84^{+0.07}_{-0.11}$	$0.25^{+0.20}_{-0.27}$	$3.80^{+0.46}_{-0.86}$	$6.21^{+0.17}_{-0.19}$	$19.48^{+6.73}_{-5.67}$	$145.00^{+51.04}_{-45.00}$
2003-08-18	0.60 (25.18/42)	$12.02^{+1.94}_{-2.89}$	$(6.83^{+1.10}_{-1.64})E43$	$0.66^{+0.66}_{-1.05}$	$1.81^{+0.10}_{-0.11}$	$0.27^{+0.23}_{-0.29}$	$3.62^{+0.59}_{-0.88}$	$6.22^{+0.17}_{-0.18}$	$19.38^{+6.94}_{-5.81}$	$143.00^{+52.17}_{-48.00}$
2004-03-01	0.58 (24.51/42)	$11.56^{+2.23}_{-2.83}$	$(6.57^{+1.26}_{-1.61})E43$	$1.10^{+1.04}_{-1.04}$	$1.89^{+0.11}_{-0.12}$	$0.46^{+0.27}_{-0.35}$	$4.00^{+0.78}_{-0.99}$	$6.23^{+0.25}_{-0.31}$	$15.96^{+7.08}_{-5.96}$	$119.00^{+51.99}_{-49.00}$
2004-04-30	0.53 (22.28/42)	$14.10^{+1.43}_{-2.92}$	$(8.02^{+0.81}_{-1.66})E43$	$0.26^{+0.26}_{-0.92}$	$1.83^{+0.06}_{-0.10}$	$0.24^{+0.19}_{-0.25}$	$4.23^{+0.43}_{-0.89}$	$6.31^{+0.19}_{-0.22}$	$18.56^{+6.61}_{-6.08}$	$124.00^{+44.34}_{-43.00}$
2004-06-20	0.57 (23.91/42)	$15.52^{+0.85}_{-2.97}$	$(8.82^{+0.48}_{-1.69})E43$	$0.00^{+0.00}_{-0.81}$	$1.80^{+0.04}_{-0.09}$	$0.23^{+0.15}_{-0.25}$	$4.32^{+0.24}_{-0.84}$	$6.20^{+0.14}_{-0.15}$	$28.80^{+7.46}_{-6.68}$	$175.00^{+46.00}_{-41.00}$
2004-08-10	0.53 (22.15/42)	$12.77^{+0.77}_{-2.34}$	$(7.26^{+0.44}_{-1.33})E43$	$0.00^{+0.00}_{-0.81}$	$1.80^{+0.04}_{-0.09}$	$0.31^{+0.17}_{-0.25}$	$3.53^{+0.22}_{-0.66}$	$6.27^{+0.14}_{-0.15}$	$22.95^{+5.96}_{-5.48}$	$172.00^{+44.00}_{-43.00}$
2004-12-20	0.61 (25.70/42)	$16.79^{+1.47}_{-3.76}$	$(9.55^{+0.84}_{-2.14})E43$	$0.17^{+0.17}_{-0.97}$	$1.86^{+0.06}_{-0.11}$	$0.26^{+0.18}_{-0.27}$	$5.19^{+0.46}_{-1.18}$	$6.10^{+0.19}_{-0.21}$	$24.16^{+9.50}_{-7.33}$	$131.00^{+52.01}_{-38.00}$
2005-03-07	0.47 (19.93/42)	$15.19^{+1.17}_{-3.10}$	$(8.64^{+0.67}_{-1.76})E43$	$0.11^{+0.11}_{-0.89}$	$1.83^{+0.05}_{-0.10}$	$0.30^{+0.18}_{-0.26}$	$4.48^{+0.35}_{-0.93}$	$6.28^{+0.14}_{-0.15}$	$25.58^{+7.80}_{-6.10}$	$161.00^{+49.00}_{-41.00}$
2005-05-02	0.81 (34.78/43)	$17.71^{+1.76}_{-3.77}$	$(1.01^{+0.10}_{-0.21})E44$	$0.24^{+0.24}_{-0.91}$	$1.87^{+0.06}_{-0.10}$	$0.34^{+0.20}_{-0.28}$	$5.54^{+0.56}_{-1.20}$	$6.29^{+0.17}_{-0.20}$	$26.91^{+8.70}_{-7.18}$	$145.00^{+47.52}_{-41.00}$
2005-06-13	0.66 (28.27/43)	$17.24^{+1.06}_{-2.68}$	$(9.81^{+0.60}_{-1.52})E43$	$0.00^{+0.00}_{-0.64}$	$1.93^{+0.05}_{-0.08}$	$0.65^{+0.21}_{-0.29}$	$5.67^{+0.36}_{-0.90}$	$6.20^{+0.14}_{-0.14}$	$30.59^{+7.24}_{-6.98}$	$170.00^{+40.00}_{-39.00}$
2005-07-30	0.60 (25.91/43)	$14.88^{+0.84}_{-2.31}$	$(8.46^{+0.48}_{-1.31})E43$	$0.00^{+0.00}_{-0.69}$	$1.80^{+0.04}_{-0.08}$	$0.20^{+0.15}_{-0.20}$	$4.14^{+0.24}_{-0.65}$	$6.27^{+0.16}_{-0.16}$	$23.13^{+6.27}_{-6.17}$	$149.00^{+42.00}_{-41.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		IRAS 04575-7537					Fe$_K\alpha\sigma = 0.18$			
1996-12-10	0.43 (19.97/46)	$2.19^{+0.72}_{-1.09}$	$(1.59^{+0.52}_{-0.79})E43$	$3.01^{+1.72}_{-1.63}$	$2.42^{+0.23}_{-0.26}$	$0.68^{+0.68}_{-1.49}$	$1.99^{+0.67}_{-1.01}$	$6.32^{+0.20}_{-0.23}$	$5.15^{+2.05}_{-3.28}$	$210.00^{+86.00}_{-152.00}$
1997-05-30	0.38 (17.47/46)	$1.87^{+0.68}_{-0.88}$	$(1.35^{+0.49}_{-0.64})E43$	$4.57^{+1.60}_{-1.37}$	$2.65^{+0.30}_{-0.30}$	$2.41^{+1.76}_{-2.59}$	$2.48^{+0.91}_{-1.18}$	$6.85^{+0.57}_{-0.65}$	$2.33^{+1.67}_{-2.84}$	$120.00^{+85.29}_{-121.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		IRAS 18325-5926					$\mathrm{Fe}_K\alpha\sigma = 0.88$			
1996-12-26	0.65 (30.07/46)	$2.23^{+0.83}_{-2.11}$	$(2.01^{+0.75}_{-1.90})E43$	$2.45^{+2.39}_{-2.26}$	$2.32^{+0.23}_{-0.44}$	$0.23^{+0.23}_{-2.02}$	$1.68^{+0.65}_{-1.65}$	$6.39^{+0.41}_{-0.77}$	$9.35^{+3.80}_{-4.82}$	$398.00^{+148.00}_{-209.00}$
1997-12-25a	0.47 (21.69/46)	$1.77^{+0.37}_{-1.73}$	$(1.60^{+0.33}_{-1.56})E43$	$0.51^{+0.51}_{-2.63}$	$2.08^{+0.14}_{-0.42}$	$0.22^{+0.22}_{-1.78}$	$0.77^{+0.17}_{-0.79}$	$6.26^{+0.37}_{-0.63}$	$8.15^{+3.55}_{-3.01}$	$473.00^{+209.00}_{-167.00}$
1997-12-25b	0.40 (18.50/46)	$2.12^{+1.31}_{-0.55}$	$(1.91^{+1.18}_{-0.50})E43$	$2.98^{+1.45}_{-1.16}$	$2.90^{+0.81}_{-0.10}$	$5.00^{+4.78}_{-0.00}$	$3.03^{+0.09}_{-0.73}$	$7.32^{+0.97}_{-0.18}$	$10.10^{+2.15}_{-2.33}$	$705.00^{+141.00}_{-116.00}$
1997-12-26a	0.35 (16.30/46)	$2.45^{+0.18}_{-1.65}$	$(2.22^{+0.16}_{-1.50})E43$	$0.00^{+0.00}_{-2.15}$	$2.07^{+0.05}_{-0.30}$	$0.00^{+0.00}_{-0.93}$	$1.00^{+0.08}_{-0.71}$	$6.28^{+0.22}_{-0.35}$	$13.87^{+3.87}_{-2.61}$	$626.00^{+186.00}_{-108.00}$
1997-12-26b	0.44 (20.39/46)	$2.66^{+0.80}_{-2.78}$	$(2.41^{+0.72}_{-2.51})E43$	$1.15^{+1.15}_{-2.10}$	$2.28^{+0.21}_{-0.61}$	$0.49^{+0.49}_{-3.98}$	$1.63^{+0.51}_{-1.79}$	$6.54^{+0.33}_{-0.64}$	$13.21^{+3.50}_{-3.89}$	$552.00^{+145.00}_{-167.00}$
1998-02-21	0.46 (21.23/46)	$2.04^{+0.42}_{-1.47}$	$(1.84^{+0.38}_{-1.33})E43$	$0.88^{+0.88}_{-2.16}$	$2.15^{+0.11}_{-0.33}$	$0.00^{+0.00}_{-1.24}$	$1.03^{+0.22}_{-0.79}$	$6.38^{+0.28}_{-0.40}$	$10.52^{+3.17}_{-3.58}$	$551.00^{+169.00}_{-210.00}$
1998-02-22a	0.56 (25.92/46)	$1.70^{+0.39}_{-1.97}$	$(1.54^{+0.35}_{-1.78})E43$	$0.70^{+0.70}_{-2.81}$	$2.17^{+0.15}_{-0.72}$	$0.20^{+0.20}_{-4.80}$	$0.86^{+0.21}_{-1.05}$	$6.31^{+0.35}_{-0.96}$	$8.48^{+3.25}_{-3.08}$	$521.00^{+193.00}_{-205.00}$
1998-02-22b	0.54 (24.65/46)	$1.60^{+0.24}_{-1.71}$	$(1.45^{+0.22}_{-1.55})E43$	$0.00^{+0.00}_{-2.52}$	$2.14^{+0.12}_{-0.64}$	$0.31^{+0.31}_{-3.25}$	$0.71^{+0.11}_{-0.80}$	$6.33^{+0.29}_{-0.73}$	$9.19^{+2.72}_{-2.25}$	$660.00^{+209.00}_{-156.00}$
1998-02-23	0.33 (15.17/46)	$1.50^{+0.30}_{-1.57}$	$(1.36^{+0.27}_{-1.42})E43$	$0.72^{+0.72}_{-2.66}$	$2.10^{+0.11}_{-0.46}$	$0.00^{+0.00}_{-1.89}$	$0.69^{+0.15}_{-0.76}$	$6.38^{+0.35}_{-0.58}$	$7.41^{+2.85}_{-2.88}$	$523.00^{+200.00}_{-222.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		MCG −2-58-22						$Fe_K\alpha\sigma = 0.16$		
1997-12-15	0.56 (25.75/46)	$3.50^{+0.40}_{-0.88}$	$(1.78^{+0.22}_{-0.42})E44$	$0.74^{+0.74}_{-1.13}$	$1.73^{+0.07}_{-0.10}$	$0.00^{+0.00}_{-0.20}$	$0.96^{+0.12}_{-0.23}$	$6.12^{+0.45}_{-0.51}$	$3.23^{+2.53}_{-2.97}$	$78.20^{+61.44}_{-73.80}$
1997-12-16	0.23 (10.78/46)	$3.35^{+0.54}_{-1.03}$	$(1.68^{+0.27}_{-0.52})E44$	$1.29^{+1.09}_{-1.33}$	$1.73^{+0.08}_{-0.14}$	$0.00^{+0.00}_{-0.31}$	$0.95^{+0.16}_{-0.29}$	$6.20^{+0.27}_{-0.30}$	$4.39^{+2.54}_{-3.10}$	$110.00^{+64.16}_{-82.00}$
1999-05-28	0.35 (14.57/42)	$1.47^{+0.33}_{-1.08}$	$(7.35^{+1.65}_{-5.38})E43$	$1.54^{+1.54}_{-2.89}$	$1.58^{+0.12}_{-0.28}$	$0.00^{+0.00}_{-0.60}$	$0.33^{+0.08}_{-0.25}$	$6.08^{+0.19}_{-0.22}$	$5.20^{+2.19}_{-4.77}$	$279.00^{+132.00}_{-288.00}$
1999-06-07	0.42 (17.47/42)	$1.77^{+0.58}_{-1.08}$	$(8.83^{+2.88}_{-5.39})E43$	$3.40^{+2.04}_{-2.37}$	$1.91^{+0.21}_{-0.27}$	$0.65^{+0.52}_{-1.08}$	$0.74^{+0.24}_{-0.46}$	$6.34^{+0.46}_{-0.75}$	$2.50^{+2.35}_{-4.16}$	$107.00^{+101.03}_{-194.00}$
1999-08-01	0.76 (31.86/42)	$2.46^{+0.25}_{-0.43}$	$(1.23^{+0.12}_{-0.22})E44$	$0.39^{+0.39}_{-0.98}$	$1.63^{+0.05}_{-0.08}$	$0.00^{+0.00}_{-0.13}$	$0.55^{+0.06}_{-0.10}$	$6.07^{+0.15}_{-0.16}$	$4.70^{+1.44}_{-2.27}$	$164.00^{+54.00}_{-80.00}$
1999-11-03	0.44 (18.36/42)	$2.79^{+0.53}_{-0.70}$	$(1.39^{+0.26}_{-0.35})E44$	$1.58^{+1.37}_{-1.40}$	$1.69^{+0.09}_{-0.10}$	$0.00^{+0.00}_{-0.16}$	$0.76^{+0.14}_{-0.19}$	$6.06^{+0.31}_{-0.35}$	$3.67^{+2.50}_{-3.49}$	$101.00^{+69.26}_{-108.00}$
1999-11-04	0.51 (21.37/42)	$2.86^{+0.51}_{-0.98}$	$(1.43^{+0.26}_{-0.49})E44$	$1.22^{+1.22}_{-1.59}$	$1.70^{+0.09}_{-0.15}$	$0.00^{+0.00}_{-0.30}$	$0.76^{+0.14}_{-0.27}$	$6.26^{+0.22}_{-0.24}$	$5.70^{+2.38}_{-3.48}$	$170.00^{+72.94}_{-113.00}$

Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	`wabs` N_H [e]	`pexrav` Γ [f]	R [g]	**Norm.**[h]	`gaussian` **Energy**[i]	**Norm.**[j]	**EW**[k]
		MCG −5-23-16					$\mathrm{Fe}_K\alpha\sigma = 0.13$			
1996-04-24a	0.63 (29.84/47)	$9.57^{+0.97}_{-1.53}$	$(1.35^{+0.14}_{-0.22})E43$	$2.41^{+0.56}_{-0.65}$	$1.79^{+0.05}_{-0.08}$	$0.03^{+0.03}_{-0.19}$	$3.23^{+0.34}_{-0.53}$	$6.31^{+0.12}_{-0.13}$	$20.00^{+4.85}_{-4.15}$	$167.00^{+40.00}_{-38.00}$
1996-04-24b	0.57 (26.70/47)	$9.16^{+1.19}_{-1.54}$	$(1.29^{+0.17}_{-0.22})E43$	$2.54^{+0.67}_{-0.69}$	$1.77^{+0.07}_{-0.08}$	$0.08^{+0.08}_{-0.20}$	$3.00^{+0.40}_{-0.51}$	$6.27^{+0.14}_{-0.14}$	$17.79^{+4.69}_{-4.36}$	$153.00^{+43.00}_{-41.00}$
1996-04-24c	0.69 (32.55/47)	$8.83^{+0.83}_{-0.96}$	$(1.25^{+0.12}_{-0.14})E43$	$2.74^{+0.57}_{-0.58}$	$1.73^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.08}$	$2.76^{+0.27}_{-0.30}$	$6.31^{+0.11}_{-0.12}$	$21.37^{+4.49}_{-4.24}$	$188.00^{+38.00}_{-41.00}$
1996-07-28a	0.74 (34.63/47)	$8.40^{+0.74}_{-1.23}$	$(1.19^{+0.10}_{-0.17})E43$	$2.30^{+0.53}_{-0.63}$	$1.71^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.16}$	$2.48^{+0.22}_{-0.37}$	$6.38^{+0.11}_{-0.11}$	$19.06^{+3.93}_{-3.76}$	$185.00^{+37.00}_{-40.00}$
1996-07-28b	0.97 (45.58/47)	$8.57^{+0.74}_{-1.38}$	$(1.21^{+0.10}_{-0.19})E43$	$2.63^{+0.52}_{-0.67}$	$1.74^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.18}$	$2.69^{+0.24}_{-0.44}$	$6.36^{+0.13}_{-0.13}$	$16.65^{+4.20}_{-3.97}$	$155.00^{+41.00}_{-40.00}$
1996-11-27	0.83 (39.00/47)	$9.85^{+0.98}_{-1.24}$	$(1.39^{+0.14}_{-0.18})E43$	$2.73^{+0.60}_{-0.55}$	$1.75^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.15}$	$3.18^{+0.32}_{-0.41}$	$6.32^{+0.13}_{-0.13}$	$19.41^{+4.55}_{-4.61}$	$157.00^{+39.00}_{-36.00}$
1996-11-28a	0.74 (34.73/47)	$10.23^{+1.42}_{-1.69}$	$(1.44^{+0.20}_{-0.24})E43$	$2.98^{+0.66}_{-0.67}$	$1.80^{+0.08}_{-0.08}$	$0.17^{+0.17}_{-0.22}$	$3.61^{+0.51}_{-0.61}$	$6.39^{+0.14}_{-0.14}$	$17.38^{+5.01}_{-4.71}$	$133.00^{+37.95}_{-39.00}$
1996-11-28b	0.65 (30.46/47)	$9.22^{+1.29}_{-1.57}$	$(1.30^{+0.18}_{-0.22})E43$	$2.42^{+0.69}_{-0.70}$	$1.71^{+0.08}_{-0.08}$	$0.13^{+0.13}_{-0.21}$	$2.72^{+0.39}_{-0.47}$	$6.34^{+0.12}_{-0.12}$	$21.05^{+4.74}_{-4.28}$	$184.00^{+45.00}_{-36.00}$
1996-11-29a	0.57 (26.71/47)	$8.45^{+0.72}_{-1.41}$	$(1.19^{+0.10}_{-0.20})E43$	$2.58^{+0.51}_{-0.70}$	$1.72^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.18}$	$2.55^{+0.22}_{-0.43}$	$6.36^{+0.12}_{-0.12}$	$18.59^{+4.29}_{-3.90}$	$176.00^{+43.00}_{-40.00}$
1996-11-29b	0.35 (16.55/47)	$6.90^{+1.12}_{-1.42}$	$(9.74^{+1.59}_{-2.00})E42$	$2.27^{+0.81}_{-0.83}$	$1.67^{+0.09}_{-0.10}$	$0.16^{+0.16}_{-0.27}$	$1.87^{+0.31}_{-0.39}$	$6.34^{+0.11}_{-0.11}$	$19.17^{+4.45}_{-3.64}$	$225.00^{+57.00}_{-43.00}$
1996-11-30a	0.54 (25.48/47)	$8.83^{+1.16}_{-1.42}$	$(1.25^{+0.16}_{-0.20})E43$	$2.97^{+0.65}_{-0.65}$	$1.84^{+0.07}_{-0.08}$	$0.11^{+0.11}_{-0.21}$	$3.33^{+0.45}_{-0.54}$	$6.43^{+0.16}_{-0.17}$	$15.05^{+4.19}_{-4.16}$	$138.00^{+40.04}_{-37.00}$
1996-11-30b	0.92 (43.39/47)	$9.18^{+1.06}_{-1.55}$	$(1.30^{+0.15}_{-0.22})E43$	$2.62^{+0.63}_{-0.69}$	$1.75^{+0.06}_{-0.08}$	$0.05^{+0.05}_{-0.21}$	$2.93^{+0.35}_{-0.50}$	$6.42^{+0.14}_{-0.14}$	$18.54^{+4.99}_{-4.27}$	$166.00^{+47.00}_{-37.00}$
1996-11-30c	0.72 (33.78/47)	$8.85^{+0.73}_{-1.20}$	$(1.25^{+0.10}_{-0.17})E43$	$2.15^{+0.50}_{-0.59}$	$1.70^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.14}$	$2.50^{+0.21}_{-0.35}$	$6.36^{+0.10}_{-0.10}$	$21.06^{+3.92}_{-3.69}$	$196.00^{+39.00}_{-37.00}$
1996-12-01	0.59 (27.79/47)	$8.79^{+1.40}_{-1.73}$	$(1.24^{+0.20}_{-0.24})E43$	$3.27^{+0.73}_{-0.74}$	$1.90^{+0.10}_{-0.10}$	$0.48^{+0.27}_{-0.36}$	$3.65^{+0.59}_{-0.73}$	$6.46^{+0.16}_{-0.18}$	$15.25^{+4.40}_{-4.60}$	$137.00^{+39.18}_{-45.00}$
1997-01-10a	0.82 (38.35/47)	$9.59^{+1.38}_{-1.66}$	$(1.35^{+0.19}_{-0.23})E43$	$2.92^{+0.67}_{-0.68}$	$1.86^{+0.08}_{-0.09}$	$0.33^{+0.22}_{-0.27}$	$3.66^{+0.54}_{-0.65}$	$6.42^{+0.13}_{-0.14}$	$20.28^{+4.81}_{-4.37}$	$172.00^{+43.00}_{-36.00}$
1997-01-10b	0.47 (22.29/47)	$12.46^{+1.42}_{-2.19}$	$(1.76^{+0.20}_{-0.31})E43$	$2.41^{+0.63}_{-0.70}$	$1.82^{+0.06}_{-0.09}$	$0.03^{+0.03}_{-0.23}$	$4.43^{+0.51}_{-0.79}$	$6.40^{+0.19}_{-0.21}$	$18.85^{+6.36}_{-6.15}$	$124.00^{+41.32}_{-43.00}$
2005-12-09	0.87 (37.48/43)	$11.25^{+2.07}_{-2.68}$	$(1.59^{+0.29}_{-0.38})E43$	$1.94^{+0.98}_{-1.01}$	$1.88^{+0.11}_{-0.11}$	$0.41^{+0.26}_{-0.34}$	$4.13^{+0.77}_{-1.00}$	$6.22^{+0.15}_{-0.15}$	$20.07^{+6.62}_{-5.90}$	$144.00^{+48.26}_{-47.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		MCG −6-30-15						Fe$_K\alpha\sigma=0.30$		
1996-08-25	0.53 (25.06/47)	$5.00^{+1.01}_{-1.58}$	$(7.08^{+1.43}_{-2.24})E42$	$2.46^{+0.81}_{-0.93}$	$2.26^{+0.14}_{-0.18}$	$1.35^{+0.63}_{-1.15}$	$3.26^{+0.67}_{-1.05}$	$6.24^{+0.28}_{-0.41}$	$7.37^{+4.25}_{-3.57}$	$123.00^{+70.28}_{-61.00}$
1996-09-15	0.48 (22.78/47)	$2.79^{+0.83}_{-0.96}$	$(3.94^{+1.17}_{-1.36})E42$	$3.93^{+1.27}_{-0.96}$	$2.25^{+0.22}_{-0.22}$	$2.10^{+1.14}_{-1.89}$	$1.88^{+0.57}_{-0.66}$	$6.17^{+0.18}_{-0.20}$	$7.04^{+2.93}_{-3.51}$	$181.00^{+78.00}_{-99.00}$
1996-09-18	0.64 (29.85/47)	$5.71^{+1.18}_{-1.57}$	$(8.09^{+1.66}_{-2.22})E42$	$1.42^{+0.87}_{-0.90}$	$2.04^{+0.13}_{-0.14}$	$0.54^{+0.41}_{-0.57}$	$2.55^{+0.53}_{-0.71}$	$6.08^{+0.21}_{-0.25}$	$10.89^{+4.52}_{-3.88}$	$162.00^{+68.34}_{-59.00}$
1996-09-23	0.51 (24.18/47)	$5.42^{+1.12}_{-1.32}$	$(7.67^{+1.59}_{-1.88})E42$	$2.14^{+0.83}_{-0.73}$	$2.25^{+0.14}_{-0.14}$	$1.35^{+0.63}_{-0.89}$	$3.38^{+0.71}_{-0.84}$	$6.26^{+0.20}_{-0.23}$	$8.86^{+3.48}_{-3.91}$	$140.00^{+55.44}_{-63.00}$
1996-11-24	0.42 (19.41/46)	$4.86^{+1.31}_{-1.54}$	$(6.87^{+1.85}_{-2.18})E42$	$2.17^{+1.34}_{-1.12}$	$2.21^{+0.18}_{-0.18}$	$1.42^{+0.73}_{-1.08}$	$2.84^{+0.78}_{-0.92}$	$6.27^{+0.26}_{-0.32}$	$6.63^{+3.75}_{-4.51}$	$115.00^{+66.04}_{-83.00}$
1997-05-10	0.47 (21.40/46)	$4.35^{+1.17}_{-1.73}$	$(6.15^{+1.66}_{-2.44})E42$	$1.33^{+1.33}_{-1.39}$	$2.08^{+0.18}_{-0.20}$	$1.10^{+0.63}_{-1.05}$	$1.95^{+0.54}_{-0.80}$	$6.04^{+0.15}_{-0.18}$	$11.68^{+4.28}_{-3.92}$	$223.00^{+86.00}_{-91.00}$
1997-08-04a	0.73 (33.66/46)	$4.96^{+0.87}_{-1.78}$	$(7.02^{+1.24}_{-2.52})E42$	$0.54^{+0.54}_{-1.34}$	$1.97^{+0.12}_{-0.17}$	$0.50^{+0.40}_{-0.63}$	$1.84^{+0.33}_{-0.67}$	$6.07^{+0.17}_{-0.20}$	$10.95^{+4.20}_{-3.53}$	$200.00^{+83.00}_{-66.00}$
1997-08-04b	0.47 (21.39/46)	$3.39^{+0.96}_{-1.38}$	$(4.79^{+1.36}_{-1.96})E42$	$2.31^{+1.47}_{-1.43}$	$2.07^{+0.19}_{-0.22}$	$1.33^{+0.71}_{-1.22}$	$1.60^{+0.47}_{-0.68}$	$6.17^{+0.15}_{-0.16}$	$10.62^{+3.59}_{-3.30}$	$251.00^{+94.00}_{-89.00}$
1997-08-04c	0.54 (24.79/46)	$4.69^{+1.08}_{-1.59}$	$(6.64^{+1.53}_{-2.26})E42$	$0.95^{+0.95}_{-1.27}$	$2.04^{+0.15}_{-0.17}$	$0.78^{+0.49}_{-0.73}$	$1.96^{+0.46}_{-0.68}$	$6.19^{+0.18}_{-0.21}$	$10.55^{+3.96}_{-3.46}$	$203.00^{+79.00}_{-72.00}$
1997-08-05a	0.47 (21.76/46)	$4.69^{+1.24}_{-1.57}$	$(6.64^{+1.75}_{-2.22})E42$	$1.28^{+1.28}_{-1.25}$	$2.01^{+0.17}_{-0.17}$	$0.66^{+0.48}_{-0.67}$	$1.96^{+0.53}_{-0.67}$	$6.17^{+0.23}_{-0.25}$	$8.04^{+3.77}_{-4.16}$	$149.00^{+71.69}_{-82.00}$
1997-08-05b	0.41 (19.09/46)	$3.91^{+1.04}_{-1.38}$	$(5.53^{+1.47}_{-1.96})E42$	$1.76^{+1.37}_{-1.27}$	$2.11^{+0.18}_{-0.19}$	$0.99^{+0.61}_{-0.94}$	$1.93^{+0.53}_{-0.70}$	$6.33^{+0.17}_{-0.20}$	$9.18^{+3.17}_{-3.31}$	$210.00^{+76.00}_{-82.00}$
1997-08-05c	0.55 (25.23/46)	$3.97^{+1.16}_{-1.41}$	$(5.62^{+1.64}_{-1.99})E42$	$1.76^{+1.47}_{-1.20}$	$2.17^{+0.20}_{-0.19}$	$1.27^{+0.75}_{-1.10}$	$2.11^{+0.63}_{-0.77}$	$6.16^{+0.18}_{-0.19}$	$8.52^{+3.40}_{-3.86}$	$183.00^{+79.00}_{-91.00}$
1997-08-06a	0.49 (22.43/46)	$3.82^{+1.10}_{-1.70}$	$(5.41^{+1.55}_{-2.40})E42$	$2.26^{+1.45}_{-1.47}$	$2.14^{+0.20}_{-0.23}$	$1.38^{+0.75}_{-1.39}$	$2.01^{+0.59}_{-0.92}$	$6.05^{+0.16}_{-0.20}$	$10.32^{+4.45}_{-3.73}$	$209.00^{+95.00}_{-91.00}$
1997-08-06b	0.49 (22.69/46)	$4.48^{+1.12}_{-1.50}$	$(6.34^{+1.58}_{-2.12})E42$	$1.89^{+1.27}_{-1.23}$	$2.12^{+0.16}_{-0.17}$	$0.92^{+0.53}_{-0.80}$	$2.27^{+0.58}_{-0.78}$	$6.17^{+0.16}_{-0.17}$	$11.05^{+3.76}_{-3.70}$	$208.00^{+77.00}_{-76.00}$
1997-08-06c	0.63 (29.01/46)	$4.68^{+1.16}_{-1.72}$	$(6.62^{+1.65}_{-2.43})E42$	$2.06^{+1.25}_{-1.33}$	$2.14^{+0.16}_{-0.19}$	$0.85^{+0.53}_{-0.85}$	$2.54^{+0.64}_{-0.95}$	$6.14^{+0.17}_{-0.22}$	$10.83^{+4.41}_{-3.72}$	$190.00^{+80.00}_{-76.00}$
1997-08-07a	0.63 (28.86/46)	$5.58^{+1.32}_{-1.93}$	$(7.91^{+1.88}_{-2.73})E42$	$1.26^{+1.18}_{-1.25}$	$2.12^{+0.15}_{-0.18}$	$0.96^{+0.51}_{-0.81}$	$2.69^{+0.65}_{-0.95}$	$6.08^{+0.16}_{-0.20}$	$12.56^{+4.83}_{-4.10}$	$195.00^{+81.00}_{-68.00}$
1997-08-07b	0.76 (34.87/46)	$4.75^{+0.93}_{-1.42}$	$(6.72^{+1.32}_{-2.00})E42$	$0.51^{+0.51}_{-1.28}$	$1.93^{+0.11}_{-0.16}$	$0.52^{+0.39}_{-0.58}$	$1.64^{+0.29}_{-0.57}$	$6.02^{+0.13}_{-0.14}$	$13.38^{+3.96}_{-3.59}$	$247.00^{+82.00}_{-75.00}$
1997-08-07c	0.24 (11.12/46)	$3.56^{+1.05}_{-1.33}$	$(5.03^{+1.48}_{-1.89})E42$	$2.74^{+1.54}_{-1.33}$	$2.10^{+0.20}_{-0.20}$	$1.32^{+0.74}_{-1.14}$	$1.84^{+0.55}_{-0.70}$	$6.25^{+0.25}_{-0.30}$	$6.35^{+3.48}_{-3.81}$	$141.00^{+79.08}_{-92.00}$
1997-08-08a	0.37 (17.02/46)	$3.87^{+1.02}_{-1.43}$	$(5.48^{+1.45}_{-2.03})E42$	$1.74^{+1.37}_{-1.34}$	$2.06^{+0.17}_{-0.19}$	$1.04^{+0.60}_{-0.95}$	$1.76^{+0.48}_{-0.67}$	$6.27^{+0.16}_{-0.18}$	$10.39^{+3.42}_{-3.27}$	$232.00^{+81.00}_{-80.00}$
1997-08-08b	0.39 (17.86/46)	$5.21^{+1.35}_{-1.91}$	$(7.37^{+1.91}_{-2.70})E42$	$2.45^{+1.22}_{-1.20}$	$2.29^{+0.18}_{-0.20}$	$1.61^{+0.78}_{-1.34}$	$3.49^{+0.92}_{-1.30}$	$6.04^{+0.21}_{-0.25}$	$9.76^{+5.19}_{-4.65}$	$145.00^{+79.00}_{-80.00}$
1997-08-09a	0.48 (22.29/46)	$4.72^{+0.94}_{-1.70}$	$(6.68^{+1.32}_{-2.41})E42$	$0.69^{+0.69}_{-1.31}$	$2.00^{+0.14}_{-0.18}$	$0.92^{+0.50}_{-0.82}$	$1.81^{+0.37}_{-0.67}$	$6.15^{+0.18}_{-0.22}$	$10.03^{+4.08}_{-3.36}$	$193.00^{+84.00}_{-67.00}$
1997-08-09b	0.45 (20.50/46)	$3.35^{+0.88}_{-1.25}$	$(4.73^{+1.25}_{-1.77})E42$	$2.11^{+1.39}_{-1.38}$	$2.03^{+0.17}_{-0.19}$	$1.11^{+0.59}_{-0.96}$	$1.48^{+0.40}_{-0.57}$	$6.26^{+0.16}_{-0.20}$	$8.78^{+3.18}_{-2.98}$	$217.00^{+83.00}_{-81.00}$
1997-08-09c	0.47 (21.40/46)	$3.90^{+1.11}_{-1.41}$	$(5.51^{+1.57}_{-1.99})E42$	$2.15^{+1.45}_{-1.26}$	$2.12^{+0.19}_{-0.19}$	$1.30^{+0.71}_{-1.08}$	$1.98^{+0.58}_{-0.73}$	$6.14^{+0.18}_{-0.21}$	$8.57^{+3.60}_{-3.84}$	$175.00^{+76.51}_{-92.00}$
1997-08-10a	0.53 (24.38/46)	$3.01^{+0.99}_{-1.52}$	$(4.25^{+1.39}_{-2.14})E42$	$2.84^{+1.71}_{-1.61}$	$2.08^{+0.23}_{-0.27}$	$1.66^{+0.93}_{-1.87}$	$1.47^{+0.50}_{-0.76}$	$6.11^{+0.16}_{-0.18}$	$9.56^{+4.11}_{-3.52}$	$237.00^{+109.00}_{-109.00}$
1997-08-10b	0.42 (19.50/46)	$3.52^{+0.99}_{-1.23}$	$(4.97^{+1.40}_{-1.74})E42$	$2.83^{+1.45}_{-1.24}$	$2.17^{+0.19}_{-0.19}$	$1.38^{+0.74}_{-1.10}$	$2.07^{+0.59}_{-0.73}$	$6.18^{+0.23}_{-0.26}$	$6.40^{+3.33}_{-3.66}$	$141.00^{+74.90}_{-88.00}$
1997-08-11a	0.46 (20.94/46)	$4.77^{+1.25}_{-1.60}$	$(6.76^{+1.77}_{-2.27})E42$	$1.62^{+1.33}_{-1.21}$	$2.14^{+0.17}_{-0.18}$	$1.09^{+0.61}_{-0.91}$	$2.45^{+0.65}_{-0.83}$	$6.20^{+0.24}_{-0.28}$	$7.42^{+3.91}_{-4.16}$	$133.00^{+71.38}_{-80.00}$
1997-08-11b	0.48 (22.28/46)	$5.00^{+1.24}_{-1.94}$	$(7.07^{+1.75}_{-2.74})E42$	$1.52^{+1.25}_{-1.41}$	$2.05^{+0.15}_{-0.19}$	$0.70^{+0.46}_{-0.74}$	$2.27^{+0.57}_{-0.90}$	$5.83^{+0.22}_{-0.22}$	$11.05^{+5.31}_{-4.14}$	$172.00^{+87.58}_{-70.00}$
1997-08-11c	0.63 (28.99/46)	$4.47^{+1.35}_{-1.44}$	$(6.33^{+1.92}_{-2.04})E42$	$2.03^{+1.50}_{-1.11}$	$2.17^{+0.21}_{-0.18}$	$1.43^{+0.82}_{-1.05}$	$2.46^{+0.76}_{-0.80}$	$6.14^{+0.24}_{-0.26}$	$6.52^{+3.65}_{-4.74}$	$117.00^{+66.39}_{-98.00}$
1998-08-04	0.59 (27.04/46)	$5.56^{+1.43}_{-2.15}$	$(7.87^{+2.02}_{-3.05})E42$	$2.38^{+1.23}_{-1.29}$	$2.27^{+0.17}_{-0.21}$	$1.51^{+0.75}_{-1.35}$	$3.65^{+0.95}_{-1.44}$	$6.03^{+0.20}_{-0.23}$	$12.10^{+5.89}_{-5.02}$	$170.00^{+85.42}_{-76.00}$
1999-07-19a	0.66 (27.53/42)	$3.51^{+0.88}_{-0.80}$	$(4.96^{+1.23}_{-1.13})E42$	$4.54^{+1.12}_{-1.36}$	$2.59^{+0.22}_{-0.09}$	$5.00^{+2.21}_{-0.00}$	$3.68^{+0.93}_{-0.85}$	$6.03^{+0.28}_{-0.31}$	$6.82^{+3.92}_{-4.38}$	$125.00^{+72.53}_{-92.00}$
1999-07-19b	0.62 (26.08/42)	$4.77^{+1.35}_{-1.83}$	$(6.74^{+1.90}_{-2.58})E42$	$3.35^{+1.41}_{-1.32}$	$2.40^{+0.20}_{-0.23}$	$2.38^{+1.09}_{-2.03}$	$3.91^{+1.12}_{-1.52}$	$6.16^{+0.36}_{-0.49}$	$6.22^{+4.89}_{-5.13}$	$98.30^{+77.75}_{-85.70}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
1999-07-20a	0.61 (25.62/42)	$4.27^{+1.28}_{-1.87}$	$(6.02^{+1.80}_{-2.63})E42$	$3.40^{+1.66}_{-1.61}$	$2.17^{+0.20}_{-0.22}$	$1.20^{+0.69}_{-1.16}$	$2.60^{+0.80}_{-1.16}$	$6.11^{+0.19}_{-0.21}$	$10.87^{+5.06}_{-4.64}$	$187.00^{+90.91}_{-90.00}$
1999-07-20b	0.52 (21.70/42)	$5.13^{+1.39}_{-2.24}$	$(7.24^{+1.96}_{-3.15})E42$	$2.33^{+1.37}_{-1.49}$	$2.23^{+0.18}_{-0.23}$	$1.60^{+0.76}_{-1.49}$	$3.09^{+0.85}_{-1.38}$	$6.12^{+0.20}_{-0.25}$	$10.88^{+5.85}_{-4.52}$	$168.00^{+93.61}_{-76.00}$
1999-07-21	0.39 (16.44/42)	$5.26^{+1.48}_{-1.99}$	$(7.42^{+2.09}_{-2.82})E42$	$3.71^{+1.45}_{-1.29}$	$2.39^{+0.19}_{-0.21}$	$1.80^{+0.87}_{-1.47}$	$4.56^{+1.30}_{-1.75}$	$6.09^{+0.43}_{-0.55}$	$5.97^{+5.52}_{-5.73}$	$82.54^{+76.38}_{-84.46}$
1999-07-22a	0.49 (20.48/42)	$5.70^{+1.41}_{-2.41}$	$(8.04^{+1.99}_{-3.40})E42$	$2.48^{+1.25}_{-1.51}$	$2.26^{+0.16}_{-0.22}$	$1.36^{+0.63}_{-1.24}$	$3.73^{+0.94}_{-1.60}$	$6.16^{+0.36}_{-0.52}$	$8.42^{+6.16}_{-4.85}$	$120.00^{+88.31}_{-68.00}$
1999-07-22b	0.40 (16.86/42)	$5.55^{+1.50}_{-1.96}$	$(7.84^{+2.11}_{-2.76})E42$	$2.25^{+1.38}_{-1.28}$	$2.28^{+0.18}_{-0.20}$	$1.83^{+0.83}_{-1.34}$	$3.58^{+0.98}_{-1.29}$	$6.12^{+0.20}_{-0.22}$	$11.01^{+5.29}_{-5.24}$	$159.00^{+79.04}_{-88.00}$
1999-07-23a	0.54 (22.82/42)	$4.65^{+1.44}_{-1.71}$	$(6.57^{+2.03}_{-2.42})E42$	$2.89^{+1.65}_{-1.31}$	$2.31^{+0.22}_{-0.20}$	$1.78^{+0.93}_{-1.39}$	$3.31^{+1.04}_{-1.24}$	$6.03^{+0.17}_{-0.20}$	$10.65^{+4.76}_{-5.48}$	$171.00^{+78.98}_{-106.00}$
1999-07-23b	0.54 (22.51/42)	$4.63^{+1.22}_{-1.85}$	$(6.53^{+1.72}_{-2.60})E42$	$3.08^{+1.32}_{-1.40}$	$2.36^{+0.18}_{-0.23}$	$1.98^{+0.89}_{-1.71}$	$3.59^{+0.96}_{-1.46}$	$6.19^{+0.21}_{-0.28}$	$9.20^{+5.21}_{-4.24}$	$155.00^{+90.28}_{-77.00}$
1999-07-24	0.40 (16.94/42)	$5.12^{+1.56}_{-1.92}$	$(7.22^{+2.20}_{-2.71})E42$	$3.45^{+1.61}_{-1.33}$	$2.35^{+0.21}_{-0.21}$	$1.52^{+0.87}_{-1.37}$	$4.14^{+1.29}_{-1.58}$	$6.24^{+0.24}_{-0.30}$	$8.69^{+4.92}_{-5.52}$	$134.00^{+77.68}_{-92.00}$
1999-07-25a	0.45 (18.88/42)	$4.76^{+1.31}_{-1.95}$	$(6.72^{+1.85}_{-2.75})E42$	$2.76^{+1.38}_{-1.40}$	$2.39^{+0.19}_{-0.24}$	$1.92^{+0.94}_{-1.83}$	$3.77^{+1.06}_{-1.57}$	$6.22^{+0.22}_{-0.30}$	$9.02^{+5.12}_{-4.43}$	$153.00^{+87.72}_{-87.00}$
1999-07-25b	0.58 (24.26/42)	$4.88^{+1.25}_{-1.13}$	$(6.90^{+1.76}_{-1.60})E42$	$3.75^{+0.99}_{-1.22}$	$2.69^{+0.22}_{-0.10}$	$4.81^{+2.18}_{-0.19}$	$5.77^{+1.49}_{-1.35}$	$5.74^{+0.24}_{-1.76}$	$3.86^{+3.86}_{-3.59}$	$49.37^{+49.37}_{-46.71}$
1999-07-26	0.39 (16.49/42)	$5.10^{+1.40}_{-2.12}$	$(7.20^{+1.98}_{-2.99})E42$	$2.76^{+1.44}_{-1.52}$	$2.24^{+0.18}_{-0.21}$	$1.34^{+0.68}_{-1.16}$	$3.31^{+0.93}_{-1.40}$	$5.96^{+0.23}_{-0.25}$	$10.96^{+6.04}_{-4.98}$	$158.00^{+89.68}_{-85.00}$
1999-07-27a	0.63 (26.52/42)	$4.29^{+1.35}_{-1.19}$	$(6.05^{+1.90}_{-1.69})E42$	$3.83^{+1.42}_{-1.16}$	$2.57^{+0.26}_{-0.15}$	$3.96^{+2.03}_{-1.04}$	$4.34^{+1.39}_{-1.23}$	$6.22^{+0.24}_{-0.30}$	$7.48^{+4.60}_{-5.76}$	$126.00^{+78.28}_{-114.00}$
1999-07-27b	0.38 (16.00/42)	$3.77^{+1.17}_{-1.82}$	$(5.31^{+1.66}_{-2.57})E42$	$3.66^{+1.53}_{-1.56}$	$2.40^{+0.23}_{-0.29}$	$2.51^{+1.25}_{-2.49}$	$3.14^{+1.00}_{-1.55}$	$5.86^{+0.36}_{-0.52}$	$8.00^{+5.82}_{-4.61}$	$142.00^{+105.80}_{-96.00}$
1999-07-28a	0.36 (15.17/42)	$5.08^{+1.55}_{-2.04}$	$(7.17^{+2.18}_{-2.88})E42$	$3.42^{+1.46}_{-1.30}$	$2.47^{+0.23}_{-0.25}$	$2.62^{+1.28}_{-2.38}$	$4.61^{+1.42}_{-1.88}$	$5.88^{+0.38}_{-0.43}$	$7.10^{+6.18}_{-6.12}$	$95.47^{+83.33}_{-93.53}$
1999-07-28b	0.66 (27.86/42)	$5.06^{+1.52}_{-2.03}$	$(7.14^{+2.14}_{-2.86})E42$	$3.36^{+1.47}_{-1.30}$	$2.49^{+0.22}_{-0.25}$	$2.45^{+1.21}_{-2.27}$	$4.79^{+1.47}_{-1.96}$	$5.97^{+0.19}_{-0.23}$	$11.04^{+6.19}_{-5.76}$	$156.00^{+89.64}_{-97.00}$
2000-03-19	0.52 (21.76/42)	$4.54^{+1.19}_{-1.78}$	$(6.41^{+1.67}_{-2.50})E42$	$1.72^{+1.42}_{-1.51}$	$2.05^{+0.16}_{-0.19}$	$0.73^{+0.48}_{-0.78}$	$2.10^{+0.56}_{-0.84}$	$6.21^{+0.20}_{-0.24}$	$9.87^{+4.34}_{-3.80}$	$184.00^{+84.00}_{-84.00}$
2000-03-28	0.53 (22.14/42)	$4.17^{+1.18}_{-2.38}$	$(5.89^{+1.66}_{-3.36})E42$	$2.51^{+1.42}_{-1.55}$	$2.25^{+0.19}_{-0.34}$	$1.79^{+0.86}_{-1.84}$	$2.64^{+0.75}_{-1.53}$	$6.14^{+0.52}_{-1.36}$	$5.33^{+4.73}_{-2.64}$	$98.76^{+86.98}_{-50.24}$
2000-04-03	0.41 (17.34/42)	$3.77^{+1.09}_{-2.07}$	$(5.32^{+1.53}_{-2.92})E42$	$1.93^{+1.41}_{-1.43}$	$2.23^{+0.21}_{-0.32}$	$2.22^{+1.08}_{-2.78}$	$2.12^{+0.62}_{-1.19}$	$6.52^{+0.29}_{-0.98}$	$6.34^{+3.66}_{-3.27}$	$150.00^{+81.12}_{-80.00}$
2000-04-06	0.52 (21.74/42)	$5.01^{+1.33}_{-1.83}$	$(7.07^{+1.87}_{-2.58})E42$	$1.89^{+1.35}_{-1.30}$	$2.24^{+0.18}_{-0.20}$	$1.63^{+0.76}_{-1.26}$	$3.00^{+0.81}_{-1.11}$	$6.17^{+0.23}_{-0.29}$	$8.40^{+4.67}_{-4.41}$	$141.00^{+80.23}_{-80.00}$
2000-04-08	0.69 (28.85/42)	$4.00^{+1.11}_{-1.74}$	$(5.65^{+1.56}_{-2.45})E42$	$1.23^{+1.23}_{-1.54}$	$2.05^{+0.19}_{-0.23}$	$1.31^{+0.72}_{-1.25}$	$1.70^{+0.48}_{-0.76}$	$6.18^{+0.19}_{-0.22}$	$9.46^{+4.11}_{-3.82}$	$204.00^{+93.00}_{-92.00}$
2000-04-20	0.44 (18.31/42)	$4.20^{+1.39}_{-1.54}$	$(5.92^{+1.96}_{-2.17})E42$	$2.28^{+1.73}_{-1.26}$	$2.20^{+0.23}_{-0.21}$	$1.82^{+1.00}_{-1.44}$	$2.38^{+0.80}_{-0.89}$	$6.16^{+0.27}_{-0.31}$	$6.28^{+4.01}_{-5.01}$	$119.00^{+77.27}_{-105.00}$
2000-05-16	0.39 (16.36/42)	$5.14^{+1.47}_{-1.90}$	$(7.25^{+2.08}_{-2.69})E42$	$1.91^{+1.49}_{-1.31}$	$2.20^{+0.20}_{-0.20}$	$1.64^{+0.82}_{-1.33}$	$2.86^{+0.84}_{-1.08}$	$6.21^{+0.20}_{-0.23}$	$10.34^{+4.78}_{-4.96}$	$167.00^{+79.69}_{-95.00}$
2000-07-10	0.42 (17.72/42)	$3.97^{+1.27}_{-1.52}$	$(5.60^{+1.79}_{-2.14})E42$	$2.88^{+1.49}_{-1.25}$	$2.37^{+0.25}_{-0.24}$	$2.84^{+1.43}_{-2.16}$	$2.94^{+0.95}_{-1.14}$	$5.69^{+0.19}_{-0.38}$	$6.17^{+5.04}_{-5.04}$	$103.00^{+85.10}_{-97.00}$
2000-07-12	0.57 (23.90/42)	$5.29^{+1.44}_{-2.12}$	$(7.47^{+2.04}_{-2.99})E42$	$1.71^{+1.37}_{-1.38}$	$2.22^{+0.18}_{-0.21}$	$1.46^{+0.72}_{-1.22}$	$3.06^{+0.84}_{-1.24}$	$5.95^{+0.43}_{-0.47}$	$6.51^{+5.50}_{-4.92}$	$96.89^{+82.18}_{-78.11}$
2000-07-26	0.34 (14.09/42)	$4.85^{+1.51}_{-1.83}$	$(6.85^{+2.13}_{-2.59})E42$	$2.96^{+1.45}_{-1.22}$	$2.39^{+0.23}_{-0.23}$	$2.83^{+1.38}_{-2.17}$	$3.72^{+1.17}_{-1.42}$	$5.84^{+0.34}_{-1.66}$	$6.20^{+3.31}_{-3.32}$	$88.51^{+47.51}_{-49.49}$
2001-01-22	0.83 (34.87/42)	$4.64^{+1.66}_{-2.08}$	$(6.55^{+2.35}_{-2.93})E42$	$2.79^{+1.79}_{-1.32}$	$2.34^{+0.27}_{-0.26}$	$2.13^{+1.28}_{-2.33}$	$3.39^{+1.23}_{-1.53}$	$6.06^{+0.32}_{-0.38}$	$6.40^{+5.27}_{-6.34}$	$103.00^{+85.31}_{-118.00}$
2001-02-22	0.39 (16.39/42)	$3.92^{+1.12}_{-1.55}$	$(5.53^{+1.58}_{-2.18})E42$	$1.82^{+1.50}_{-1.41}$	$2.10^{+0.19}_{-0.21}$	$1.66^{+0.79}_{-1.31}$	$1.86^{+0.54}_{-0.75}$	$6.09^{+0.24}_{-0.26}$	$7.49^{+4.22}_{-4.03}$	$153.00^{+88.89}_{-90.00}$
2001-05-25	0.50 (21.13/42)	$4.96^{+1.45}_{-1.89}$	$(6.99^{+2.05}_{-2.67})E42$	$2.47^{+1.40}_{-1.21}$	$2.35^{+0.21}_{-0.24}$	$2.39^{+1.15}_{-2.16}$	$3.50^{+1.05}_{-1.36}$	$6.15^{+0.22}_{-0.27}$	$9.18^{+5.33}_{-5.13}$	$149.00^{+89.01}_{-91.00}$
2001-08-13	0.48 (20.08/42)	$5.14^{+1.60}_{-1.78}$	$(7.25^{+2.26}_{-2.52})E42$	$2.53^{+1.59}_{-1.24}$	$2.25^{+0.21}_{-0.19}$	$1.44^{+0.79}_{-1.09}$	$3.31^{+1.04}_{-1.17}$	$5.90^{+0.32}_{-0.33}$	$8.21^{+5.32}_{-5.83}$	$116.00^{+76.19}_{-96.00}$
2002-02-07	0.37 (15.37/42)	$4.94^{+1.36}_{-1.89}$	$(6.97^{+1.91}_{-2.67})E42$	$2.08^{+1.37}_{-1.31}$	$2.29^{+0.19}_{-0.21}$	$1.58^{+0.79}_{-1.31}$	$3.23^{+0.90}_{-1.25}$	$6.10^{+0.26}_{-0.32}$	$7.80^{+4.89}_{-4.66}$	$129.00^{+82.37}_{-82.00}$
2002-04-18	0.37 (15.59/42)	$5.43^{+1.54}_{-1.90}$	$(7.67^{+2.17}_{-2.69})E42$	$2.57^{+1.38}_{-1.15}$	$2.46^{+0.20}_{-0.21}$	$1.87^{+0.97}_{-1.57}$	$4.75^{+1.38}_{-1.70}$	$6.11^{+0.15}_{-0.17}$	$13.41^{+4.97}_{-5.32}$	$202.00^{+78.00}_{-88.00}$
2002-07-07	0.46 (19.51/42)	$4.93^{+1.42}_{-1.81}$	$(6.96^{+2.01}_{-2.56})E42$	$2.85^{+1.33}_{-1.17}$	$2.49^{+0.22}_{-0.25}$	$2.56^{+1.25}_{-2.44}$	$4.42^{+1.29}_{-1.65}$	$6.10^{+0.21}_{-0.25}$	$9.30^{+5.57}_{-5.26}$	$147.00^{+89.94}_{-91.00}$
2002-09-11	0.54 (22.67/42)	$5.56^{+1.43}_{-1.95}$	$(7.85^{+2.02}_{-2.75})E42$	$1.45^{+1.26}_{-1.21}$	$2.27^{+0.17}_{-0.19}$	$1.54^{+0.74}_{-1.21}$	$3.39^{+0.89}_{-1.20}$	$6.13^{+0.25}_{-0.31}$	$8.07^{+4.83}_{-4.65}$	$125.00^{+76.07}_{-76.00}$
2003-01-11	0.53 (22.34/42)	$4.63^{+1.33}_{-1.66}$	$(6.54^{+1.87}_{-2.35})E42$	$2.44^{+1.43}_{-1.23}$	$2.31^{+0.20}_{-0.20}$	$1.60^{+0.84}_{-1.29}$	$3.25^{+0.95}_{-1.18}$	$6.09^{+0.27}_{-0.33}$	$6.70^{+4.39}_{-4.79}$	$115.00^{+76.16}_{-88.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2003-04-01	0.42 (17.67/42)	$4.70^{+1.19}_{-1.64}$	$(6.63^{+1.67}_{-2.32})E42$	$0.98^{+0.98}_{-1.23}$	$2.14^{+0.18}_{-0.19}$	$1.25^{+0.70}_{-1.03}$	$2.28^{+0.58}_{-0.81}$	$6.14^{+0.22}_{-0.25}$	$7.90^{+3.85}_{-4.34}$	$148.00^{+74.04}_{-92.00}$
2003-06-08	0.49 (20.79/42)	$4.94^{+1.22}_{-1.95}$	$(7.01^{+1.75}_{-2.73})E42$	$2.71^{+1.23}_{-1.35}$	$2.33^{+0.16}_{-0.21}$	$1.38^{+0.68}_{-1.22}$	$3.70^{+0.94}_{-1.46}$	$6.07^{+0.47}_{-0.62}$	$5.90^{+5.17}_{-4.43}$	$91.45^{+79.94}_{-72.55}$
2003-07-19	0.51 (21.47/42)	$4.73^{+1.09}_{-2.73}$	$(6.68^{+1.54}_{-3.85})E42$	$2.59^{+1.09}_{-1.41}$	$2.38^{+0.16}_{-0.35}$	$1.97^{+0.81}_{-1.83}$	$3.64^{+0.85}_{-2.12}$	$6.11^{+0.61}_{-1.39}$	$5.68^{+5.06}_{-2.60}$	$94.88^{+83.65}_{-44.12}$
2003-08-20	0.58 (24.35/42)	$5.05^{+1.14}_{-1.98}$	$(7.13^{+1.62}_{-2.79})E42$	$0.88^{+0.88}_{-1.39}$	$2.15^{+0.16}_{-0.20}$	$1.16^{+0.60}_{-1.03}$	$2.42^{+0.56}_{-0.97}$	$6.00^{+0.18}_{-0.19}$	$12.19^{+4.96}_{-3.99}$	$212.00^{+93.00}_{-75.00}$
2005-03-07	0.62 (26.02/42)	$4.29^{+1.20}_{-1.79}$	$(6.06^{+1.69}_{-2.53})E42$	$2.32^{+1.36}_{-1.34}$	$2.29^{+0.19}_{-0.23}$	$1.55^{+0.81}_{-1.43}$	$2.85^{+0.81}_{-1.21}$	$6.02^{+0.30}_{-0.32}$	$6.86^{+4.72}_{-4.22}$	$125.00^{+86.95}_{-83.00}$

Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	wabs N_H[e]	pexrav Γ[f]	pexrav R[g]	pexrav **Norm.**[h]	gaussian **Energy**[i]	gaussian **Norm.**[j]	gaussian **EW**[k]
		MR 2251-178						$\mathrm{Fe}_K\alpha\sigma = 0.17$		
1996-12-09	0.72 (33.07/46)	$3.03^{+0.48}_{-0.62}$	$(2.84^{+0.46}_{-0.57})E44$	$3.17^{+1.01}_{-1.16}$	$1.69^{+0.07}_{-0.07}$	$0.00^{+0.00}_{-0.07}$	$0.92^{+0.15}_{-0.18}$	$5.90^{+0.40}_{-0.63}$	$3.14^{+2.72}_{-2.60}$	$68.17^{+58.88}_{-63.83}$
1996-12-10a	0.47 (21.70/46)	$3.10^{+0.50}_{-0.77}$	$(2.89^{+0.46}_{-0.72})E44$	$2.98^{+1.07}_{-1.21}$	$1.63^{+0.07}_{-0.11}$	$0.00^{+0.00}_{-0.18}$	$0.84^{+0.14}_{-0.21}$	$5.76^{+0.26}_{-1.74}$	$2.51^{+2.20}_{-2.18}$	$52.80^{+46.36}_{-44.36}$
1996-12-10b	0.65 (29.80/46)	$3.04^{+0.50}_{-0.60}$	$(2.83^{+0.46}_{-0.56})E44$	$3.81^{+0.45}_{-0.46}$	$1.71^{+0.05}_{-0.08}$	$0.00^{+0.00}_{-0.06}$	$1.00^{+0.16}_{-0.20}$	$5.89^{+0.39}_{-1.61}$	$1.88^{+1.88}_{-2.77}$	$39.30^{+39.30}_{-60.70}$
1996-12-11	0.53 (24.29/46)	$3.10^{+0.46}_{-0.69}$	$(2.89^{+0.43}_{-0.64})E44$	$3.91^{+1.00}_{-1.13}$	$1.72^{+0.06}_{-0.09}$	$0.00^{+0.00}_{-0.13}$	$1.04^{+0.16}_{-0.23}$	$6.17^{+0.67}_{-1.33}$	$1.85^{+1.85}_{-2.38}$	$41.54^{+41.54}_{-53.76}$
1996-12-12	0.52 (24.00/46)	$3.24^{+0.53}_{-0.65}$	$(3.02^{+0.49}_{-0.60})E44$	$3.23^{+1.12}_{-0.96}$	$1.72^{+0.07}_{-0.07}$	$0.00^{+0.00}_{-0.10}$	$1.03^{+0.17}_{-0.21}$	$6.32^{+0.82}_{-1.18}$	$2.30^{+2.30}_{-2.58}$	$54.12^{+54.12}_{-62.88}$
2004-03-27	0.50 (21.20/42)	$5.44^{+0.41}_{-1.08}$	$(5.14^{+0.39}_{-1.02})E44$	$0.20^{+0.20}_{-0.96}$	$1.77^{+0.04}_{-0.09}$	$0.00^{+0.00}_{-0.17}$	$1.50^{+0.11}_{-0.30}$	$6.26^{+0.34}_{-0.36}$	$5.25^{+3.11}_{-2.86}$	$90.66^{+53.79}_{-47.34}$
2004-08-27	0.50 (20.87/42)	$4.59^{+0.63}_{-1.45}$	$(4.32^{+0.59}_{-1.37})E44$	$1.20^{+0.88}_{-1.36}$	$1.77^{+0.06}_{-0.14}$	$0.00^{+0.00}_{-0.31}$	$1.39^{+0.19}_{-0.44}$	$5.84^{+0.34}_{-1.66}$	$1.39^{+1.39}_{-2.87}$	$23.04^{+23.04}_{-44.91}$
2005-03-28	0.56 (23.40/42)	$5.93^{+0.85}_{-1.44}$	$(5.60^{+0.80}_{-1.35})E44$	$0.94^{+0.92}_{-0.99}$	$1.81^{+0.06}_{-0.10}$	$0.00^{+0.00}_{-0.23}$	$1.88^{+0.27}_{-0.46}$	$6.02^{+0.52}_{-0.50}$	$4.24^{+3.81}_{-3.86}$	$59.24^{+53.23}_{-54.76}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 79					$\mathrm{Fe}_K\alpha\sigma = 0.25$			
2003-03-22	0.35 (14.64/42)	$1.79^{+0.35}_{-0.98}$	$(1.94^{+0.38}_{-1.06})E43$	$0.47^{+0.47}_{-2.05}$	$1.78^{+0.14}_{-0.25}$	$0.67^{+0.50}_{-0.97}$	$0.48^{+0.10}_{-0.27}$	$6.08^{+0.14}_{-0.15}$	$6.97^{+2.19}_{-1.84}$	$339.00^{+122.00}_{-94.00}$
2004-02-28	0.51 (21.34/42)	$2.56^{+0.44}_{-1.16}$	$(2.79^{+0.50}_{-1.24})E43$	$0.41^{+0.41}_{-1.63}$	$1.96^{+0.13}_{-0.21}$	$0.62^{+0.48}_{-0.86}$	$0.92^{+0.17}_{-0.42}$	$6.17^{+0.21}_{-0.26}$	$5.39^{+2.48}_{-2.14}$	$195.00^{+93.00}_{-78.00}$
2004-09-03	0.39 (16.58/42)	$2.64^{+0.29}_{-0.60}$	$(2.85^{+0.31}_{-0.65})E43$	$0.00^{+0.00}_{-0.85}$	$1.89^{+0.08}_{-0.13}$	$0.45^{+0.38}_{-0.53}$	$0.82^{+0.09}_{-0.19}$	$6.05^{+0.18}_{-0.19}$	$6.60^{+1.86}_{-1.86}$	$229.00^{+63.00}_{-68.00}$
2005-03-04	0.49 (20.55/42)	$2.68^{+0.79}_{-1.29}$	$(2.90^{+0.85}_{-1.40})E43$	$1.19^{+1.19}_{-1.57}$	$2.13^{+0.21}_{-0.26}$	$1.69^{+0.91}_{-1.84}$	$1.24^{+0.37}_{-0.61}$	$6.07^{+0.20}_{-0.22}$	$6.55^{+3.12}_{-2.82}$	$208.00^{+106.00}_{-100.00}$
2005-06-14	0.54 (23.03/43)	$3.51^{+0.56}_{-1.46}$	$(3.79^{+0.60}_{-1.58})E43$	$0.33^{+0.33}_{-1.49}$	$1.97^{+0.11}_{-0.20}$	$0.64^{+0.45}_{-0.81}$	$1.27^{+0.21}_{-0.54}$	$6.09^{+0.22}_{-0.24}$	$6.88^{+3.16}_{-2.61}$	$180.00^{+85.60}_{-68.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 110					$\mathrm{Fe}_K\alpha\sigma = 0.43$			
2005-03-04	0.49 (20.66/42)	$9.23^{+1.28}_{-4.42}$	$(2.56^{+0.36}_{-1.22})E44$	$0.26^{+0.26}_{-1.78}$	$1.87^{+0.10}_{-0.21}$	$0.32^{+0.32}_{-0.62}$	$2.88^{+0.42}_{-1.40}$	$5.98^{+0.24}_{-0.30}$	$23.11^{+11.37}_{-8.22}$	$218.00^{+110.00}_{-83.00}$
2005-08-03	0.53 (22.98/43)	$8.88^{+0.74}_{-2.56}$	$(2.47^{+0.22}_{-0.69})E44$	$0.00^{+0.00}_{-1.14}$	$1.81^{+0.06}_{-0.13}$	$0.17^{+0.17}_{-0.35}$	$2.52^{+0.23}_{-0.72}$	$5.98^{+0.22}_{-0.22}$	$20.25^{+7.40}_{-6.20}$	$202.00^{+76.00}_{-64.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^{2}_{ν} [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 279					$\mathrm{Fe}_K\alpha\sigma = 0.12$			
1996-05-22	0.52 (24.25/47)	$3.57^{+0.34}_{-0.68}$	$(7.36^{+0.71}_{-1.40})E43$	$0.29^{+0.29}_{-0.84}$	$1.91^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.20}$	$1.23^{+0.12}_{-0.24}$	$6.23^{+0.23}_{-0.26}$	$5.58^{+2.28}_{-2.10}$	$152.00^{+64.15}_{-56.00}$
1996-05-28	0.71 (33.37/47)	$2.56^{+0.40}_{-0.59}$	$(5.23^{+0.82}_{-1.21})E43$	$1.09^{+0.88}_{-0.93}$	$1.87^{+0.08}_{-0.11}$	$0.00^{+0.00}_{-0.29}$	$0.89^{+0.14}_{-0.21}$	$6.28^{+0.19}_{-0.20}$	$4.76^{+1.83}_{-1.83}$	$168.00^{+67.00}_{-71.00}$
1999-07-11	0.70 (29.31/42)	$2.99^{+0.36}_{-1.31}$	$(6.04^{+0.71}_{-2.67})E43$	$0.21^{+0.21}_{-1.78}$	$1.85^{+0.07}_{-0.20}$	$0.09^{+0.09}_{-0.55}$	$0.92^{+0.11}_{-0.42}$	$6.18^{+0.16}_{-0.18}$	$6.91^{+2.52}_{-2.05}$	$217.00^{+83.00}_{-70.00}$
2002-05-18	0.43 (17.93/42)	$1.39^{+0.13}_{-0.36}$	$(2.80^{+0.24}_{-0.74})E43$	$0.00^{+0.00}_{-1.43}$	$1.67^{+0.05}_{-0.11}$	$0.00^{+0.00}_{-0.21}$	$0.32^{+0.03}_{-0.09}$	$6.20^{+0.20}_{-0.21}$	$3.69^{+1.35}_{-1.31}$	$245.00^{+94.00}_{-90.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 348						$Fe_K \alpha \sigma = 0.17$		
1996-05-24	1.04 (48.78/47)	$0.98^{+0.78}_{-0.09}$	$(5.66^{+1.29}_{-3.01})E42$	$21.49^{+2.68}_{-3.33}$	$1.39^{+0.11}_{-0.20}$	$0.00^{+0.00}_{-0.26}$	$0.38^{+0.09}_{-0.21}$	$6.00^{+0.21}_{-0.18}$	$7.21^{+2.71}_{-9.31}$	$235.00^{+98.00}_{-183.00}$
1996-05-30	0.98 (45.85/47)	$0.67^{+0.57}_{-0.08}$	$(3.99^{+1.07}_{-2.10})E42$	$21.23^{+3.29}_{-3.86}$	$1.40^{+0.13}_{-0.18}$	$0.00^{+0.00}_{-0.19}$	$0.27^{+0.07}_{-0.15}$	$5.98^{+0.22}_{-0.18}$	$6.00^{+2.21}_{-11.20}$	$275.00^{+107.00}_{-276.00}$
1996-06-02	1.09 (51.41/47)	$0.64^{+0.61}_{-0.08}$	$(3.95^{+1.18}_{-2.20})E42$	$24.50^{+4.02}_{-4.03}$	$1.36^{+0.14}_{-0.19}$	$0.00^{+0.00}_{-0.22}$	$0.26^{+0.08}_{-0.15}$	$6.08^{+0.18}_{-0.17}$	$6.74^{+2.16}_{-12.92}$	$302.00^{+104.00}_{-241.00}$
1996-12-29	0.32 (14.68/46)	$1.87^{+0.61}_{-0.96}$	$(6.18^{+1.67}_{-6.06})E42$	$14.34^{+2.67}_{-4.39}$	$1.41^{+0.14}_{-0.34}$	$0.04^{+0.04}_{-0.60}$	$0.35^{+0.10}_{-0.36}$	$6.10^{+0.17}_{-0.18}$	$6.85^{+3.43}_{-7.01}$	$252.00^{+142.00}_{-307.00}$
1997-07-03	0.46 (21.24/46)	$3.25^{+1.04}_{-0.57}$	$(1.33^{+0.24}_{-0.56})E43$	$12.73^{+1.59}_{-2.14}$	$1.57^{+0.08}_{-0.17}$	$0.00^{+0.00}_{-0.28}$	$1.00^{+0.18}_{-0.43}$	$5.90^{+0.28}_{-0.26}$	$7.25^{+4.53}_{-5.36}$	$119.00^{+76.41}_{-98.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 509						$\mathrm{Fe}_K\alpha\sigma = 0.13$		
1996-05-01	0.46 (21.59/47)	$6.34^{+0.75}_{-1.25}$	$(1.67^{+0.20}_{-0.33})E44$	$0.56^{+0.56}_{-0.75}$	$1.74^{+0.06}_{-0.10}$	$0.02^{+0.02}_{-0.24}$	$1.71^{+0.20}_{-0.34}$	$6.25^{+0.20}_{-0.21}$	$8.34^{+3.32}_{-3.32}$	$119.00^{+49.13}_{-46.00}$
1996-10-22	0.58 (26.58/46)	$6.00^{+0.72}_{-1.55}$	$(1.59^{+0.21}_{-0.38})E44$	$0.41^{+0.41}_{-1.03}$	$1.81^{+0.08}_{-0.11}$	$0.18^{+0.18}_{-0.30}$	$1.78^{+0.24}_{-0.43}$	$6.30^{+0.26}_{-0.32}$	$6.15^{+3.15}_{-3.01}$	$94.64^{+47.69}_{-49.36}$
1996-10-25	0.59 (27.33/46)	$6.85^{+0.30}_{-1.48}$	$(1.79^{+0.08}_{-0.38})E44$	$0.00^{+0.00}_{-0.94}$	$1.80^{+0.02}_{-0.10}$	$0.00^{+0.00}_{-0.25}$	$1.92^{+0.08}_{-0.42}$	$6.29^{+0.24}_{-0.27}$	$6.65^{+3.31}_{-2.77}$	$95.19^{+47.39}_{-40.81}$
1996-10-26	0.44 (20.40/46)	$7.39^{+0.29}_{-1.25}$	$(1.93^{+0.08}_{-0.32})E44$	$0.00^{+0.00}_{-0.82}$	$1.77^{+0.02}_{-0.08}$	$0.00^{+0.00}_{-0.15}$	$1.99^{+0.08}_{-0.34}$	$6.19^{+0.22}_{-0.23}$	$7.35^{+3.36}_{-2.73}$	$94.55^{+43.23}_{-35.45}$
1996-10-28	0.47 (21.78/46)	$8.08^{+0.56}_{-0.91}$	$(2.11^{+0.14}_{-0.24})E44$	$0.00^{+0.00}_{-0.45}$	$1.81^{+0.05}_{-0.06}$	$0.12^{+0.12}_{-0.23}$	$2.28^{+0.16}_{-0.26}$	$6.20^{+0.27}_{-0.29}$	$7.19^{+3.26}_{-3.33}$	$84.74^{+37.57}_{-40.26}$
1996-10-31	0.38 (17.32/46)	$6.25^{+0.43}_{-1.39}$	$(1.63^{+0.11}_{-0.36})E44$	$0.18^{+0.18}_{-1.00}$	$1.75^{+0.03}_{-0.10}$	$0.00^{+0.00}_{-0.22}$	$1.66^{+0.12}_{-0.37}$	$6.12^{+0.25}_{-0.27}$	$6.00^{+3.37}_{-3.01}$	$86.89^{+49.13}_{-45.11}$
1996-11-01	0.52 (23.95/46)	$5.48^{+0.52}_{-1.49}$	$(1.43^{+0.14}_{-0.39})E44$	$0.22^{+0.22}_{-1.16}$	$1.74^{+0.05}_{-0.13}$	$0.06^{+0.06}_{-0.30}$	$1.42^{+0.14}_{-0.39}$	$6.18^{+0.22}_{-0.24}$	$6.76^{+3.31}_{-2.88}$	$114.00^{+56.75}_{-50.00}$
1996-11-04	0.36 (16.79/46)	$4.99^{+0.38}_{-1.17}$	$(1.30^{+0.10}_{-0.31})E44$	$0.20^{+0.20}_{-1.06}$	$1.69^{+0.04}_{-0.11}$	$0.00^{+0.00}_{-0.23}$	$1.21^{+0.09}_{-0.29}$	$6.14^{+0.22}_{-0.23}$	$6.46^{+2.91}_{-2.66}$	$116.00^{+53.11}_{-50.00}$
1996-11-06	0.51 (23.56/46)	$4.87^{+0.37}_{-1.11}$	$(1.27^{+0.10}_{-0.29})E44$	$0.00^{+0.00}_{-0.97}$	$1.71^{+0.05}_{-0.11}$	$0.15^{+0.15}_{-0.29}$	$1.18^{+0.09}_{-0.27}$	$6.21^{+0.24}_{-0.25}$	$6.54^{+2.67}_{-2.26}$	$125.00^{+51.57}_{-44.00}$
1996-11-09	0.40 (18.40/46)	$5.37^{+0.95}_{-1.60}$	$(1.40^{+0.25}_{-0.42})E44$	$0.64^{+0.64}_{-1.22}$	$1.78^{+0.11}_{-0.14}$	$0.37^{+0.29}_{-0.41}$	$1.51^{+0.27}_{-0.46}$	$6.13^{+0.29}_{-0.38}$	$5.96^{+3.66}_{-3.49}$	$95.72^{+58.51}_{-61.28}$
1996-11-13	0.46 (21.27/46)	$6.49^{+0.90}_{-1.59}$	$(1.69^{+0.23}_{-0.41})E44$	$0.44^{+0.44}_{-1.05}$	$1.80^{+0.08}_{-0.12}$	$0.20^{+0.20}_{-0.30}$	$1.87^{+0.26}_{-0.46}$	$6.20^{+0.46}_{-0.57}$	$4.13^{+3.60}_{-3.47}$	$57.51^{+50.16}_{-48.49}$
1996-11-16	0.62 (28.55/46)	$4.93^{+0.34}_{-0.94}$	$(1.28^{+0.09}_{-0.25})E44$	$0.00^{+0.00}_{-0.85}$	$1.69^{+0.04}_{-0.09}$	$0.09^{+0.09}_{-0.23}$	$1.16^{+0.08}_{-0.23}$	$6.20^{+0.24}_{-0.24}$	$5.97^{+2.48}_{-2.20}$	$112.00^{+46.39}_{-42.00}$
2001-04-13a	0.42 (17.49/42)	$5.66^{+0.40}_{-0.83}$	$(1.47^{+0.10}_{-0.22})E44$	$0.00^{+0.00}_{-0.64}$	$1.71^{+0.05}_{-0.07}$	$0.11^{+0.11}_{-0.21}$	$1.40^{+0.10}_{-0.21}$	$6.07^{+0.18}_{-0.18}$	$8.61^{+2.73}_{-2.78}$	$136.00^{+44.32}_{-41.00}$
2001-04-13b	0.48 (20.31/42)	$5.59^{+0.53}_{-1.56}$	$(1.45^{+0.14}_{-0.40})E44$	$0.13^{+0.13}_{-1.24}$	$1.71^{+0.06}_{-0.13}$	$0.13^{+0.13}_{-0.30}$	$1.40^{+0.13}_{-0.39}$	$6.26^{+0.27}_{-0.35}$	$5.96^{+3.52}_{-2.96}$	$98.04^{+58.52}_{-46.96}$
2003-03-28	0.52 (21.93/42)	$5.13^{+0.79}_{-1.62}$	$(1.33^{+0.21}_{-0.42})E44$	$0.46^{+0.46}_{-1.24}$	$1.81^{+0.10}_{-0.15}$	$0.47^{+0.31}_{-0.49}$	$1.50^{+0.23}_{-0.48}$	$6.39^{+0.48}_{-0.83}$	$4.25^{+3.16}_{-3.00}$	$76.19^{+55.22}_{-53.81}$
2003-05-21	0.48 (20.02/42)	$5.19^{+0.37}_{-1.02}$	$(1.36^{+0.11}_{-0.26})E44$	$0.00^{+0.00}_{-0.79}$	$1.77^{+0.06}_{-0.09}$	$0.33^{+0.22}_{-0.29}$	$1.39^{+0.11}_{-0.26}$	$6.08^{+0.25}_{-0.27}$	$6.18^{+2.76}_{-2.61}$	$107.00^{+49.31}_{-42.00}$
2003-07-14	0.45 (18.77/42)	$5.15^{+0.38}_{-0.83}$	$(1.34^{+0.10}_{-0.22})E44$	$0.00^{+0.00}_{-0.68}$	$1.72^{+0.05}_{-0.08}$	$0.11^{+0.11}_{-0.24}$	$1.29^{+0.10}_{-0.21}$	$6.23^{+0.27}_{-0.28}$	$5.39^{+2.47}_{-2.47}$	$96.19^{+43.51}_{-44.81}$
2003-09-18	0.74 (31.15/42)	$4.81^{+0.42}_{-1.64}$	$(1.25^{+0.11}_{-0.43})E44$	$0.03^{+0.03}_{-1.36}$	$1.78^{+0.06}_{-0.16}$	$0.29^{+0.24}_{-0.44}$	$1.31^{+0.11}_{-0.45}$	$6.05^{+0.26}_{-0.29}$	$6.61^{+3.55}_{-2.53}$	$121.00^{+66.24}_{-48.00}$
2004-02-29	0.49 (20.70/42)	$5.34^{+0.41}_{-0.80}$	$(1.39^{+0.11}_{-0.21})E44$	$0.00^{+0.00}_{-0.62}$	$1.77^{+0.06}_{-0.08}$	$0.21^{+0.21}_{-0.26}$	$1.43^{+0.11}_{-0.22}$	$6.13^{+0.20}_{-0.19}$	$7.95^{+2.57}_{-2.59}$	$136.00^{+43.11}_{-45.00}$
2004-04-29	0.60 (25.38/42)	$4.70^{+0.38}_{-0.73}$	$(1.22^{+0.10}_{-0.19})E44$	$0.00^{+0.00}_{-0.63}$	$1.78^{+0.06}_{-0.08}$	$0.45^{+0.25}_{-0.31}$	$1.25^{+0.10}_{-0.20}$	$6.29^{+0.23}_{-0.24}$	$5.65^{+2.26}_{-2.31}$	$113.00^{+44.36}_{-47.00}$
2004-06-25	0.56 (23.71/42)	$4.94^{+0.41}_{-0.77}$	$(1.29^{+0.11}_{-0.20})E44$	$0.00^{+0.00}_{-0.62}$	$1.83^{+0.06}_{-0.09}$	$0.61^{+0.28}_{-0.36}$	$1.41^{+0.12}_{-0.22}$	$6.24^{+0.26}_{-0.28}$	$5.85^{+2.39}_{-2.38}$	$112.00^{+46.51}_{-43.00}$
2004-09-02	0.53 (22.05/42)	$5.27^{+0.41}_{-1.01}$	$(1.37^{+0.11}_{-0.26})E44$	$0.00^{+0.00}_{-0.78}$	$1.82^{+0.06}_{-0.10}$	$0.38^{+0.24}_{-0.32}$	$1.50^{+0.12}_{-0.29}$	$5.99^{+0.26}_{-0.27}$	$6.07^{+2.84}_{-2.66}$	$103.00^{+49.57}_{-42.00}$
2004-10-29	0.64 (26.82/42)	$5.57^{+0.42}_{-1.16}$	$(1.45^{+0.11}_{-0.30})E44$	$0.00^{+0.00}_{-0.88}$	$1.80^{+0.05}_{-0.10}$	$0.24^{+0.21}_{-0.30}$	$1.57^{+0.12}_{-0.33}$	$6.13^{+0.24}_{-0.25}$	$6.25^{+2.95}_{-2.67}$	$102.00^{+47.99}_{-45.00}$
2005-03-04	0.63 (26.43/42)	$4.90^{+0.40}_{-0.97}$	$(1.28^{+0.10}_{-0.25})E44$	$0.00^{+0.00}_{-0.81}$	$1.83^{+0.06}_{-0.10}$	$0.32^{+0.24}_{-0.32}$	$1.42^{+0.12}_{-0.28}$	$6.13^{+0.22}_{-0.24}$	$6.81^{+2.64}_{-2.46}$	$127.00^{+48.74}_{-48.00}$
2005-05-15	0.42 (17.90/43)	$5.40^{+0.41}_{-0.77}$	$(1.41^{+0.11}_{-0.20})E44$	$0.00^{+0.00}_{-0.58}$	$1.78^{+0.05}_{-0.08}$	$0.20^{+0.20}_{-0.25}$	$1.46^{+0.11}_{-0.21}$	$6.05^{+0.26}_{-0.27}$	$6.61^{+2.67}_{-2.68}$	$109.00^{+43.27}_{-45.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		Mkn 766					$\mathrm{Fe}_K\alpha\sigma = 0.55$			
2001-05-05	0.42 (17.52/42)	$3.69^{+0.58}_{-1.84}$	$(1.39^{+0.22}_{-0.69})E43$	$0.25^{+0.25}_{-1.72}$	$2.25^{+0.12}_{-0.24}$	$0.55^{+0.52}_{-1.00}$	$2.04^{+0.33}_{-1.03}$	$6.13^{+0.30}_{-0.42}$	$7.85^{+4.31}_{-3.41}$	$214.00^{+115.80}_{-91.00}$
2001-05-08	0.46 (19.15/42)	$3.90^{+0.78}_{-2.87}$	$(1.46^{+0.29}_{-1.08})E43$	$0.67^{+0.67}_{-1.91}$	$2.22^{+0.13}_{-0.36}$	$0.24^{+0.24}_{-1.64}$	$2.21^{+0.45}_{-1.64}$	$6.38^{+0.49}_{-1.11}$	$5.23^{+3.66}_{-3.48}$	$141.00^{+96.77}_{-95.00}$
2004-03-01	0.69 (28.99/42)	$2.66^{+0.30}_{-0.55}$	$(1.01^{+0.12}_{-0.20})E43$	$0.00^{+0.00}_{-0.59}$	$2.16^{+0.10}_{-0.13}$	$0.46^{+0.46}_{-0.77}$	$1.26^{+0.16}_{-0.25}$	$6.28^{+0.33}_{-0.37}$	$4.91^{+2.08}_{-3.21}$	$195.00^{+81.00}_{-125.00}$
2005-05-24	0.74 (31.74/43)	$2.55^{+0.31}_{-1.13}$	$(9.56^{+1.17}_{-4.25})E42$	$0.00^{+0.00}_{-1.50}$	$2.10^{+0.10}_{-0.21}$	$0.46^{+0.46}_{-0.87}$	$1.09^{+0.14}_{-0.49}$	$5.73^{+0.23}_{-0.47}$	$4.50^{+3.47}_{-3.43}$	$153.00^{+118.22}_{-114.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 2110					Fe$_K\alpha\sigma = 0.18$			
1997-12-07a	0.59 (27.22/46)	$3.49^{+0.69}_{-1.06}$	$(4.92^{+0.97}_{-1.50})E42$	$4.47^{+1.33}_{-1.42}$	$1.70^{+0.10}_{-0.14}$	$0.09^{+0.09}_{-0.32}$	$1.12^{+0.23}_{-0.35}$	$6.41^{+0.15}_{-0.17}$	$10.34^{+2.98}_{-3.51}$	$216.00^{+68.00}_{-80.00}$
1997-12-07b	0.51 (23.23/46)	$3.37^{+0.79}_{-1.07}$	$(4.75^{+1.11}_{-1.50})E42$	$4.93^{+1.42}_{-1.44}$	$1.76^{+0.14}_{-0.15}$	$0.29^{+0.29}_{-0.41}$	$1.22^{+0.29}_{-0.40}$	$6.42^{+0.15}_{-0.17}$	$10.25^{+2.95}_{-3.49}$	$217.00^{+69.00}_{-82.00}$
1997-12-08	0.44 (20.04/46)	$3.38^{+0.71}_{-1.06}$	$(4.76^{+1.00}_{-1.49})E42$	$5.20^{+1.36}_{-1.46}$	$1.75^{+0.12}_{-0.14}$	$0.15^{+0.15}_{-0.36}$	$1.23^{+0.27}_{-0.40}$	$6.40^{+0.14}_{-0.16}$	$9.93^{+3.01}_{-3.56}$	$208.00^{+69.00}_{-80.00}$
1997-12-17	0.65 (29.73/46)	$3.44^{+0.75}_{-1.04}$	$(4.85^{+1.05}_{-1.46})E42$	$4.90^{+1.38}_{-1.40}$	$1.75^{+0.12}_{-0.14}$	$0.17^{+0.17}_{-0.35}$	$1.23^{+0.27}_{-0.38}$	$6.42^{+0.15}_{-0.17}$	$10.09^{+2.95}_{-3.47}$	$210.00^{+67.00}_{-79.00}$
1997-12-18a	0.45 (20.54/46)	$3.46^{+0.80}_{-1.08}$	$(4.88^{+1.13}_{-1.52})E42$	$6.01^{+1.38}_{-1.41}$	$1.90^{+0.14}_{-0.15}$	$0.44^{+0.34}_{-0.47}$	$1.67^{+0.40}_{-0.53}$	$6.40^{+0.17}_{-0.20}$	$8.38^{+3.19}_{-3.56}$	$164.00^{+66.31}_{-76.00}$
1997-12-18b	0.39 (17.92/46)	$3.63^{+0.79}_{-1.07}$	$(5.12^{+1.11}_{-1.51})E42$	$4.32^{+1.33}_{-1.35}$	$1.74^{+0.13}_{-0.14}$	$0.20^{+0.20}_{-0.36}$	$1.25^{+0.28}_{-0.38}$	$6.49^{+0.15}_{-0.17}$	$9.78^{+2.88}_{-3.43}$	$203.00^{+65.00}_{-77.00}$
1998-02-08a	0.50 (23.20/46)	$3.76^{+0.84}_{-1.14}$	$(5.30^{+1.18}_{-1.60})E42$	$4.92^{+1.36}_{-1.37}$	$1.80^{+0.13}_{-0.14}$	$0.19^{+0.19}_{-0.37}$	$1.48^{+0.34}_{-0.46}$	$6.44^{+0.25}_{-0.32}$	$6.47^{+3.30}_{-3.55}$	$123.00^{+63.69}_{-71.00}$
1998-02-09	0.52 (24.06/46)	$4.01^{+0.56}_{-0.73}$	$(5.65^{+0.78}_{-1.03})E42$	$5.04^{+1.01}_{-1.04}$	$1.74^{+0.06}_{-0.08}$	$0.00^{+0.00}_{-0.14}$	$1.47^{+0.21}_{-0.27}$	$6.43^{+0.20}_{-0.21}$	$7.75^{+2.92}_{-3.48}$	$137.00^{+53.73}_{-63.00}$
1998-08-30	0.44 (20.19/46)	$4.12^{+0.58}_{-0.93}$	$(5.81^{+0.82}_{-1.30})E42$	$5.33^{+1.03}_{-1.16}$	$1.73^{+0.06}_{-0.10}$	$0.00^{+0.00}_{-0.20}$	$1.49^{+0.21}_{-0.34}$	$6.29^{+0.17}_{-0.17}$	$9.70^{+3.29}_{-3.65}$	$157.00^{+54.00}_{-66.00}$
1998-08-31	0.56 (25.53/46)	$4.18^{+0.58}_{-0.83}$	$(5.90^{+0.82}_{-1.17})E42$	$4.65^{+1.01}_{-1.08}$	$1.69^{+0.06}_{-0.09}$	$0.00^{+0.00}_{-0.16}$	$1.37^{+0.19}_{-0.28}$	$6.31^{+0.17}_{-0.17}$	$9.49^{+3.17}_{-3.59}$	$156.00^{+53.00}_{-65.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 3227						$\mathrm{Fe}_K\alpha\sigma = 0.25$		
1996-11-18a	0.51 (23.67/46)	$6.55^{+1.12}_{-1.49}$	$(2.30^{+0.39}_{-0.53})E42$	$0.68^{+0.68}_{-0.96}$	$1.86^{+0.10}_{-0.11}$	$0.34^{+0.28}_{-0.36}$	$2.15^{+0.37}_{-0.49}$	$6.48^{+0.33}_{-0.37}$	$5.48^{+3.34}_{-3.57}$	$79.67^{+47.95}_{-52.33}$
1996-11-18b	0.47 (21.82/46)	$5.70^{+1.10}_{-1.93}$	$(2.01^{+0.39}_{-0.68})E42$	$0.79^{+0.79}_{-1.36}$	$1.82^{+0.12}_{-0.15}$	$0.28^{+0.28}_{-0.44}$	$1.77^{+0.34}_{-0.61}$	$5.95^{+0.30}_{-0.33}$	$8.75^{+5.02}_{-4.10}$	$125.00^{+73.12}_{-62.00}$
1996-11-19a	0.53 (24.58/46)	$5.01^{+0.46}_{-1.38}$	$(1.77^{+0.16}_{-0.49})E42$	$0.14^{+0.14}_{-1.20}$	$1.66^{+0.06}_{-0.13}$	$0.11^{+0.11}_{-0.32}$	$1.15^{+0.11}_{-0.32}$	$6.31^{+0.21}_{-0.24}$	$8.18^{+3.31}_{-2.71}$	$150.00^{+62.12}_{-52.00}$
1996-11-19b	0.40 (18.47/46)	$5.34^{+0.43}_{-1.59}$	$(1.88^{+0.15}_{-0.56})E42$	$0.07^{+0.07}_{-1.27}$	$1.68^{+0.05}_{-0.14}$	$0.10^{+0.10}_{-0.34}$	$1.24^{+0.10}_{-0.36}$	$6.24^{+0.17}_{-0.20}$	$10.90^{+3.77}_{-2.73}$	$190.00^{+71.00}_{-45.00}$
1996-11-20a	0.40 (18.60/46)	$4.99^{+0.81}_{-1.28}$	$(1.76^{+0.29}_{-0.45})E42$	$0.90^{+0.90}_{-1.13}$	$1.73^{+0.08}_{-0.12}$	$0.06^{+0.06}_{-0.29}$	$1.38^{+0.23}_{-0.36}$	$6.30^{+0.20}_{-0.22}$	$7.68^{+3.17}_{-3.28}$	$135.00^{+56.32}_{-64.00}$
1996-11-20b	0.60 (27.51/46)	$6.18^{+1.18}_{-1.43}$	$(2.17^{+0.42}_{-0.50})E42$	$1.59^{+1.04}_{-1.00}$	$1.86^{+0.11}_{-0.11}$	$0.27^{+0.27}_{-0.34}$	$2.19^{+0.42}_{-0.51}$	$6.51^{+0.29}_{-0.32}$	$6.54^{+3.40}_{-3.61}$	$96.47^{+50.20}_{-54.53}$
1996-11-20c	0.47 (21.64/46)	$5.95^{+0.81}_{-1.49}$	$(2.09^{+0.29}_{-0.53})E42$	$0.61^{+0.61}_{-1.09}$	$1.75^{+0.07}_{-0.12}$	$0.05^{+0.05}_{-0.29}$	$1.64^{+0.23}_{-0.42}$	$6.31^{+0.23}_{-0.26}$	$7.73^{+3.59}_{-3.65}$	$117.00^{+54.89}_{-61.00}$
1996-11-21a	0.44 (20.26/46)	$4.38^{+0.64}_{-1.25}$	$(1.54^{+0.23}_{-0.44})E42$	$1.15^{+0.99}_{-1.27}$	$1.67^{+0.07}_{-0.13}$	$0.00^{+0.00}_{-0.29}$	$1.11^{+0.17}_{-0.32}$	$6.32^{+0.23}_{-0.26}$	$7.13^{+3.20}_{-2.89}$	$142.00^{+66.71}_{-58.00}$
1996-11-21b	0.41 (18.66/46)	$5.33^{+0.99}_{-1.48}$	$(1.88^{+0.35}_{-0.52})E42$	$0.85^{+0.85}_{-1.18}$	$1.76^{+0.11}_{-0.13}$	$0.17^{+0.17}_{-0.33}$	$1.50^{+0.28}_{-0.42}$	$6.14^{+0.23}_{-0.26}$	$8.00^{+3.82}_{-3.70}$	$126.00^{+61.16}_{-66.00}$
1996-11-21c	0.42 (19.55/46)	$4.62^{+0.88}_{-1.26}$	$(1.62^{+0.31}_{-0.44})E42$	$1.15^{+1.15}_{-1.19}$	$1.74^{+0.10}_{-0.13}$	$0.09^{+0.09}_{-0.32}$	$1.30^{+0.25}_{-0.36}$	$6.29^{+0.21}_{-0.23}$	$7.13^{+3.14}_{-3.38}$	$133.00^{+59.45}_{-70.00}$
1996-11-22	0.38 (17.46/46)	$5.31^{+0.72}_{-1.29}$	$(1.87^{+0.25}_{-0.45})E42$	$0.57^{+0.57}_{-1.07}$	$1.70^{+0.07}_{-0.11}$	$0.06^{+0.06}_{-0.28}$	$1.35^{+0.19}_{-0.33}$	$6.37^{+0.19}_{-0.21}$	$8.11^{+3.11}_{-3.34}$	$140.00^{+54.47}_{-63.00}$
1999-01-02	0.85 (39.16/46)	$4.96^{+0.36}_{-0.78}$	$(1.75^{+0.12}_{-0.28})E42$	$0.00^{+0.00}_{-0.60}$	$1.90^{+0.05}_{-0.09}$	$0.09^{+0.09}_{-0.33}$	$1.64^{+0.12}_{-0.26}$	$6.00^{+0.31}_{-0.36}$	$7.08^{+2.81}_{-2.54}$	$132.00^{+51.12}_{-44.00}$
1999-04-01	0.45 (18.82/42)	$4.79^{+0.40}_{-0.97}$	$(1.68^{+0.14}_{-0.34})E42$	$0.00^{+0.00}_{-0.88}$	$1.67^{+0.06}_{-0.10}$	$0.17^{+0.17}_{-0.29}$	$1.10^{+0.09}_{-0.23}$	$6.25^{+0.17}_{-0.17}$	$9.65^{+2.68}_{-2.71}$	$187.00^{+55.00}_{-49.00}$
1999-04-29	0.53 (22.27/42)	$3.25^{+0.78}_{-1.35}$	$(1.14^{+0.27}_{-0.48})E42$	$1.15^{+1.15}_{-1.75}$	$1.67^{+0.14}_{-0.19}$	$0.24^{+0.24}_{-0.51}$	$0.81^{+0.20}_{-0.35}$	$6.32^{+0.20}_{-0.23}$	$7.47^{+3.04}_{-2.88}$	$199.00^{+85.00}_{-85.00}$
2000-04-02	0.36 (15.27/42)	$3.15^{+0.76}_{-1.24}$	$(1.11^{+0.27}_{-0.43})E42$	$1.12^{+1.12}_{-1.63}$	$1.76^{+0.15}_{-0.18}$	$0.31^{+0.31}_{-0.53}$	$0.90^{+0.22}_{-0.36}$	$6.34^{+0.23}_{-0.27}$	$6.24^{+2.82}_{-2.69}$	$175.00^{+81.89}_{-81.00}$
2000-04-15	0.46 (19.16/42)	$1.52^{+0.31}_{-0.67}$	$(5.34^{+1.09}_{-2.35})E41$	$1.37^{+1.37}_{-2.14}$	$1.49^{+0.11}_{-0.18}$	$0.00^{+0.00}_{-0.33}$	$0.29^{+0.06}_{-0.13}$	$6.32^{+0.21}_{-0.23}$	$5.13^{+1.90}_{-1.68}$	$283.00^{+115.00}_{-102.00}$
2000-05-23	0.36 (15.30/42)	$2.83^{+0.83}_{-1.21}$	$(9.93^{+2.91}_{-4.25})E41$	$3.00^{+1.82}_{-1.82}$	$1.75^{+0.18}_{-0.19}$	$0.35^{+0.35}_{-0.55}$	$0.90^{+0.27}_{-0.40}$	$6.21^{+0.18}_{-0.20}$	$7.90^{+3.15}_{-3.07}$	$207.00^{+87.00}_{-97.00}$
2001-01-29	0.44 (18.34/42)	$1.83^{+0.42}_{-0.97}$	$(6.44^{+1.47}_{-3.41})E41$	$1.54^{+1.54}_{-2.27}$	$1.51^{+0.12}_{-0.22}$	$0.05^{+0.05}_{-0.49}$	$0.36^{+0.08}_{-0.20}$	$6.32^{+0.19}_{-0.22}$	$5.94^{+2.27}_{-1.96}$	$268.00^{+113.00}_{-99.00}$
2001-10-06	0.49 (20.68/42)	$3.89^{+0.92}_{-1.27}$	$(1.37^{+0.32}_{-0.45})E42$	$1.29^{+1.29}_{-1.43}$	$1.71^{+0.14}_{-0.15}$	$0.22^{+0.22}_{-0.39}$	$1.04^{+0.25}_{-0.35}$	$6.29^{+0.18}_{-0.20}$	$8.25^{+3.11}_{-3.21}$	$179.00^{+70.00}_{-81.00}$
2002-01-04	0.73 (30.71/42)	$3.91^{+0.70}_{-1.47}$	$(1.38^{+0.25}_{-0.52})E42$	$0.62^{+0.62}_{-1.54}$	$1.78^{+0.12}_{-0.17}$	$0.40^{+0.34}_{-0.54}$	$1.10^{+0.20}_{-0.42}$	$6.33^{+0.20}_{-0.25}$	$9.03^{+3.36}_{-2.71}$	$213.00^{+83.00}_{-66.00}$
2002-04-20	0.50 (21.20/42)	$4.11^{+0.82}_{-1.31}$	$(1.44^{+0.29}_{-0.46})E42$	$0.84^{+0.84}_{-1.36}$	$1.76^{+0.12}_{-0.15}$	$0.35^{+0.31}_{-0.44}$	$1.15^{+0.24}_{-0.37}$	$6.42^{+0.27}_{-0.34}$	$6.23^{+3.09}_{-2.97}$	$139.00^{+70.38}_{-69.00}$
2003-06-19	0.43 (18.01/42)	$4.52^{+0.56}_{-1.41}$	$(1.60^{+0.20}_{-0.49})E42$	$0.23^{+0.23}_{-1.23}$	$1.83^{+0.09}_{-0.15}$	$0.71^{+0.36}_{-0.59}$	$1.31^{+0.17}_{-0.41}$	$6.47^{+0.22}_{-0.26}$	$7.35^{+2.99}_{-2.63}$	$157.00^{+65.46}_{-59.00}$
2003-11-12	0.46 (19.36/42)	$4.03^{+0.85}_{-1.52}$	$(1.42^{+0.30}_{-0.54})E42$	$0.86^{+0.86}_{-1.50}$	$1.81^{+0.13}_{-0.18}$	$0.47^{+0.37}_{-0.58}$	$1.20^{+0.26}_{-0.46}$	$6.24^{+0.20}_{-0.24}$	$9.02^{+3.57}_{-3.06}$	$199.00^{+82.00}_{-72.00}$
2004-02-10	0.47 (19.69/42)	$4.77^{+0.38}_{-1.14}$	$(1.68^{+0.13}_{-0.40})E42$	$0.00^{+0.00}_{-1.04}$	$1.74^{+0.06}_{-0.11}$	$0.19^{+0.19}_{-0.32}$	$1.21^{+0.10}_{-0.29}$	$6.40^{+0.19}_{-0.19}$	$7.88^{+2.71}_{-2.48}$	$163.00^{+59.00}_{-48.00}$
2004-03-19	0.59 (24.98/42)	$5.03^{+0.38}_{-1.50}$	$(1.77^{+0.13}_{-0.53})E42$	$0.00^{+0.00}_{-1.25}$	$1.72^{+0.05}_{-0.14}$	$0.19^{+0.19}_{-0.37}$	$1.24^{+0.10}_{-0.38}$	$6.22^{+0.16}_{-0.17}$	$11.52^{+3.55}_{-2.55}$	$212.00^{+68.00}_{-48.00}$
2004-06-17	0.55 (23.14/42)	$4.56^{+0.29}_{-1.00}$	$(1.61^{+0.10}_{-0.35})E42$	$0.00^{+0.00}_{-0.95}$	$1.66^{+0.04}_{-0.11}$	$0.06^{+0.06}_{-0.27}$	$1.04^{+0.07}_{-0.23}$	$6.32^{+0.15}_{-0.15}$	$9.88^{+2.58}_{-2.53}$	$207.00^{+57.00}_{-50.00}$
2004-10-13	0.45 (18.94/42)	$5.38^{+0.43}_{-0.98}$	$(1.90^{+0.15}_{-0.35})E42$	$0.00^{+0.00}_{-0.75}$	$1.79^{+0.06}_{-0.10}$	$0.49^{+0.26}_{-0.35}$	$1.45^{+0.12}_{-0.27}$	$6.25^{+0.15}_{-0.15}$	$10.97^{+2.74}_{-2.81}$	$193.00^{+51.00}_{-46.00}$
2005-01-23	0.66 (27.53/42)	$5.69^{+0.42}_{-1.52}$	$(2.00^{+0.15}_{-0.54})E42$	$0.00^{+0.00}_{-1.13}$	$1.75^{+0.05}_{-0.13}$	$0.23^{+0.21}_{-0.35}$	$1.47^{+0.11}_{-0.40}$	$6.31^{+0.16}_{-0.18}$	$10.39^{+3.49}_{-2.83}$	$173.00^{+59.00}_{-49.00}$
2005-05-11	0.64 (27.52/43)	$7.42^{+0.61}_{-1.61}$	$(2.61^{+0.21}_{-0.57})E42$	$0.00^{+0.00}_{-0.86}$	$1.90^{+0.06}_{-0.11}$	$0.64^{+0.31}_{-0.45}$	$2.34^{+0.20}_{-0.52}$	$6.33^{+0.18}_{-0.19}$	$13.26^{+4.02}_{-3.57}$	$177.00^{+56.00}_{-44.00}$

Spectrum[a]	χ^2_ν[b]	$F_{2-10KeV}$[c]	L_x[d]	wabs N_H[e]	pexrav Γ[f]	pexrav R[g]	pexrav Norm.[h]	gaussian Energy[i]	gaussian Norm.[j]	gaussian EW[k]
		NGC 3516						$Fe_K\alpha\sigma = 0.23$		
1997-03-16	0.49 (22.34/46)	$5.77^{+1.30}_{-1.74}$	$(1.03^{+0.23}_{-0.31})E43$	$1.68^{+1.20}_{-1.20}$	$1.91^{+0.14}_{-0.15}$	$0.54^{+0.36}_{-0.51}$	$2.14^{+0.49}_{-0.66}$	$6.14^{+0.17}_{-0.19}$	$10.12^{+4.12}_{-3.56}$	$141.00^{+58.82}_{-56.00}$
1997-03-25	0.75 (34.32/46)	$5.57^{+1.07}_{-1.41}$	$(9.98^{+1.92}_{-2.52})E42$	$1.43^{+1.09}_{-1.11}$	$1.79^{+0.11}_{-0.12}$	$0.17^{+0.17}_{-0.29}$	$1.72^{+0.34}_{-0.44}$	$6.22^{+0.15}_{-0.16}$	$11.54^{+3.40}_{-3.24}$	$173.00^{+53.00}_{-55.00}$
1997-03-31	0.64 (29.23/46)	$12.39^{+2.86}_{-3.87}$	$(2.22^{+0.51}_{-0.69})E43$	$1.91^{+1.26}_{-1.26}$	$1.90^{+0.14}_{-0.15}$	$0.32^{+0.32}_{-0.45}$	$4.66^{+1.10}_{-1.48}$	$6.11^{+0.16}_{-0.17}$	$26.14^{+8.66}_{-7.52}$	$168.00^{+58.00}_{-55.00}$
1997-04-05	0.61 (28.04/46)	$5.60^{+1.28}_{-1.75}$	$(1.00^{+0.23}_{-0.31})E43$	$1.88^{+1.28}_{-1.29}$	$1.81^{+0.14}_{-0.15}$	$0.27^{+0.27}_{-0.42}$	$1.84^{+0.43}_{-0.59}$	$6.11^{+0.13}_{-0.14}$	$15.95^{+4.42}_{-3.66}$	$226.00^{+70.00}_{-62.00}$
1997-04-13	0.61 (28.18/46)	$4.95^{+1.04}_{-1.36}$	$(8.87^{+1.85}_{-2.45})E42$	$1.56^{+1.16}_{-1.17}$	$1.80^{+0.12}_{-0.13}$	$0.40^{+0.28}_{-0.38}$	$1.54^{+0.33}_{-0.43}$	$6.26^{+0.15}_{-0.17}$	$11.40^{+3.44}_{-3.14}$	$194.00^{+61.00}_{-56.00}$
1997-04-21	0.60 (27.72/46)	$4.44^{+1.07}_{-1.48}$	$(7.94^{+1.91}_{-2.65})E42$	$2.40^{+1.37}_{-1.39}$	$1.76^{+0.14}_{-0.16}$	$0.34^{+0.32}_{-0.46}$	$1.39^{+0.34}_{-0.48}$	$6.22^{+0.15}_{-0.16}$	$11.29^{+3.57}_{-3.45}$	$196.00^{+65.00}_{-71.00}$
1997-04-29	1.00 (45.97/46)	$3.36^{+0.82}_{-1.13}$	$(6.01^{+1.46}_{-2.03})E42$	$2.55^{+1.43}_{-1.43}$	$1.76^{+0.15}_{-0.16}$	$0.33^{+0.30}_{-0.43}$	$1.04^{+0.26}_{-0.36}$	$6.15^{+0.10}_{-0.11}$	$12.43^{+2.98}_{-3.14}$	$285.00^{+79.00}_{-82.00}$
1997-05-09	0.64 (29.22/46)	$3.86^{+0.84}_{-1.33}$	$(6.91^{+1.51}_{-2.37})E42$	$1.40^{+1.40}_{-1.46}$	$1.64^{+0.14}_{-0.16}$	$0.23^{+0.23}_{-0.42}$	$0.91^{+0.21}_{-0.33}$	$6.24^{+0.10}_{-0.11}$	$14.38^{+3.19}_{-3.33}$	$313.00^{+80.00}_{-82.00}$
1997-05-18	0.94 (43.47/46)	$3.72^{+0.95}_{-1.36}$	$(6.64^{+1.69}_{-2.44})E42$	$5.04^{+1.50}_{-1.54}$	$1.85^{+0.15}_{-0.17}$	$0.45^{+0.33}_{-0.49}$	$1.55^{+0.41}_{-0.58}$	$6.10^{+0.14}_{-0.15}$	$12.17^{+3.66}_{-3.42}$	$213.00^{+72.00}_{-72.00}$
1997-05-22a	0.48 (21.93/46)	$3.75^{+1.03}_{-1.50}$	$(6.70^{+1.84}_{-2.68})E42$	$5.58^{+1.56}_{-1.55}$	$1.96^{+0.18}_{-0.20}$	$1.00^{+0.54}_{-0.89}$	$1.88^{+0.53}_{-0.78}$	$6.23^{+0.16}_{-0.18}$	$10.85^{+4.25}_{-3.68}$	$186.00^{+77.00}_{-76.00}$
1997-05-22b	0.96 (44.18/46)	$3.73^{+1.06}_{-1.59}$	$(6.66^{+1.89}_{-2.85})E42$	$4.88^{+1.65}_{-1.66}$	$1.88^{+0.18}_{-0.21}$	$0.70^{+0.48}_{-0.78}$	$1.60^{+0.47}_{-0.70}$	$6.20^{+0.13}_{-0.14}$	$13.48^{+4.16}_{-3.68}$	$243.00^{+81.00}_{-82.00}$
1997-05-22c	0.53 (24.38/46)	$3.96^{+0.94}_{-1.33}$	$(7.07^{+1.68}_{-2.37})E42$	$3.56^{+1.42}_{-1.46}$	$1.70^{+0.14}_{-0.15}$	$0.25^{+0.25}_{-0.39}$	$1.19^{+0.29}_{-0.41}$	$6.10^{+0.10}_{-0.11}$	$16.03^{+3.73}_{-3.48}$	$286.00^{+78.00}_{-77.00}$
1997-05-23a	0.60 (27.64/46)	$3.50^{+0.96}_{-1.45}$	$(6.26^{+1.71}_{-2.59})E42$	$3.78^{+1.66}_{-1.71}$	$1.70^{+0.17}_{-0.19}$	$0.44^{+0.36}_{-0.56}$	$1.04^{+0.30}_{-0.45}$	$6.12^{+0.10}_{-0.11}$	$15.50^{+3.78}_{-3.65}$	$307.00^{+83.00}_{-94.00}$
1997-05-23b	0.91 (42.08/46)	$3.41^{+0.92}_{-1.39}$	$(6.09^{+1.65}_{-2.48})E42$	$4.40^{+1.57}_{-1.60}$	$1.82^{+0.17}_{-0.19}$	$0.61^{+0.42}_{-0.67}$	$1.29^{+0.36}_{-0.54}$	$6.21^{+0.11}_{-0.12}$	$12.47^{+3.53}_{-3.27}$	$251.00^{+77.00}_{-82.00}$
1997-05-23c	0.76 (35.05/46)	$3.80^{+1.04}_{-1.54}$	$(6.79^{+1.86}_{-2.74})E42$	$4.96^{+1.51}_{-1.50}$	$1.99^{+0.18}_{-0.20}$	$1.01^{+0.56}_{-0.93}$	$1.92^{+0.54}_{-0.80}$	$6.21^{+0.15}_{-0.18}$	$10.35^{+4.12}_{-3.42}$	$182.00^{+77.00}_{-71.00}$
1997-05-23d	0.67 (30.93/46)	$3.86^{+0.86}_{-1.38}$	$(6.90^{+1.54}_{-2.47})E42$	$2.62^{+1.44}_{-1.54}$	$1.64^{+0.12}_{-0.16}$	$0.14^{+0.14}_{-0.38}$	$1.00^{+0.23}_{-0.37}$	$6.11^{+0.10}_{-0.10}$	$16.41^{+3.55}_{-3.44}$	$317.00^{+81.00}_{-86.00}$
1997-05-24a	0.87 (39.82/46)	$3.68^{+0.99}_{-1.51}$	$(6.57^{+1.77}_{-2.69})E42$	$3.62^{+1.63}_{-1.67}$	$1.76^{+0.17}_{-0.19}$	$0.30^{+0.30}_{-0.53}$	$1.23^{+0.34}_{-0.52}$	$6.09^{+0.11}_{-0.11}$	$15.51^{+3.84}_{-3.59}$	$299.00^{+87.00}_{-89.00}$
1997-05-24b	0.74 (33.86/46)	$3.88^{+0.93}_{-1.41}$	$(6.93^{+1.66}_{-2.51})E42$	$2.21^{+1.47}_{-1.52}$	$1.64^{+0.14}_{-0.17}$	$0.22^{+0.22}_{-0.41}$	$0.97^{+0.24}_{-0.36}$	$6.10^{+0.10}_{-0.10}$	$15.78^{+3.49}_{-3.30}$	$310.00^{+81.00}_{-83.00}$
1997-05-24c	0.52 (23.89/46)	$4.15^{+1.01}_{-1.44}$	$(7.41^{+1.80}_{-2.57})E42$	$2.90^{+1.41}_{-1.45}$	$1.77^{+0.15}_{-0.16}$	$0.35^{+0.32}_{-0.46}$	$1.34^{+0.34}_{-0.48}$	$6.19^{+0.13}_{-0.13}$	$13.72^{+3.69}_{-3.42}$	$249.00^{+76.00}_{-76.00}$
1997-05-25a	0.83 (38.22/46)	$3.65^{+0.97}_{-1.44}$	$(6.51^{+1.74}_{-2.57})E42$	$3.89^{+1.53}_{-1.55}$	$1.86^{+0.17}_{-0.19}$	$0.68^{+0.44}_{-0.70}$	$1.42^{+0.39}_{-0.58}$	$6.18^{+0.11}_{-0.12}$	$14.25^{+3.65}_{-3.36}$	$279.00^{+83.00}_{-83.00}$
1997-05-25b	0.60 (27.76/46)	$3.33^{+0.84}_{-1.20}$	$(5.96^{+1.51}_{-2.13})E42$	$3.42^{+1.50}_{-1.51}$	$1.75^{+0.16}_{-0.17}$	$0.44^{+0.35}_{-0.52}$	$1.06^{+0.28}_{-0.40}$	$6.22^{+0.10}_{-0.11}$	$13.73^{+3.15}_{-3.35}$	$300.00^{+75.00}_{-93.00}$
1997-05-25c	0.40 (18.52/46)	$3.18^{+0.87}_{-1.27}$	$(5.68^{+1.55}_{-2.27})E42$	$3.82^{+1.63}_{-1.64}$	$1.77^{+0.17}_{-0.19}$	$0.53^{+0.40}_{-0.61}$	$1.06^{+0.30}_{-0.44}$	$6.25^{+0.12}_{-0.13}$	$12.84^{+3.27}_{-3.52}$	$293.00^{+86.00}_{-94.00}$
1997-05-26	0.85 (39.20/46)	$3.35^{+0.81}_{-1.15}$	$(5.99^{+1.45}_{-2.04})E42$	$4.16^{+1.48}_{-1.51}$	$1.72^{+0.14}_{-0.16}$	$0.27^{+0.27}_{-0.40}$	$1.09^{+0.27}_{-0.39}$	$6.29^{+0.13}_{-0.14}$	$12.00^{+3.39}_{-3.26}$	$255.00^{+77.00}_{-87.00}$
1997-05-30	0.84 (38.58/46)	$3.49^{+0.74}_{-1.14}$	$(6.24^{+1.32}_{-2.04})E42$	$2.46^{+1.35}_{-1.43}$	$1.66^{+0.12}_{-0.15}$	$0.13^{+0.13}_{-0.34}$	$0.93^{+0.20}_{-0.32}$	$6.23^{+0.11}_{-0.12}$	$12.49^{+2.92}_{-3.11}$	$275.00^{+69.00}_{-85.00}$
1997-06-25	0.88 (40.66/46)	$3.47^{+0.88}_{-1.27}$	$(6.21^{+1.57}_{-2.26})E42$	$2.85^{+1.44}_{-1.46}$	$1.81^{+0.16}_{-0.18}$	$0.69^{+0.40}_{-0.61}$	$1.16^{+0.30}_{-0.44}$	$6.16^{+0.10}_{-0.11}$	$13.49^{+3.25}_{-3.16}$	$293.00^{+82.00}_{-79.00}$
1997-07-08	0.64 (29.35/46)	$3.65^{+0.90}_{-1.25}$	$(6.52^{+1.60}_{-2.23})E42$	$4.15^{+1.37}_{-1.36}$	$1.97^{+0.15}_{-0.17}$	$0.85^{+0.45}_{-0.69}$	$1.72^{+0.43}_{-0.60}$	$6.24^{+0.14}_{-0.15}$	$10.14^{+3.39}_{-3.17}$	$200.00^{+73.00}_{-68.00}$
1997-08-03	0.65 (29.98/46)	$3.72^{+1.07}_{-1.62}$	$(6.65^{+1.91}_{-2.89})E42$	$3.93^{+1.58}_{-1.57}$	$1.94^{+0.19}_{-0.22}$	$1.10^{+0.62}_{-1.08}$	$1.62^{+0.48}_{-0.73}$	$6.17^{+0.14}_{-0.15}$	$11.73^{+4.21}_{-3.55}$	$222.00^{+88.00}_{-76.00}$
1997-12-30	0.71 (32.79/46)	$25.64^{+5.92}_{-7.92}$	$(4.60^{+1.06}_{-1.42})E43$	$1.99^{+1.17}_{-1.15}$	$2.05^{+0.15}_{-0.16}$	$0.89^{+0.47}_{-0.70}$	$11.94^{+2.79}_{-3.74}$	$6.19^{+0.23}_{-0.28}$	$36.12^{+19.28}_{-16.22}$	$115.00^{+62.30}_{-54.00}$
1998-03-25	0.85 (39.14/46)	$4.97^{+1.24}_{-1.75}$	$(8.89^{+2.22}_{-3.13})E42$	$2.28^{+1.33}_{-1.32}$	$1.89^{+0.16}_{-0.17}$	$0.75^{+0.44}_{-0.67}$	$1.83^{+0.47}_{-0.66}$	$6.08^{+0.15}_{-0.16}$	$11.19^{+4.43}_{-3.49}$	$172.00^{+73.05}_{-58.00}$
1998-04-13a	0.59 (27.30/46)	$5.63^{+1.23}_{-1.65}$	$(1.01^{+0.22}_{-0.29})E43$	$1.61^{+1.22}_{-1.22}$	$1.75^{+0.13}_{-0.14}$	$0.30^{+0.28}_{-0.39}$	$1.63^{+0.37}_{-0.49}$	$6.15^{+0.12}_{-0.12}$	$15.45^{+4.21}_{-3.53}$	$219.00^{+62.00}_{-60.00}$
1998-04-13b	0.57 (26.13/46)	$4.88^{+1.12}_{-1.56}$	$(8.74^{+2.01}_{-2.78})E42$	$2.40^{+1.30}_{-1.33}$	$1.75^{+0.14}_{-0.15}$	$0.35^{+0.30}_{-0.42}$	$1.47^{+0.35}_{-0.48}$	$6.10^{+0.12}_{-0.13}$	$15.17^{+4.15}_{-3.50}$	$235.00^{+72.00}_{-65.00}$

Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	wabs N_H [e]	pexrav Γ [f]	pexrav R [g]	pexrav **Norm.**[h]	gaussian **Energy**[i]	gaussian **Norm.**[j]	gaussian **EW**[k]
1998-04-13c	0.55 (25.15/46)	$5.91^{+1.37}_{-1.88}$	$(1.06^{+0.24}_{-0.34})E43$	$2.62^{+1.27}_{-1.28}$	$1.84^{+0.14}_{-0.15}$	$0.52^{+0.34}_{-0.49}$	$2.12^{+0.50}_{-0.69}$	$6.05^{+0.15}_{-0.17}$	$13.94^{+4.96}_{-3.96}$	$172.00^{+64.00}_{-57.00}$
1998-04-14a	0.70 (32.37/46)	$4.69^{+1.09}_{-1.52}$	$(8.39^{+1.96}_{-2.72})E42$	$2.76^{+1.30}_{-1.33}$	$1.79^{+0.14}_{-0.15}$	$0.42^{+0.31}_{-0.45}$	$1.56^{+0.37}_{-0.52}$	$6.10^{+0.15}_{-0.16}$	$12.29^{+4.41}_{-3.30}$	$193.00^{+75.00}_{-57.00}$
1998-04-14b	0.67 (30.87/46)	$5.01^{+1.10}_{-1.48}$	$(8.95^{+1.97}_{-2.66})E42$	$2.46^{+1.23}_{-1.25}$	$1.76^{+0.13}_{-0.14}$	$0.33^{+0.28}_{-0.39}$	$1.56^{+0.35}_{-0.47}$	$6.14^{+0.13}_{-0.14}$	$13.18^{+4.21}_{-3.37}$	$198.00^{+66.00}_{-60.00}$
1998-04-14c	0.75 (34.41/46)	$5.44^{+1.25}_{-1.69}$	$(9.73^{+2.24}_{-3.03})E42$	$3.16^{+1.28}_{-1.28}$	$1.87^{+0.14}_{-0.15}$	$0.36^{+0.32}_{-0.44}$	$2.13^{+0.50}_{-0.68}$	$6.14^{+0.15}_{-0.16}$	$12.46^{+4.63}_{-3.83}$	$167.00^{+64.00}_{-59.00}$
1998-04-15a	0.71 (32.70/46)	$5.10^{+1.16}_{-1.57}$	$(9.12^{+2.08}_{-2.80})E42$	$3.09^{+1.29}_{-1.30}$	$1.82^{+0.13}_{-0.14}$	$0.27^{+0.27}_{-0.40}$	$1.84^{+0.43}_{-0.58}$	$6.18^{+0.15}_{-0.17}$	$12.75^{+4.28}_{-3.69}$	$186.00^{+67.00}_{-58.00}$
1998-04-15b	0.74 (33.89/46)	$5.37^{+1.18}_{-1.72}$	$(9.60^{+2.11}_{-3.07})E42$	$2.44^{+1.29}_{-1.35}$	$1.74^{+0.13}_{-0.15}$	$0.19^{+0.19}_{-0.38}$	$1.62^{+0.37}_{-0.53}$	$6.10^{+0.13}_{-0.14}$	$15.67^{+4.67}_{-3.71}$	$221.00^{+73.00}_{-62.00}$
1998-04-15c	0.85 (38.90/46)	$5.14^{+1.20}_{-1.66}$	$(9.19^{+2.15}_{-2.97})E42$	$3.65^{+1.26}_{-1.27}$	$1.91^{+0.14}_{-0.16}$	$0.70^{+0.40}_{-0.60}$	$2.18^{+0.52}_{-0.72}$	$6.25^{+0.17}_{-0.19}$	$10.26^{+4.38}_{-3.65}$	$146.00^{+65.78}_{-55.00}$
1998-04-15d	0.44 (20.41/46)	$4.67^{+1.09}_{-1.50}$	$(8.35^{+1.95}_{-2.68})E42$	$2.37^{+1.33}_{-1.35}$	$1.76^{+0.14}_{-0.15}$	$0.30^{+0.30}_{-0.43}$	$1.45^{+0.35}_{-0.48}$	$6.24^{+0.14}_{-0.15}$	$13.24^{+3.69}_{-3.48}$	$225.00^{+70.00}_{-64.00}$
1998-04-16	0.56 (25.99/46)	$4.17^{+1.01}_{-1.39}$	$(7.45^{+1.80}_{-2.49})E42$	$3.11^{+1.37}_{-1.38}$	$1.80^{+0.15}_{-0.16}$	$0.43^{+0.33}_{-0.48}$	$1.43^{+0.36}_{-0.49}$	$6.13^{+0.14}_{-0.14}$	$11.96^{+3.82}_{-3.37}$	$208.00^{+70.00}_{-70.00}$
1998-05-28	0.58 (26.75/46)	$3.69^{+1.00}_{-1.51}$	$(6.59^{+1.79}_{-2.70})E42$	$2.88^{+1.54}_{-1.59}$	$1.79^{+0.17}_{-0.19}$	$0.47^{+0.39}_{-0.62}$	$1.23^{+0.34}_{-0.52}$	$6.12^{+0.16}_{-0.17}$	$10.32^{+3.79}_{-3.45}$	$205.00^{+80.00}_{-82.00}$
1998-08-05	0.62 (28.33/46)	$4.10^{+1.11}_{-1.64}$	$(7.34^{+1.99}_{-2.94})E42$	$2.99^{+1.50}_{-1.52}$	$1.88^{+0.17}_{-0.19}$	$0.66^{+0.45}_{-0.72}$	$1.58^{+0.44}_{-0.65}$	$6.02^{+0.14}_{-0.15}$	$13.21^{+4.26}_{-3.57}$	$231.00^{+83.00}_{-76.00}$
1998-10-12	0.51 (23.40/46)	$3.82^{+1.04}_{-1.52}$	$(6.83^{+1.86}_{-2.72})E42$	$3.50^{+1.51}_{-1.50}$	$1.90^{+0.18}_{-0.20}$	$0.86^{+0.51}_{-0.82}$	$1.54^{+0.43}_{-0.63}$	$6.14^{+0.14}_{-0.15}$	$11.71^{+4.00}_{-3.47}$	$217.00^{+79.00}_{-78.00}$
1999-01-05	0.32 (14.74/46)	$3.38^{+0.94}_{-1.38}$	$(6.04^{+1.67}_{-2.47})E42$	$2.72^{+1.57}_{-1.59}$	$1.93^{+0.18}_{-0.20}$	$0.76^{+0.49}_{-0.78}$	$1.36^{+0.39}_{-0.57}$	$5.98^{+0.15}_{-0.15}$	$11.46^{+4.03}_{-3.54}$	$244.00^{+91.00}_{-95.00}$
1999-04-30	0.44 (18.43/42)	$3.38^{+0.97}_{-1.48}$	$(6.03^{+1.74}_{-2.64})E42$	$2.29^{+1.84}_{-1.88}$	$1.67^{+0.17}_{-0.19}$	$0.29^{+0.29}_{-0.52}$	$0.88^{+0.27}_{-0.40}$	$6.23^{+0.11}_{-0.12}$	$13.81^{+3.40}_{-3.77}$	$317.00^{+87.00}_{-114.00}$
1999-07-25	0.39 (16.39/42)	$2.63^{+0.83}_{-1.37}$	$(4.70^{+1.48}_{-2.44})E42$	$2.32^{+2.04}_{-2.09}$	$1.72^{+0.20}_{-0.23}$	$0.43^{+0.42}_{-0.72}$	$0.75^{+0.24}_{-0.40}$	$6.24^{+0.16}_{-0.18}$	$8.64^{+3.01}_{-3.83}$	$259.00^{+102.00}_{-138.00}$
1999-11-08	0.54 (22.66/42)	$2.08^{+0.70}_{-1.29}$	$(3.72^{+1.26}_{-2.31})E42$	$3.65^{+2.44}_{-2.54}$	$1.62^{+0.21}_{-0.26}$	$0.29^{+0.29}_{-0.71}$	$0.55^{+0.19}_{-0.36}$	$6.16^{+0.12}_{-0.13}$	$10.77^{+2.98}_{-4.42}$	$370.00^{+123.00}_{-199.00}$
2001-04-10	0.55 (22.98/42)	$2.88^{+0.86}_{-1.28}$	$(5.15^{+1.53}_{-2.29})E42$	$2.78^{+1.78}_{-1.78}$	$1.81^{+0.19}_{-0.21}$	$0.65^{+0.46}_{-0.74}$	$0.97^{+0.29}_{-0.44}$	$6.16^{+0.14}_{-0.16}$	$9.00^{+3.22}_{-3.54}$	$235.00^{+93.00}_{-107.00}$
2001-04-11	0.53 (22.24/42)	$3.06^{+0.88}_{-1.32}$	$(5.46^{+1.57}_{-2.35})E42$	$2.52^{+1.76}_{-1.78}$	$1.73^{+0.18}_{-0.19}$	$0.40^{+0.37}_{-0.58}$	$0.91^{+0.27}_{-0.40}$	$6.17^{+0.14}_{-0.14}$	$10.00^{+3.24}_{-3.61}$	$250.00^{+91.00}_{-104.00}$
2005-08-22	0.68 (29.41/43)	$2.63^{+0.88}_{-1.47}$	$(4.70^{+1.57}_{-2.61})E42$	$6.42^{+2.13}_{-2.13}$	$1.81^{+0.22}_{-0.25}$	$0.72^{+0.53}_{-0.95}$	$1.06^{+0.37}_{-0.62}$	$6.11^{+0.11}_{-0.11}$	$14.41^{+3.96}_{-4.11}$	$335.00^{+111.00}_{-129.00}$
2005-10-14	1.37 (59.04/43)	$3.25^{+1.18}_{-2.39}$	$(5.81^{+2.10}_{-4.26})E42$	$4.43^{+2.00}_{-2.02}$	$2.00^{+0.26}_{-0.41}$	$1.42^{+0.91}_{-3.16}$	$1.56^{+0.58}_{-1.18}$	$6.23^{+0.14}_{-0.18}$	$10.98^{+5.61}_{-3.72}$	$231.00^{+127.00}_{-97.00}$

Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	Norm.[h]	Energy[i]	Norm.[j]	EW[k]
				wabs	pexrav			gaussian		
		NGC 3783						$Fe_K \alpha \sigma = 0.28$		
1996-01-30	0.50 (28.01/56)	$5.36^{+0.85}_{-1.07}$	$(1.18^{+0.19}_{-0.24})E43$	$2.40^{+0.75}_{-0.77}$	$1.75^{+0.09}_{-0.10}$	$0.61^{+0.27}_{-0.36}$	$1.62^{+0.26}_{-0.33}$	$6.33^{+0.15}_{-0.17}$	$12.08^{+3.29}_{-3.14}$	$179.00^{+52.00}_{-48.00}$
1996-01-31	0.61 (33.97/56)	$4.94^{+0.82}_{-0.99}$	$(1.09^{+0.18}_{-0.22})E43$	$2.85^{+0.80}_{-0.77}$	$1.76^{+0.10}_{-0.10}$	$0.49^{+0.27}_{-0.35}$	$1.58^{+0.27}_{-0.32}$	$6.45^{+0.16}_{-0.17}$	$10.28^{+2.88}_{-2.96}$	$165.00^{+46.00}_{-48.00}$
1996-02-03	0.45 (25.14/56)	$4.26^{+0.75}_{-0.94}$	$(9.41^{+1.66}_{-2.08})E42$	$3.20^{+0.83}_{-0.84}$	$1.78^{+0.11}_{-0.11}$	$0.69^{+0.32}_{-0.43}$	$1.41^{+0.25}_{-0.32}$	$6.40^{+0.17}_{-0.19}$	$9.68^{+2.87}_{-2.79}$	$172.00^{+52.00}_{-55.00}$
1999-01-02	0.60 (27.42/46)	$7.27^{+1.50}_{-1.93}$	$(1.61^{+0.33}_{-0.43})E43$	$1.50^{+1.15}_{-1.15}$	$1.75^{+0.12}_{-0.12}$	$0.20^{+0.20}_{-0.31}$	$2.11^{+0.45}_{-0.57}$	$6.12^{+0.16}_{-0.17}$	$15.67^{+5.34}_{-5.27}$	$173.00^{+61.00}_{-68.00}$
1999-05-01	0.60 (25.26/42)	$6.00^{+1.52}_{-2.02}$	$(1.32^{+0.34}_{-0.45})E43$	$2.70^{+1.48}_{-1.42}$	$1.88^{+0.15}_{-0.16}$	$0.63^{+0.39}_{-0.55}$	$2.26^{+0.59}_{-0.78}$	$6.30^{+0.16}_{-0.19}$	$14.51^{+5.11}_{-5.11}$	$188.00^{+69.00}_{-79.00}$
1999-06-30	0.62 (25.93/42)	$7.04^{+1.63}_{-2.09}$	$(1.55^{+0.36}_{-0.46})E43$	$1.73^{+1.36}_{-1.32}$	$1.80^{+0.13}_{-0.14}$	$0.28^{+0.27}_{-0.36}$	$2.27^{+0.54}_{-0.69}$	$6.22^{+0.19}_{-0.22}$	$12.93^{+5.36}_{-5.38}$	$149.00^{+63.57}_{-71.00}$
1999-09-11	0.66 (27.91/42)	$6.84^{+1.58}_{-2.01}$	$(1.51^{+0.35}_{-0.44})E43$	$1.97^{+1.38}_{-1.32}$	$1.78^{+0.13}_{-0.14}$	$0.30^{+0.27}_{-0.35}$	$2.16^{+0.51}_{-0.65}$	$6.18^{+0.15}_{-0.17}$	$15.15^{+5.36}_{-5.54}$	$176.00^{+67.00}_{-70.00}$
1999-11-09	0.61 (25.52/42)	$7.86^{+1.70}_{-2.21}$	$(1.73^{+0.38}_{-0.49})E43$	$2.08^{+1.24}_{-1.24}$	$1.86^{+0.13}_{-0.13}$	$0.44^{+0.29}_{-0.39}$	$2.82^{+0.62}_{-0.81}$	$6.35^{+0.27}_{-0.34}$	$10.92^{+5.58}_{-5.46}$	$115.00^{+59.62}_{-61.00}$
2000-01-21	0.56 (23.72/42)	$6.89^{+1.55}_{-1.91}$	$(1.52^{+0.34}_{-0.42})E43$	$1.68^{+1.30}_{-1.21}$	$1.86^{+0.13}_{-0.13}$	$0.56^{+0.32}_{-0.42}$	$2.36^{+0.54}_{-0.67}$	$6.22^{+0.13}_{-0.14}$	$16.46^{+4.84}_{-5.12}$	$195.00^{+59.00}_{-72.00}$
2000-07-10	0.43 (18.17/42)	$7.12^{+1.54}_{-2.04}$	$(1.57^{+0.34}_{-0.45})E43$	$1.16^{+1.16}_{-1.27}$	$1.78^{+0.12}_{-0.13}$	$0.23^{+0.23}_{-0.34}$	$2.12^{+0.47}_{-0.62}$	$6.19^{+0.16}_{-0.18}$	$15.15^{+5.23}_{-5.17}$	$180.00^{+64.00}_{-66.00}$
2000-11-06	0.42 (17.58/42)	$6.64^{+1.51}_{-2.00}$	$(1.47^{+0.33}_{-0.44})E43$	$2.50^{+1.29}_{-1.28}$	$1.91^{+0.14}_{-0.14}$	$0.59^{+0.34}_{-0.47}$	$2.62^{+0.61}_{-0.80}$	$6.20^{+0.20}_{-0.23}$	$12.41^{+5.48}_{-5.36}$	$145.00^{+65.98}_{-66.00}$
2001-02-20	0.55 (22.89/42)	$5.25^{+1.35}_{-1.79}$	$(1.16^{+0.30}_{-0.39})E43$	$2.28^{+1.47}_{-1.40}$	$1.84^{+0.16}_{-0.16}$	$0.65^{+0.40}_{-0.56}$	$1.82^{+0.48}_{-0.63}$	$6.21^{+0.17}_{-0.19}$	$12.42^{+4.62}_{-4.65}$	$184.00^{+71.00}_{-82.00}$
2001-02-24	0.52 (21.94/42)	$5.48^{+1.32}_{-1.70}$	$(1.21^{+0.29}_{-0.38})E43$	$1.83^{+1.40}_{-1.34}$	$1.78^{+0.14}_{-0.14}$	$0.34^{+0.30}_{-0.41}$	$1.71^{+0.42}_{-0.54}$	$6.29^{+0.17}_{-0.19}$	$11.66^{+4.26}_{-4.39}$	$175.00^{+67.00}_{-76.00}$
2001-02-28	0.78 (32.97/42)	$5.91^{+1.18}_{-1.81}$	$(1.30^{+0.26}_{-0.40})E43$	$0.87^{+0.87}_{-1.32}$	$1.74^{+0.12}_{-0.14}$	$0.29^{+0.28}_{-0.38}$	$1.61^{+0.33}_{-0.51}$	$6.21^{+0.13}_{-0.14}$	$16.20^{+4.42}_{-4.38}$	$236.00^{+68.00}_{-77.00}$
2001-03-05	0.65 (27.40/42)	$5.55^{+1.41}_{-1.90}$	$(1.22^{+0.31}_{-0.42})E43$	$1.89^{+1.46}_{-1.41}$	$1.82^{+0.16}_{-0.16}$	$0.49^{+0.36}_{-0.51}$	$1.83^{+0.48}_{-0.64}$	$6.22^{+0.16}_{-0.18}$	$13.67^{+4.71}_{-4.65}$	$198.00^{+72.00}_{-80.00}$
2001-03-11	0.29 (12.12/42)	$7.03^{+1.58}_{-2.02}$	$(1.55^{+0.35}_{-0.45})E43$	$1.86^{+1.25}_{-1.22}$	$1.91^{+0.13}_{-0.14}$	$0.51^{+0.33}_{-0.44}$	$2.66^{+0.61}_{-0.78}$	$6.25^{+0.20}_{-0.23}$	$12.06^{+5.19}_{-5.23}$	$143.00^{+63.10}_{-65.00}$
2001-06-07	0.62 (26.19/42)	$6.73^{+1.60}_{-2.06}$	$(1.49^{+0.35}_{-0.45})E43$	$1.84^{+1.35}_{-1.28}$	$1.86^{+0.14}_{-0.15}$	$0.48^{+0.34}_{-0.46}$	$2.35^{+0.57}_{-0.73}$	$6.22^{+0.17}_{-0.19}$	$14.30^{+5.17}_{-5.27}$	$172.00^{+64.00}_{-74.00}$
2004-02-28	0.74 (31.27/42)	$7.00^{+1.56}_{-2.06}$	$(1.55^{+0.35}_{-0.45})E43$	$1.89^{+1.25}_{-1.22}$	$1.84^{+0.13}_{-0.14}$	$0.30^{+0.29}_{-0.38}$	$2.41^{+0.56}_{-0.72}$	$6.23^{+0.16}_{-0.18}$	$15.88^{+5.24}_{-5.20}$	$184.00^{+63.00}_{-70.00}$
2004-04-18	0.58 (24.44/42)	$6.61^{+1.58}_{-1.98}$	$(1.46^{+0.35}_{-0.44})E43$	$1.96^{+1.30}_{-1.21}$	$1.90^{+0.15}_{-0.15}$	$0.77^{+0.40}_{-0.54}$	$2.41^{+0.59}_{-0.74}$	$6.08^{+0.16}_{-0.17}$	$14.36^{+5.39}_{-5.63}$	$170.00^{+68.00}_{-73.00}$
2004-06-17	0.92 (38.58/42)	$7.71^{+1.71}_{-2.30}$	$(1.70^{+0.38}_{-0.51})E43$	$1.70^{+1.22}_{-1.23}$	$1.88^{+0.13}_{-0.14}$	$0.41^{+0.30}_{-0.42}$	$2.73^{+0.62}_{-0.83}$	$6.06^{+0.14}_{-0.16}$	$19.91^{+6.22}_{-5.81}$	$204.00^{+66.00}_{-71.00}$
2004-08-06	0.74 (30.95/42)	$8.20^{+1.84}_{-2.40}$	$(1.81^{+0.41}_{-0.53})E43$	$1.55^{+1.20}_{-1.18}$	$1.90^{+0.13}_{-0.14}$	$0.55^{+0.34}_{-0.46}$	$2.96^{+0.68}_{-0.88}$	$6.12^{+0.17}_{-0.19}$	$16.52^{+6.25}_{-6.08}$	$164.00^{+64.03}_{-70.00}$
2004-09-13	0.53 (22.17/42)	$7.94^{+1.70}_{-2.20}$	$(1.75^{+0.38}_{-0.49})E43$	$1.14^{+1.14}_{-1.17}$	$1.81^{+0.13}_{-0.13}$	$0.42^{+0.29}_{-0.38}$	$2.41^{+0.53}_{-0.69}$	$6.11^{+0.13}_{-0.14}$	$19.92^{+5.79}_{-5.69}$	$209.00^{+63.00}_{-71.00}$
2004-10-29	0.75 (31.37/42)	$8.26^{+1.81}_{-2.21}$	$(1.82^{+0.40}_{-0.49})E43$	$1.71^{+1.19}_{-1.10}$	$1.90^{+0.13}_{-0.13}$	$0.60^{+0.34}_{-0.44}$	$3.02^{+0.68}_{-0.83}$	$6.14^{+0.14}_{-0.15}$	$18.56^{+5.86}_{-6.20}$	$181.00^{+59.00}_{-71.00}$
2004-12-22	0.65 (27.29/42)	$8.02^{+1.31}_{-2.30}$	$(1.77^{+0.29}_{-0.51})E43$	$0.61^{+0.61}_{-1.22}$	$1.74^{+0.10}_{-0.13}$	$0.21^{+0.21}_{-0.32}$	$2.12^{+0.35}_{-0.62}$	$6.01^{+0.15}_{-0.16}$	$18.51^{+6.09}_{-5.54}$	$195.00^{+70.00}_{-60.00}$
2005-03-04	0.97 (40.80/42)	$5.48^{+1.45}_{-1.88}$	$(1.21^{+0.32}_{-0.41})E43$	$2.47^{+1.40}_{-1.28}$	$2.04^{+0.17}_{-0.18}$	$1.04^{+0.55}_{-0.80}$	$2.54^{+0.69}_{-0.89}$	$6.11^{+0.15}_{-0.16}$	$14.31^{+4.99}_{-5.09}$	$202.00^{+74.00}_{-85.00}$
2005-04-19	0.47 (19.67/42)	$5.80^{+1.32}_{-1.86}$	$(1.28^{+0.29}_{-0.41})E43$	$1.75^{+1.23}_{-1.28}$	$1.94^{+0.14}_{-0.16}$	$0.61^{+0.37}_{-0.55}$	$2.27^{+0.53}_{-0.75}$	$6.15^{+0.17}_{-0.19}$	$13.85^{+4.90}_{-4.45}$	$194.00^{+71.00}_{-73.00}$
2005-06-10	0.59 (25.47/43)	$6.76^{+1.64}_{-2.21}$	$(1.49^{+0.36}_{-0.49})E43$	$1.20^{+1.20}_{-1.22}$	$1.99^{+0.15}_{-0.17}$	$0.97^{+0.49}_{-0.72}$	$2.68^{+0.66}_{-0.89}$	$6.07^{+0.17}_{-0.19}$	$14.25^{+5.60}_{-5.33}$	$178.00^{+75.00}_{-72.00}$
2005-07-17	0.81 (34.77/43)	$6.97^{+1.62}_{-2.10}$	$(1.54^{+0.36}_{-0.46})E43$	$1.12^{+1.12}_{-1.19}$	$1.90^{+0.14}_{-0.15}$	$0.52^{+0.35}_{-0.48}$	$2.45^{+0.58}_{-0.75}$	$6.11^{+0.20}_{-0.22}$	$12.06^{+5.29}_{-5.34}$	$146.00^{+65.74}_{-69.00}$
2005-08-25	0.69 (29.54/43)	$5.63^{+1.09}_{-1.72}$	$(1.25^{+0.24}_{-0.39})E43$	$0.78^{+0.78}_{-1.26}$	$1.79^{+0.12}_{-0.15}$	$0.32^{+0.30}_{-0.41}$	$1.64^{+0.32}_{-0.52}$	$6.19^{+0.15}_{-0.17}$	$13.87^{+4.30}_{-4.07}$	$216.00^{+70.00}_{-68.00}$

Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	wabs	pexrav			gaussian		
				N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 4051						$\mathrm{Fe}_K \alpha \sigma = 0.38$		
1996-04-23	0.67 (31.50/47)	$2.58^{+0.75}_{-1.24}$	$(2.26^{+0.66}_{-1.09})E41$	$2.34^{+1.24}_{-1.24}$	$2.33^{+0.21}_{-0.28}$	$1.19^{+0.88}_{-1.88}$	$1.86^{+0.55}_{-0.91}$	$6.20^{+0.29}_{-0.43}$	$5.65^{+2.80}_{-2.88}$	$186.00^{+89.71}_{-101.00}$
1996-11-10	0.35 (16.21/46)	$1.73^{+0.74}_{-1.46}$	$(1.52^{+0.65}_{-1.28})E41$	$2.53^{+2.37}_{-2.27}$	$2.23^{+0.32}_{-0.44}$	$1.48^{+1.19}_{-3.52}$	$1.06^{+0.46}_{-0.92}$	$6.06^{+0.32}_{-0.42}$	$4.33^{+3.36}_{-3.77}$	$192.00^{+151.61}_{-202.00}$
1996-12-13	0.45 (20.78/46)	$0.87^{+0.40}_{-1.36}$	$(7.61^{+3.48}_{-11.91})E40$	$2.83^{+2.83}_{-4.02}$	$1.81^{+0.33}_{-0.59}$	$0.46^{+0.46}_{-3.00}$	$0.29^{+0.14}_{-0.48}$	$6.00^{+0.20}_{-0.22}$	$4.93^{+2.62}_{-5.52}$	$421.00^{+257.00}_{-609.00}$
2000-03-23	0.51 (21.39/42)	$1.75^{+0.70}_{-0.69}$	$(1.54^{+0.62}_{-0.60})E41$	$1.91^{+1.91}_{-1.79}$	$2.45^{+0.35}_{-0.18}$	$4.18^{+2.54}_{-0.82}$	$1.25^{+0.51}_{-0.50}$	$6.31^{+0.59}_{-1.19}$	$2.80^{+1.89}_{-3.81}$	$133.00^{+87.16}_{-213.00}$
2001-03-04	0.32 (13.53/42)	$1.89^{+0.63}_{-1.31}$	$(1.66^{+0.55}_{-1.15})E41$	$1.33^{+1.33}_{-2.13}$	$2.16^{+0.25}_{-0.35}$	$1.47^{+1.04}_{-2.56}$	$0.96^{+0.32}_{-0.68}$	$6.14^{+0.35}_{-0.57}$	$3.65^{+2.68}_{-3.63}$	$164.00^{+121.53}_{-180.00}$
2001-05-16	0.46 (19.16/42)	$1.87^{+0.80}_{-1.30}$	$(1.64^{+0.70}_{-1.14})E41$	$2.39^{+2.34}_{-2.09}$	$2.25^{+0.33}_{-0.37}$	$2.02^{+1.40}_{-2.98}$	$1.16^{+0.50}_{-0.81}$	$6.13^{+0.63}_{-1.37}$	$2.41^{+1.75}_{-3.75}$	$100.00^{+73.02}_{-175.00}$
2002-03-01	0.37 (15.69/42)	$2.35^{+0.75}_{-1.32}$	$(2.07^{+0.66}_{-1.16})E41$	$1.46^{+1.46}_{-1.87}$	$2.20^{+0.23}_{-0.28}$	$1.09^{+0.80}_{-1.57}$	$1.32^{+0.43}_{-0.76}$	$6.08^{+0.30}_{-0.38}$	$4.89^{+3.21}_{-3.33}$	$179.00^{+120.59}_{-130.00}$

Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	wabs	pexrav			gaussian		
				N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 4151						$Fe_K\alpha\sigma = 0.28$		
1996-01-20	1.61 (90.13/56)	$23.63^{+3.23}_{-3.98}$	$(4.66^{+0.64}_{-0.78})E42$	$8.63^{+0.72}_{-0.75}$	$1.70^{+0.08}_{-0.08}$	$0.43^{+0.16}_{-0.20}$	$9.01^{+1.27}_{-1.56}$	$6.10^{+0.09}_{-0.10}$	$77.10^{+16.20}_{-14.54}$	$178.00^{+41.00}_{-38.00}$
1996-01-22a	2.46 (137.92/56)	$28.47^{+3.72}_{-4.52}$	$(5.62^{+0.73}_{-0.89})E42$	$8.13^{+0.67}_{-0.69}$	$1.73^{+0.07}_{-0.08}$	$0.41^{+0.15}_{-0.18}$	$11.25^{+1.51}_{-1.84}$	$6.10^{+0.08}_{-0.09}$	$92.03^{+18.09}_{-16.55}$	$180.00^{+39.00}_{-37.00}$
1996-01-22b	2.22 (124.31/56)	$26.59^{+3.36}_{-4.10}$	$(5.25^{+0.66}_{-0.81})E42$	$8.04^{+0.66}_{-0.69}$	$1.69^{+0.07}_{-0.07}$	$0.34^{+0.13}_{-0.16}$	$9.76^{+1.27}_{-1.55}$	$6.14^{+0.09}_{-0.09}$	$83.57^{+17.55}_{-14.67}$	$176.00^{+38.00}_{-35.00}$
1996-06-03	1.55 (72.73/47)	$29.96^{+4.43}_{-5.13}$	$(5.92^{+0.87}_{-1.01})E42$	$5.29^{+0.68}_{-0.66}$	$1.89^{+0.08}_{-0.09}$	$0.74^{+0.23}_{-0.28}$	$13.43^{+2.02}_{-2.33}$	$6.00^{+0.15}_{-0.15}$	$52.50^{+19.56}_{-18.22}$	$108.00^{+41.99}_{-38.00}$
1996-06-04	2.04 (95.66/47)	$32.00^{+4.86}_{-6.12}$	$(6.32^{+0.96}_{-1.21})E42$	$6.30^{+0.73}_{-0.75}$	$1.81^{+0.09}_{-0.09}$	$0.56^{+0.20}_{-0.26}$	$13.33^{+2.06}_{-2.60}$	$5.98^{+0.13}_{-0.14}$	$71.47^{+24.84}_{-21.04}$	$128.00^{+45.08}_{-42.00}$
1996-06-05	2.22 (104.33/47)	$25.69^{+4.81}_{-6.60}$	$(5.07^{+0.95}_{-1.30})E42$	$7.88^{+0.95}_{-1.01}$	$1.76^{+0.11}_{-0.12}$	$0.52^{+0.24}_{-0.34}$	$10.48^{+2.02}_{-2.77}$	$5.87^{+0.12}_{-0.12}$	$90.08^{+26.05}_{-22.01}$	$185.00^{+59.00}_{-52.00}$
1996-06-06	2.36 (110.79/47)	$22.80^{+3.49}_{-4.28}$	$(4.50^{+0.69}_{-0.84})E42$	$6.98^{+0.79}_{-0.80}$	$1.64^{+0.09}_{-0.09}$	$0.38^{+0.17}_{-0.21}$	$7.29^{+1.15}_{-1.41}$	$6.05^{+0.09}_{-0.09}$	$76.38^{+16.97}_{-14.68}$	$191.00^{+44.00}_{-43.00}$
1996-06-07	1.82 (85.69/47)	$20.58^{+3.05}_{-3.85}$	$(4.06^{+0.60}_{-0.76})E42$	$5.47^{+0.74}_{-0.78}$	$1.63^{+0.08}_{-0.09}$	$0.44^{+0.18}_{-0.23}$	$6.02^{+0.92}_{-1.16}$	$6.14^{+0.09}_{-0.10}$	$67.39^{+15.21}_{-11.92}$	$205.00^{+48.00}_{-42.00}$
1996-06-08	1.34 (62.88/47)	$39.28^{+5.44}_{-6.31}$	$(7.76^{+1.07}_{-1.25})E42$	$3.82^{+0.66}_{-0.65}$	$1.74^{+0.08}_{-0.08}$	$0.32^{+0.16}_{-0.18}$	$12.98^{+1.83}_{-2.12}$	$6.04^{+0.17}_{-0.17}$	$69.21^{+23.37}_{-22.84}$	$118.00^{+40.31}_{-42.00}$
1996-06-25	1.74 (81.61/47)	$15.06^{+2.66}_{-3.52}$	$(2.97^{+0.53}_{-0.69})E42$	$6.71^{+0.96}_{-1.01}$	$1.51^{+0.10}_{-0.11}$	$0.29^{+0.18}_{-0.24}$	$3.77^{+0.69}_{-0.92}$	$6.15^{+0.08}_{-0.09}$	$70.55^{+12.28}_{-10.00}$	$285.00^{+58.00}_{-42.00}$
1996-06-26	1.98 (93.27/47)	$14.77^{+2.61}_{-3.44}$	$(2.91^{+0.52}_{-0.68})E42$	$7.71^{+0.97}_{-1.02}$	$1.56^{+0.10}_{-0.11}$	$0.37^{+0.19}_{-0.26}$	$4.18^{+0.77}_{-1.02}$	$6.20^{+0.07}_{-0.08}$	$74.32^{+13.30}_{-9.74}$	$295.00^{+62.00}_{-48.00}$
1996-06-27	2.62 (123.01/47)	$18.83^{+2.85}_{-3.67}$	$(3.72^{+0.56}_{-0.72})E42$	$7.39^{+0.80}_{-0.85}$	$1.59^{+0.08}_{-0.09}$	$0.30^{+0.15}_{-0.20}$	$5.67^{+0.89}_{-1.14}$	$6.08^{+0.08}_{-0.08}$	$75.65^{+14.37}_{-11.42}$	$232.00^{+50.00}_{-35.00}$
1996-06-28	1.35 (63.55/47)	$14.97^{+2.78}_{-3.68}$	$(2.95^{+0.55}_{-0.73})E42$	$7.89^{+1.04}_{-1.08}$	$1.54^{+0.11}_{-0.12}$	$0.43^{+0.21}_{-0.28}$	$4.12^{+0.80}_{-1.06}$	$6.17^{+0.07}_{-0.08}$	$80.71^{+13.07}_{-10.70}$	$313.00^{+60.00}_{-52.00}$
1996-06-29	2.38 (111.81/47)	$15.72^{+2.77}_{-3.68}$	$(3.10^{+0.55}_{-0.73})E42$	$7.70^{+0.98}_{-1.04}$	$1.51^{+0.10}_{-0.11}$	$0.27^{+0.17}_{-0.23}$	$4.16^{+0.77}_{-1.02}$	$6.14^{+0.08}_{-0.08}$	$78.58^{+12.92}_{-10.55}$	$287.00^{+51.00}_{-47.00}$
1996-07-01a	2.05 (96.16/47)	$18.94^{+2.88}_{-3.55}$	$(3.74^{+0.57}_{-0.70})E42$	$6.74^{+0.82}_{-0.84}$	$1.51^{+0.08}_{-0.09}$	$0.21^{+0.14}_{-0.17}$	$4.83^{+0.76}_{-0.94}$	$6.06^{+0.07}_{-0.08}$	$84.16^{+14.09}_{-11.52}$	$259.00^{+46.00}_{-43.00}$
1996-07-01b	2.38 (111.73/47)	$20.15^{+3.02}_{-3.85}$	$(3.98^{+0.60}_{-0.76})E42$	$6.63^{+0.74}_{-0.78}$	$1.71^{+0.09}_{-0.09}$	$0.54^{+0.19}_{-0.25}$	$7.15^{+1.10}_{-1.41}$	$6.03^{+0.09}_{-0.09}$	$68.15^{+14.90}_{-12.43}$	$196.00^{+47.00}_{-42.00}$
1996-07-03	2.50 (117.53/47)	$15.73^{+2.81}_{-3.80}$	$(3.10^{+0.55}_{-0.75})E42$	$7.67^{+1.01}_{-1.08}$	$1.44^{+0.10}_{-0.11}$	$0.19^{+0.15}_{-0.21}$	$3.65^{+0.68}_{-0.92}$	$6.12^{+0.07}_{-0.07}$	$83.67^{+14.33}_{-10.28}$	$307.00^{+63.00}_{-47.00}$
1996-07-04	3.62 (170.13/47)	$11.29^{+0.81}_{-0.89}$	$(2.23^{+0.16}_{-0.17})E42$	$8.49^{+0.60}_{-0.61}$	$1.15^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.02}$	$1.59^{+0.12}_{-0.14}$	$6.20^{+0.05}_{-0.05}$	$91.15^{+7.13}_{-6.72}$	$473.00^{+42.00}_{-42.00}$
1996-07-05	3.25 (152.91/47)	$10.92^{+0.81}_{-0.91}$	$(2.15^{+0.16}_{-0.18})E42$	$8.22^{+0.63}_{-0.64}$	$1.10^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.02}$	$1.38^{+0.11}_{-0.12}$	$6.24^{+0.05}_{-0.05}$	$89.83^{+7.04}_{-6.67}$	$496.00^{+45.00}_{-43.00}$
1996-07-07	2.54 (119.59/47)	$10.23^{+0.83}_{-0.94}$	$(2.02^{+0.16}_{-0.19})E42$	$6.82^{+0.67}_{-0.68}$	$1.06^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.03}$	$1.15^{+0.10}_{-0.11}$	$6.25^{+0.05}_{-0.05}$	$86.82^{+6.83}_{-6.40}$	$540.00^{+50.00}_{-47.00}$
1996-07-08	2.53 (118.76/47)	$15.26^{+2.28}_{-2.93}$	$(3.01^{+0.45}_{-0.58})E42$	$6.43^{+0.83}_{-0.88}$	$1.39^{+0.08}_{-0.09}$	$0.21^{+0.13}_{-0.17}$	$3.10^{+0.48}_{-0.62}$	$6.16^{+0.06}_{-0.06}$	$80.29^{+10.90}_{-8.52}$	$325.00^{+53.00}_{-35.00}$
1996-09-14	1.43 (67.14/47)	$19.69^{+3.09}_{-3.87}$	$(3.88^{+0.61}_{-0.76})E42$	$8.63^{+0.90}_{-0.92}$	$1.53^{+0.09}_{-0.09}$	$0.18^{+0.14}_{-0.18}$	$5.67^{+0.93}_{-1.16}$	$6.23^{+0.08}_{-0.08}$	$93.25^{+15.31}_{-13.05}$	$273.00^{+52.00}_{-39.00}$
1996-09-18	1.28 (60.06/47)	$20.53^{+3.00}_{-3.74}$	$(4.05^{+0.59}_{-0.74})E42$	$7.06^{+0.82}_{-0.86}$	$1.48^{+0.08}_{-0.08}$	$0.11^{+0.11}_{-0.15}$	$5.09^{+0.77}_{-0.96}$	$6.21^{+0.08}_{-0.08}$	$89.35^{+15.35}_{-12.58}$	$261.00^{+47.00}_{-44.00}$
1996-09-20	1.63 (76.54/47)	$17.22^{+2.97}_{-3.80}$	$(3.40^{+0.59}_{-0.75})E42$	$7.20^{+0.98}_{-1.00}$	$1.45^{+0.10}_{-0.10}$	$0.19^{+0.15}_{-0.20}$	$4.03^{+0.73}_{-0.93}$	$6.15^{+0.08}_{-0.08}$	$86.97^{+14.07}_{-11.60}$	$302.00^{+57.00}_{-43.00}$
1996-09-25	1.49 (70.12/47)	$19.76^{+2.99}_{-3.70}$	$(3.90^{+0.59}_{-0.73})E42$	$8.28^{+0.83}_{-0.86}$	$1.55^{+0.08}_{-0.09}$	$0.26^{+0.14}_{-0.18}$	$5.78^{+0.91}_{-1.13}$	$6.13^{+0.07}_{-0.08}$	$89.41^{+15.15}_{-12.85}$	$253.00^{+45.00}_{-43.00}$
1996-09-26	1.53 (71.86/47)	$19.82^{+3.51}_{-4.52}$	$(3.91^{+0.69}_{-0.89})E42$	$9.06^{+0.99}_{-1.02}$	$1.58^{+0.10}_{-0.11}$	$0.31^{+0.18}_{-0.23}$	$6.22^{+1.14}_{-1.47}$	$6.09^{+0.09}_{-0.09}$	$88.23^{+17.74}_{-15.30}$	$241.00^{+55.00}_{-50.00}$
1996-09-29	1.52 (71.21/47)	$21.29^{+3.50}_{-4.43}$	$(4.20^{+0.69}_{-0.87})E42$	$6.87^{+0.90}_{-0.93}$	$1.49^{+0.09}_{-0.09}$	$0.13^{+0.13}_{-0.18}$	$5.28^{+0.90}_{-1.14}$	$6.12^{+0.08}_{-0.09}$	$95.38^{+17.29}_{-13.92}$	$266.00^{+56.00}_{-46.00}$
1997-05-01	1.51 (69.67/46)	$22.57^{+3.27}_{-4.49}$	$(4.46^{+0.65}_{-0.89})E42$	$4.39^{+0.91}_{-0.98}$	$1.54^{+0.07}_{-0.09}$	$0.08^{+0.08}_{-0.15}$	$5.55^{+0.83}_{-1.14}$	$6.16^{+0.09}_{-0.10}$	$69.43^{+14.03}_{-11.36}$	$207.00^{+47.00}_{-35.00}$
1997-05-02	0.88 (40.29/46)	$19.70^{+2.78}_{-4.23}$	$(3.89^{+0.55}_{-0.83})E42$	$4.37^{+0.95}_{-1.08}$	$1.46^{+0.07}_{-0.10}$	$0.06^{+0.06}_{-0.16}$	$4.15^{+0.61}_{-0.92}$	$6.26^{+0.09}_{-0.09}$	$75.15^{+14.05}_{-10.71}$	$263.00^{+57.00}_{-45.00}$
1997-05-03a	1.00 (46.17/46)	$24.65^{+2.19}_{-4.30}$	$(4.87^{+0.43}_{-0.85})E42$	$3.84^{+0.63}_{-0.87}$	$1.51^{+0.04}_{-0.08}$	$0.01^{+0.01}_{-0.12}$	$5.64^{+0.52}_{-1.01}$	$6.16^{+0.10}_{-0.10}$	$69.88^{+14.32}_{-11.34}$	$196.00^{+45.00}_{-31.00}$
1997-05-03b	2.06 (94.63/46)	$25.08^{+3.67}_{-4.68}$	$(4.95^{+0.72}_{-0.92})E42$	$4.63^{+0.87}_{-0.91}$	$1.58^{+0.08}_{-0.08}$	$0.09^{+0.09}_{-0.14}$	$6.75^{+1.02}_{-1.29}$	$6.07^{+0.09}_{-0.09}$	$78.67^{+15.95}_{-11.92}$	$201.00^{+43.00}_{-36.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
1997-05-05	2.04 (93.98/46)	$13.98^{+1.00}_{-3.09}$	$(2.76^{+0.20}_{-0.61})E42$	$6.92^{+0.60}_{-1.18}$	$1.39^{+0.03}_{-0.10}$	$0.00^{+0.00}_{-0.13}$	$2.94^{+0.22}_{-0.68}$	$6.21^{+0.06}_{-0.07}$	$75.74^{+10.91}_{-7.72}$	$329.00^{+52.00}_{-38.00}$
1997-05-06	1.45 (66.92/46)	$17.44^{+3.28}_{-4.42}$	$(3.44^{+0.65}_{-0.87})E42$	$8.33^{+1.24}_{-1.28}$	$1.54^{+0.10}_{-0.11}$	$0.12^{+0.12}_{-0.20}$	$5.12^{+1.00}_{-1.34}$	$6.20^{+0.10}_{-0.11}$	$66.73^{+16.87}_{-11.81}$	$217.00^{+58.00}_{-47.00}$
1997-05-07	1.47 (67.76/46)	$22.05^{+2.74}_{-4.69}$	$(4.35^{+0.54}_{-0.92})E42$	$6.47^{+0.84}_{-1.05}$	$1.56^{+0.06}_{-0.09}$	$0.04^{+0.04}_{-0.15}$	$6.23^{+0.80}_{-1.37}$	$6.06^{+0.09}_{-0.09}$	$83.99^{+17.03}_{-12.33}$	$225.00^{+49.00}_{-38.00}$
1997-10-20	1.91 (87.82/46)	$16.44^{+1.55}_{-3.75}$	$(3.24^{+0.31}_{-0.74})E42$	$6.77^{+0.72}_{-1.18}$	$1.39^{+0.04}_{-0.10}$	$0.01^{+0.01}_{-0.14}$	$3.41^{+0.34}_{-0.81}$	$6.17^{+0.07}_{-0.08}$	$77.44^{+13.55}_{-9.05}$	$286.00^{+59.00}_{-39.00}$
1999-01-01	1.48 (67.91/46)	$18.58^{+1.54}_{-2.00}$	$(3.67^{+0.30}_{-0.39})E42$	$9.87^{+0.70}_{-0.74}$	$1.48^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.05}$	$5.14^{+0.45}_{-0.58}$	$6.11^{+0.07}_{-0.07}$	$96.09^{+12.81}_{-12.05}$	$275.00^{+41.00}_{-39.00}$
1999-01-27	1.44 (66.43/46)	$21.83^{+2.07}_{-3.09}$	$(4.31^{+0.41}_{-0.61})E42$	$7.31^{+0.76}_{-0.80}$	$1.50^{+0.04}_{-0.06}$	$0.00^{+0.00}_{-0.09}$	$5.72^{+0.56}_{-0.84}$	$6.20^{+0.08}_{-0.08}$	$94.29^{+13.85}_{-13.30}$	$257.00^{+43.00}_{-41.00}$
1999-02-17	1.52 (69.83/46)	$18.96^{+1.99}_{-4.65}$	$(3.74^{+0.39}_{-0.92})E42$	$7.79^{+0.80}_{-1.23}$	$1.56^{+0.05}_{-0.11}$	$0.01^{+0.01}_{-0.17}$	$5.66^{+0.61}_{-1.44}$	$6.20^{+0.10}_{-0.11}$	$74.44^{+16.42}_{-11.83}$	$229.00^{+54.00}_{-41.00}$
1999-04-09	1.09 (45.82/42)	$14.26^{+1.48}_{-2.57}$	$(2.81^{+0.29}_{-0.51})E42$	$8.15^{+0.90}_{-1.08}$	$1.45^{+0.05}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$3.46^{+0.38}_{-0.66}$	$6.24^{+0.07}_{-0.07}$	$78.55^{+10.74}_{-9.55}$	$326.00^{+53.00}_{-46.00}$
1999-05-05	1.01 (42.39/42)	$9.79^{+1.08}_{-1.22}$	$(1.93^{+0.21}_{-0.24})E42$	$10.79^{+1.02}_{-1.01}$	$1.38^{+0.05}_{-0.05}$	$0.00^{+0.00}_{-0.04}$	$2.30^{+0.27}_{-0.30}$	$6.29^{+0.06}_{-0.06}$	$69.71^{+7.99}_{-7.37}$	$388.00^{+51.00}_{-50.00}$
1999-06-08	1.16 (48.57/42)	$11.16^{+1.57}_{-3.57}$	$(2.20^{+0.31}_{-0.70})E42$	$9.84^{+1.16}_{-1.72}$	$1.46^{+0.07}_{-0.14}$	$0.03^{+0.03}_{-0.21}$	$2.96^{+0.44}_{-1.00}$	$6.26^{+0.08}_{-0.09}$	$61.94^{+12.00}_{-8.08}$	$308.00^{+72.00}_{-49.00}$
1999-07-16	1.13 (47.51/42)	$12.71^{+1.60}_{-3.67}$	$(2.51^{+0.32}_{-0.72})E42$	$9.47^{+1.03}_{-1.54}$	$1.53^{+0.06}_{-0.12}$	$0.02^{+0.02}_{-0.19}$	$3.78^{+0.50}_{-1.14}$	$6.23^{+0.09}_{-0.09}$	$60.80^{+12.87}_{-8.98}$	$262.00^{+61.00}_{-46.00}$
1999-08-19	0.87 (36.67/42)	$11.23^{+1.16}_{-2.15}$	$(2.22^{+0.23}_{-0.42})E42$	$9.35^{+0.92}_{-1.17}$	$1.42^{+0.05}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$2.71^{+0.30}_{-0.55}$	$6.21^{+0.07}_{-0.07}$	$67.79^{+9.30}_{-8.05}$	$336.00^{+55.00}_{-47.00}$
1999-09-18	0.76 (32.06/42)	$12.54^{+2.56}_{-3.42}$	$(2.47^{+0.51}_{-0.67})E42$	$9.66^{+1.37}_{-1.42}$	$1.60^{+0.12}_{-0.12}$	$0.49^{+0.22}_{-0.28}$	$4.10^{+0.87}_{-1.16}$	$6.25^{+0.09}_{-0.10}$	$55.17^{+12.92}_{-9.69}$	$241.00^{+64.00}_{-53.00}$
1999-10-31	1.12 (46.86/42)	$13.93^{+1.50}_{-1.98}$	$(2.75^{+0.30}_{-0.39})E42$	$9.95^{+0.94}_{-0.93}$	$1.55^{+0.05}_{-0.06}$	$0.00^{+0.00}_{-0.08}$	$4.43^{+0.50}_{-0.65}$	$6.24^{+0.10}_{-0.10}$	$58.69^{+10.54}_{-10.07}$	$231.00^{+46.00}_{-39.00}$
1999-12-08	1.12 (46.93/42)	$13.92^{+1.38}_{-2.70}$	$(2.75^{+0.27}_{-0.53})E42$	$10.33^{+0.88}_{-1.16}$	$1.49^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$4.00^{+0.41}_{-0.81}$	$6.20^{+0.08}_{-0.08}$	$74.87^{+11.79}_{-10.03}$	$287.00^{+53.00}_{-45.00}$
1999-12-30	1.15 (48.27/42)	$17.11^{+3.84}_{-5.46}$	$(3.38^{+0.76}_{-1.08})E42$	$10.60^{+1.52}_{-1.60}$	$1.62^{+0.12}_{-0.14}$	$0.17^{+0.17}_{-0.25}$	$6.27^{+1.45}_{-2.06}$	$6.07^{+0.11}_{-0.11}$	$67.60^{+20.58}_{-14.15}$	$201.00^{+69.00}_{-46.00}$
2000-01-28	0.97 (40.65/42)	$14.34^{+1.72}_{-4.21}$	$(2.83^{+0.34}_{-0.83})E42$	$11.03^{+1.00}_{-1.58}$	$1.51^{+0.05}_{-0.12}$	$0.01^{+0.01}_{-0.18}$	$4.37^{+0.55}_{-1.34}$	$6.09^{+0.10}_{-0.10}$	$73.45^{+16.75}_{-11.22}$	$261.00^{+70.00}_{-46.00}$
2000-03-03	0.85 (35.50/42)	$12.66^{+1.32}_{-2.74}$	$(2.50^{+0.26}_{-0.54})E42$	$5.72^{+0.84}_{-1.16}$	$1.52^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.15}$	$3.20^{+0.35}_{-0.72}$	$6.34^{+0.10}_{-0.11}$	$45.79^{+9.38}_{-7.72}$	$239.00^{+55.00}_{-46.00}$
2000-06-30	1.14 (47.94/42)	$24.92^{+3.99}_{-5.73}$	$(4.92^{+0.79}_{-1.13})E42$	$5.01^{+1.10}_{-1.16}$	$1.57^{+0.08}_{-0.10}$	$0.07^{+0.07}_{-0.18}$	$6.71^{+1.10}_{-1.59}$	$6.34^{+0.12}_{-0.13}$	$73.72^{+17.44}_{-15.34}$	$202.00^{+53.00}_{-43.00}$
2000-08-12	1.29 (54.08/42)	$20.21^{+3.19}_{-4.97}$	$(3.99^{+0.63}_{-0.98})E42$	$5.26^{+1.08}_{-1.23}$	$1.55^{+0.08}_{-0.11}$	$0.07^{+0.07}_{-0.18}$	$5.30^{+0.86}_{-1.35}$	$6.15^{+0.10}_{-0.11}$	$71.09^{+15.78}_{-12.74}$	$223.00^{+53.00}_{-48.00}$
2000-09-28	0.73 (30.69/42)	$18.72^{+1.74}_{-3.15}$	$(3.70^{+0.34}_{-0.62})E42$	$4.57^{+0.72}_{-0.92}$	$1.54^{+0.04}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$4.71^{+0.45}_{-0.82}$	$6.21^{+0.09}_{-0.09}$	$65.92^{+11.95}_{-10.51}$	$237.00^{+48.00}_{-42.00}$
2000-11-18	0.70 (29.41/42)	$6.77^{+1.15}_{-2.08}$	$(1.34^{+0.23}_{-0.41})E42$	$3.95^{+1.27}_{-1.56}$	$1.38^{+0.09}_{-0.14}$	$0.06^{+0.06}_{-0.23}$	$1.19^{+0.21}_{-0.39}$	$6.29^{+0.06}_{-0.07}$	$44.10^{+6.07}_{-4.44}$	$466.00^{+82.00}_{-63.00}$
2000-11-26	0.61 (25.81/42)	$6.64^{+1.09}_{-1.85}$	$(1.31^{+0.21}_{-0.36})E42$	$4.86^{+1.23}_{-1.46}$	$1.42^{+0.08}_{-0.12}$	$0.05^{+0.05}_{-0.21}$	$1.33^{+0.23}_{-0.39}$	$6.32^{+0.07}_{-0.07}$	$38.43^{+5.64}_{-4.42}$	$403.00^{+74.00}_{-50.00}$
2000-11-30	0.99 (41.45/42)	$7.33^{+1.29}_{-2.12}$	$(1.45^{+0.26}_{-0.42})E42$	$5.05^{+1.29}_{-1.48}$	$1.46^{+0.09}_{-0.13}$	$0.07^{+0.07}_{-0.22}$	$1.57^{+0.29}_{-0.48}$	$6.28^{+0.08}_{-0.08}$	$39.82^{+6.44}_{-4.89}$	$367.00^{+73.00}_{-58.00}$
2000-12-03	0.55 (22.97/42)	$7.72^{+1.10}_{-2.14}$	$(1.52^{+0.22}_{-0.42})E42$	$4.39^{+1.09}_{-1.43}$	$1.40^{+0.07}_{-0.12}$	$0.03^{+0.03}_{-0.19}$	$1.45^{+0.22}_{-0.43}$	$6.22^{+0.07}_{-0.07}$	$44.22^{+6.62}_{-5.03}$	$392.00^{+67.00}_{-55.00}$
2000-12-07	1.18 (49.36/42)	$6.96^{+0.81}_{-1.38}$	$(1.37^{+0.16}_{-0.27})E42$	$4.08^{+0.95}_{-1.13}$	$1.39^{+0.05}_{-0.09}$	$0.00^{+0.00}_{-0.13}$	$1.27^{+0.16}_{-0.27}$	$6.31^{+0.07}_{-0.07}$	$39.03^{+5.08}_{-4.47}$	$397.00^{+55.00}_{-53.00}$
2000-12-10	0.64 (26.96/42)	$6.29^{+0.76}_{-1.53}$	$(1.24^{+0.15}_{-0.30})E42$	$4.26^{+1.00}_{-1.32}$	$1.39^{+0.06}_{-0.11}$	$0.00^{+0.00}_{-0.16}$	$1.16^{+0.15}_{-0.30}$	$6.30^{+0.07}_{-0.07}$	$37.06^{+5.00}_{-4.42}$	$415.00^{+62.00}_{-59.00}$
2000-12-14	0.86 (36.05/42)	$5.22^{+0.60}_{-1.52}$	$(1.03^{+0.12}_{-0.30})E42$	$3.93^{+0.98}_{-1.56}$	$1.32^{+0.05}_{-0.13}$	$0.00^{+0.00}_{-0.18}$	$0.83^{+0.10}_{-0.26}$	$6.34^{+0.06}_{-0.06}$	$38.88^{+4.44}_{-4.14}$	$548.00^{+82.00}_{-71.00}$
2000-12-17	1.00 (41.81/42)	$6.50^{+1.15}_{-1.93}$	$(1.28^{+0.23}_{-0.38})E42$	$5.05^{+1.32}_{-1.52}$	$1.44^{+0.09}_{-0.13}$	$0.07^{+0.07}_{-0.23}$	$1.36^{+0.26}_{-0.43}$	$6.33^{+0.07}_{-0.08}$	$37.48^{+5.64}_{-4.55}$	$398.00^{+74.00}_{-54.00}$
2000-12-20	0.64 (27.02/42)	$6.34^{+0.99}_{-1.83}$	$(1.25^{+0.20}_{-0.36})E42$	$5.77^{+1.23}_{-1.53}$	$1.42^{+0.08}_{-0.13}$	$0.03^{+0.03}_{-0.20}$	$1.32^{+0.22}_{-0.40}$	$6.31^{+0.08}_{-0.09}$	$34.76^{+5.29}_{-4.74}$	$358.00^{+62.00}_{-59.00}$
2000-12-23	0.89 (37.58/42)	$8.30^{+1.05}_{-1.37}$	$(1.64^{+0.21}_{-0.27})E42$	$6.08^{+1.03}_{-0.95}$	$1.48^{+0.06}_{-0.07}$	$0.00^{+0.00}_{-0.11}$	$1.97^{+0.26}_{-0.34}$	$6.22^{+0.08}_{-0.08}$	$38.98^{+5.90}_{-5.57}$	$295.00^{+45.00}_{-50.00}$
2000-12-24	0.98 (41.09/42)	$10.21^{+1.20}_{-2.84}$	$(2.02^{+0.24}_{-0.56})E42$	$6.53^{+0.92}_{-1.41}$	$1.55^{+0.05}_{-0.12}$	$0.01^{+0.01}_{-0.20}$	$2.84^{+0.35}_{-0.82}$	$6.17^{+0.10}_{-0.10}$	$41.80^{+9.62}_{-6.94}$	$252.00^{+67.00}_{-48.00}$
2003-05-24	1.01 (42.48/42)	$24.64^{+4.89}_{-6.46}$	$(4.87^{+0.97}_{-1.27})E42$	$7.17^{+1.19}_{-1.22}$	$1.72^{+0.11}_{-0.11}$	$0.25^{+0.18}_{-0.24}$	$9.42^{+1.91}_{-2.51}$	$6.03^{+0.18}_{-0.18}$	$54.92^{+23.86}_{-19.42}$	$126.00^{+56.51}_{-50.00}$
2003-05-26	1.29 (54.06/42)	$31.46^{+2.77}_{-5.40}$	$(6.21^{+0.55}_{-1.07})E42$	$4.57^{+0.67}_{-0.90}$	$1.59^{+0.04}_{-0.08}$	$0.00^{+0.00}_{-0.11}$	$8.49^{+0.77}_{-1.50}$	$6.03^{+0.11}_{-0.11}$	$112.60^{+21.24}_{-18.56}$	$231.00^{+49.00}_{-43.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 4258					Fe$_K\alpha\sigma = 0.23$			
1996-12-03	0.39 (18.05/46)	$1.20^{+0.30}_{-0.43}$	$(2.63^{+0.67}_{-0.94})E40$	$10.47^{+2.10}_{-2.27}$	$1.94^{+0.12}_{-0.13}$	$0.00^{+0.00}_{-0.19}$	$0.80^{+0.21}_{-0.29}$	$6.49^{+0.48}_{-0.62}$	$2.10^{+1.87}_{-1.92}$	$101.00^{+90.41}_{-97.00}$
1996-12-04	0.41 (19.02/46)	$1.38^{+0.35}_{-0.54}$	$(3.02^{+0.76}_{-1.18})E40$	$8.79^{+1.99}_{-2.06}$	$1.88^{+0.12}_{-0.16}$	$0.00^{+0.00}_{-0.34}$	$0.77^{+0.19}_{-0.30}$	$6.26^{+0.76}_{-1.24}$	$1.82^{+1.60}_{-1.73}$	$74.86^{+66.18}_{-73.14}$
1997-02-04	0.53 (24.58/46)	$1.33^{+0.34}_{-0.52}$	$(2.92^{+0.75}_{-1.15})E40$	$9.45^{+2.04}_{-2.01}$	$1.91^{+0.12}_{-0.17}$	$0.00^{+0.00}_{-0.41}$	$0.82^{+0.21}_{-0.32}$	$6.36^{+0.86}_{-1.14}$	$0.77^{+0.77}_{-2.13}$	$32.65^{+32.65}_{-93.35}$
1998-03-03	0.33 (15.13/46)	$1.26^{+0.43}_{-0.54}$	$(2.76^{+0.94}_{-1.19})E40$	$9.85^{+2.44}_{-2.03}$	$1.97^{+0.19}_{-0.20}$	$0.24^{+0.24}_{-0.71}$	$0.85^{+0.29}_{-0.37}$	$6.70^{+1.20}_{-0.80}$	$0.48^{+0.48}_{-2.13}$	$23.29^{+23.29}_{-93.71}$
1998-05-12	0.36 (16.62/46)	$1.08^{+0.30}_{-0.51}$	$(2.36^{+0.66}_{-1.12})E40$	$8.51^{+2.28}_{-2.33}$	$1.85^{+0.14}_{-0.19}$	$0.00^{+0.00}_{-0.47}$	$0.57^{+0.16}_{-0.27}$	$6.39^{+0.89}_{-1.11}$	$1.62^{+1.62}_{-1.91}$	$88.42^{+88.42}_{-111.58}$
1998-08-05	0.34 (15.79/46)	$0.75^{+0.25}_{-0.53}$	$(1.64^{+0.55}_{-1.16})E40$	$10.05^{+2.94}_{-3.40}$	$1.85^{+0.17}_{-0.27}$	$0.00^{+0.00}_{-0.63}$	$0.41^{+0.14}_{-0.30}$	$6.41^{+0.91}_{-1.09}$	$1.57^{+1.57}_{-1.59}$	$119.00^{+119.00}_{-132.00}$
1999-04-02	0.47 (19.55/42)	$0.73^{+0.28}_{-0.50}$	$(1.60^{+0.61}_{-1.09})E40$	$8.24^{+3.32}_{-3.39}$	$1.94^{+0.20}_{-0.25}$	$0.00^{+0.00}_{-0.57}$	$0.45^{+0.17}_{-0.31}$	$6.15^{+0.65}_{-1.35}$	$0.85^{+0.85}_{-1.62}$	$64.90^{+64.90}_{-131.10}$
1999-05-15	0.55 (23.25/42)	$0.68^{+0.27}_{-0.55}$	$(1.48^{+0.58}_{-1.21})E40$	$5.82^{+3.42}_{-3.68}$	$1.87^{+0.21}_{-0.30}$	$0.00^{+0.00}_{-0.72}$	$0.32^{+0.13}_{-0.27}$	$6.28^{+0.78}_{-1.22}$	$1.55^{+1.55}_{-1.43}$	$152.00^{+152.00}_{-169.00}$
1999-07-17	0.51 (21.40/42)	$0.96^{+0.35}_{-0.71}$	$(2.10^{+0.77}_{-1.56})E40$	$9.14^{+3.05}_{-3.13}$	$1.95^{+0.20}_{-0.30}$	$0.11^{+0.11}_{-1.03}$	$0.61^{+0.23}_{-0.46}$	$6.58^{+1.08}_{-0.92}$	$0.97^{+0.97}_{-1.93}$	$62.74^{+62.74}_{-120.26}$
1999-10-11	0.38 (15.75/42)	$1.11^{+0.33}_{-0.54}$	$(2.43^{+0.72}_{-1.18})E40$	$9.09^{+2.47}_{-2.60}$	$1.94^{+0.15}_{-0.19}$	$0.00^{+0.00}_{-0.41}$	$0.70^{+0.21}_{-0.34}$	$6.29^{+0.79}_{-1.21}$	$1.12^{+1.12}_{-1.68}$	$56.76^{+56.76}_{-93.24}$
1999-12-28	0.30 (12.54/42)	$1.52^{+0.46}_{-0.77}$	$(3.33^{+1.01}_{-1.70})E40$	$8.04^{+2.28}_{-2.22}$	$1.89^{+0.16}_{-0.23}$	$0.14^{+0.14}_{-0.76}$	$0.83^{+0.26}_{-0.43}$	$6.86^{+1.36}_{-0.64}$	$1.17^{+1.17}_{-2.09}$	$53.86^{+53.86}_{-86.14}$

Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	`wabs` N_H[e]	`pexrav` Γ[f]	`pexrav` R[g]	`pexrav` **Norm.**[h]	`gaussian` **Energy**[i]	`gaussian` **Norm.**[j]	`gaussian` **EW**[k]
		NGC 4388					$Fe_K\alpha\sigma = 0.09$			
1996-03-06a	1.70 (93.55/55)	$4.80^{+0.41}_{-0.60}$	$(6.76^{+0.58}_{-0.84})E42$	$0.73^{+0.68}_{-0.88}$	$1.08^{+0.04}_{-0.05}$	$0.00^{+0.00}_{-0.02}$	$0.43^{+0.04}_{-0.06}$	$6.42^{+0.05}_{-0.06}$	$24.32^{+2.54}_{-2.88}$	$428.00^{+52.00}_{-59.00}$
1996-07-13a	3.03 (142.44/47)	$5.80^{+0.55}_{-0.63}$	$(8.16^{+0.77}_{-0.88})E42$	$3.67^{+0.74}_{-0.75}$	$1.08^{+0.04}_{-0.04}$	$0.00^{+0.00}_{-0.01}$	$0.60^{+0.06}_{-0.07}$	$6.32^{+0.06}_{-0.06}$	$36.28^{+3.55}_{-3.51}$	$451.00^{+50.00}_{-44.00}$
1996-07-13b	2.19 (103.05/47)	$4.43^{+0.23}_{-0.41}$	$(6.24^{+0.33}_{-0.58})E42$	$0.00^{+0.00}_{-0.13}$	$1.12^{+0.04}_{-0.05}$	$0.05^{+0.05}_{-0.13}$	$0.40^{+0.02}_{-0.04}$	$6.39^{+0.07}_{-0.07}$	$19.64^{+2.27}_{-2.88}$	$386.00^{+47.00}_{-59.00}$
1996-11-15	2.44 (112.37/46)	$4.20^{+0.21}_{-0.41}$	$(5.92^{+0.29}_{-0.58})E42$	$0.00^{+0.00}_{-0.18}$	$1.03^{+0.03}_{-0.03}$	$0.00^{+0.00}_{-0.07}$	$0.34^{+0.02}_{-0.03}$	$6.36^{+0.07}_{-0.07}$	$18.95^{+2.28}_{-3.40}$	$388.00^{+49.00}_{-73.00}$
1996-11-16	2.21 (101.82/46)	$3.74^{+0.32}_{-0.44}$	$(5.27^{+0.45}_{-0.62})E42$	$0.00^{+0.00}_{-0.18}$	$1.28^{+0.06}_{-0.07}$	$0.35^{+0.19}_{-0.26}$	$0.43^{+0.04}_{-0.05}$	$6.33^{+0.07}_{-0.07}$	$17.04^{+2.13}_{-3.29}$	$403.00^{+53.00}_{-83.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 4593						$Fe_K\alpha\sigma = 0.33$		
2001-06-29a	0.49 (20.52/42)	$4.23^{+0.95}_{-1.70}$	$(7.56^{+1.71}_{-3.03})E42$	$0.94^{+0.94}_{-1.48}$	$2.05^{+0.15}_{-0.20}$	$1.00^{+0.53}_{-0.96}$	$1.80^{+0.41}_{-0.74}$	$6.32^{+0.21}_{-0.28}$	$8.87^{+3.57}_{-3.37}$	$192.00^{+78.00}_{-84.00}$
2001-06-29b	0.58 (24.18/42)	$4.61^{+0.73}_{-1.56}$	$(8.24^{+1.30}_{-2.79})E42$	$0.46^{+0.46}_{-1.39}$	$1.88^{+0.11}_{-0.16}$	$0.47^{+0.35}_{-0.54}$	$1.49^{+0.24}_{-0.52}$	$6.30^{+0.18}_{-0.21}$	$10.15^{+3.65}_{-3.44}$	$205.00^{+76.00}_{-77.00}$
2002-06-25	0.39 (16.19/42)	$4.28^{+0.22}_{-1.25}$	$(7.66^{+0.40}_{-2.23})E42$	$0.00^{+0.00}_{-1.25}$	$1.72^{+0.03}_{-0.13}$	$0.02^{+0.02}_{-0.33}$	$1.07^{+0.06}_{-0.32}$	$6.31^{+0.16}_{-0.18}$	$10.40^{+3.07}_{-3.28}$	$231.00^{+70.00}_{-76.00}$
2002-06-29	0.51 (21.31/42)	$4.17^{+0.36}_{-1.26}$	$(7.45^{+0.64}_{-2.26})E42$	$0.00^{+0.00}_{-1.26}$	$1.82^{+0.07}_{-0.15}$	$0.26^{+0.26}_{-0.43}$	$1.19^{+0.11}_{-0.37}$	$6.37^{+0.16}_{-0.18}$	$10.72^{+2.89}_{-3.20}$	$255.00^{+71.00}_{-79.00}$
2002-07-01	0.49 (20.49/42)	$4.71^{+0.38}_{-1.14}$	$(8.42^{+0.68}_{-2.04})E42$	$0.00^{+0.00}_{-1.07}$	$1.79^{+0.06}_{-0.12}$	$0.16^{+0.16}_{-0.32}$	$1.29^{+0.11}_{-0.32}$	$6.30^{+0.16}_{-0.16}$	$12.35^{+3.03}_{-3.36}$	$253.00^{+63.00}_{-72.00}$
2002-07-03	0.39 (16.56/42)	$3.69^{+0.35}_{-0.96}$	$(6.59^{+0.63}_{-1.72})E42$	$0.00^{+0.00}_{-1.12}$	$1.78^{+0.07}_{-0.13}$	$0.34^{+0.30}_{-0.40}$	$0.98^{+0.10}_{-0.26}$	$6.36^{+0.16}_{-0.17}$	$9.81^{+2.51}_{-3.23}$	$260.00^{+68.00}_{-89.00}$
2002-07-07	0.51 (21.23/42)	$4.24^{+0.78}_{-1.47}$	$(7.57^{+1.40}_{-2.63})E42$	$0.69^{+0.69}_{-1.43}$	$1.85^{+0.12}_{-0.16}$	$0.33^{+0.33}_{-0.49}$	$1.36^{+0.26}_{-0.48}$	$6.25^{+0.20}_{-0.23}$	$8.63^{+3.37}_{-3.36}$	$186.00^{+75.00}_{-75.00}$
2004-02-28	0.41 (17.23/42)	$3.95^{+0.50}_{-1.33}$	$(7.11^{+0.94}_{-2.33})E42$	$0.30^{+0.30}_{-1.35}$	$1.84^{+0.09}_{-0.16}$	$0.30^{+0.30}_{-0.47}$	$1.20^{+0.16}_{-0.40}$	$6.32^{+0.16}_{-0.18}$	$10.15^{+3.08}_{-3.21}$	$249.00^{+82.00}_{-78.00}$
2004-05-30	0.67 (28.01/42)	$4.53^{+0.58}_{-1.46}$	$(8.11^{+1.04}_{-2.61})E42$	$0.25^{+0.25}_{-1.29}$	$1.92^{+0.09}_{-0.16}$	$0.51^{+0.35}_{-0.56}$	$1.52^{+0.20}_{-0.50}$	$6.30^{+0.17}_{-0.19}$	$10.98^{+3.41}_{-3.30}$	$235.00^{+76.00}_{-76.00}$
2004-08-16	0.53 (22.23/42)	$5.06^{+0.45}_{-0.83}$	$(9.05^{+0.80}_{-1.48})E42$	$0.00^{+0.00}_{-0.61}$	$1.97^{+0.07}_{-0.10}$	$0.78^{+0.37}_{-0.49}$	$1.75^{+0.16}_{-0.29}$	$6.36^{+0.18}_{-0.19}$	$9.67^{+2.62}_{-3.30}$	$193.00^{+53.00}_{-69.00}$
2004-12-31	0.55 (23.11/42)	$4.17^{+0.36}_{-1.32}$	$(7.45^{+0.64}_{-2.37})E42$	$0.00^{+0.00}_{-1.27}$	$1.84^{+0.07}_{-0.15}$	$0.38^{+0.28}_{-0.50}$	$1.21^{+0.11}_{-0.39}$	$6.36^{+0.17}_{-0.18}$	$10.22^{+3.01}_{-3.21}$	$244.00^{+74.00}_{-80.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 5506						$\mathrm{Fe}_K\alpha\sigma = 0.26$		
1996-06-24	0.48 (22.53/47)	$7.81^{+1.30}_{-1.65}$	$(6.19^{+1.03}_{-1.31})E42$	$4.76^{+0.79}_{-0.81}$	$1.99^{+0.10}_{-0.11}$	$0.70^{+0.32}_{-0.43}$	$4.02^{+0.69}_{-0.87}$	$6.43^{+0.15}_{-0.17}$	$20.93^{+5.21}_{-5.04}$	$197.00^{+50.00}_{-47.00}$
1996-08-10	0.45 (21.19/47)	$5.84^{+1.07}_{-1.34}$	$(4.63^{+0.85}_{-1.06})E42$	$4.81^{+0.88}_{-0.87}$	$1.95^{+0.11}_{-0.12}$	$0.67^{+0.35}_{-0.47}$	$2.83^{+0.53}_{-0.66}$	$6.42^{+0.16}_{-0.18}$	$14.24^{+4.20}_{-4.21}$	$177.00^{+56.00}_{-53.00}$
1996-08-17	0.62 (29.34/47)	$7.14^{+1.25}_{-1.51}$	$(5.66^{+0.99}_{-1.20})E42$	$4.28^{+0.83}_{-0.81}$	$1.93^{+0.11}_{-0.11}$	$0.60^{+0.31}_{-0.41}$	$3.22^{+0.58}_{-0.70}$	$6.37^{+0.12}_{-0.13}$	$18.97^{+4.72}_{-4.87}$	$194.00^{+48.00}_{-57.00}$
1996-08-25	0.53 (25.07/47)	$7.66^{+1.26}_{-1.54}$	$(6.07^{+1.00}_{-1.22})E42$	$4.48^{+0.79}_{-0.78}$	$1.96^{+0.10}_{-0.11}$	$0.60^{+0.30}_{-0.39}$	$3.71^{+0.62}_{-0.77}$	$6.36^{+0.12}_{-0.13}$	$21.54^{+5.03}_{-5.09}$	$205.00^{+52.00}_{-55.00}$
1996-11-27	0.60 (27.80/46)	$8.55^{+1.67}_{-2.08}$	$(6.78^{+1.32}_{-1.65})E42$	$4.24^{+1.04}_{-1.02}$	$2.04^{+0.12}_{-0.13}$	$1.01^{+0.40}_{-0.54}$	$4.49^{+0.90}_{-1.12}$	$6.39^{+0.13}_{-0.15}$	$21.09^{+5.92}_{-5.91}$	$181.00^{+52.00}_{-59.00}$
1997-03-05	0.74 (33.88/46)	$8.32^{+1.52}_{-1.89}$	$(6.59^{+1.21}_{-1.50})E42$	$3.84^{+1.01}_{-1.00}$	$1.94^{+0.11}_{-0.11}$	$0.60^{+0.30}_{-0.39}$	$3.77^{+0.71}_{-0.88}$	$6.44^{+0.12}_{-0.13}$	$22.55^{+5.26}_{-5.25}$	$210.00^{+50.00}_{-50.00}$
1997-06-20	0.73 (33.38/46)	$9.14^{+1.70}_{-2.12}$	$(7.24^{+1.34}_{-1.68})E42$	$4.62^{+1.00}_{-0.99}$	$2.05^{+0.11}_{-0.12}$	$0.85^{+0.36}_{-0.48}$	$5.14^{+0.97}_{-1.21}$	$6.45^{+0.16}_{-0.18}$	$19.32^{+6.07}_{-6.04}$	$156.00^{+49.00}_{-51.00}$
1997-06-22a	2.53 (116.49/46)	$9.20^{+1.77}_{-2.15}$	$(7.29^{+1.40}_{-1.70})E42$	$4.57^{+1.02}_{-0.98}$	$2.05^{+0.12}_{-0.12}$	$0.77^{+0.35}_{-0.45}$	$5.18^{+1.02}_{-1.23}$	$6.37^{+0.16}_{-0.19}$	$18.29^{+6.12}_{-6.23}$	$144.00^{+48.73}_{-51.00}$
1997-06-22b	1.10 (50.48/46)	$7.11^{+1.39}_{-1.75}$	$(5.63^{+1.10}_{-1.39})E42$	$4.69^{+1.02}_{-1.00}$	$2.13^{+0.13}_{-0.14}$	$1.40^{+0.52}_{-0.74}$	$4.38^{+0.88}_{-1.11}$	$6.55^{+0.14}_{-0.17}$	$18.32^{+4.87}_{-4.86}$	$194.00^{+53.00}_{-60.00}$
1997-06-22c	0.60 (27.82/46)	$9.21^{+1.56}_{-1.90}$	$(7.30^{+1.24}_{-1.51})E42$	$3.99^{+0.89}_{-0.88}$	$2.05^{+0.10}_{-0.11}$	$0.96^{+0.35}_{-0.46}$	$4.90^{+0.85}_{-1.04}$	$6.54^{+0.13}_{-0.15}$	$21.47^{+5.14}_{-5.16}$	$183.00^{+44.00}_{-51.00}$
1997-06-24a	0.42 (19.48/46)	$10.12^{+1.75}_{-2.10}$	$(8.02^{+1.38}_{-1.67})E42$	$4.20^{+0.91}_{-0.89}$	$2.07^{+0.11}_{-0.11}$	$0.90^{+0.34}_{-0.44}$	$5.65^{+1.00}_{-1.20}$	$6.49^{+0.14}_{-0.15}$	$22.38^{+5.81}_{-5.90}$	$173.00^{+49.00}_{-46.00}$
1997-06-24b	0.50 (22.78/46)	$10.00^{+1.74}_{-2.14}$	$(7.93^{+1.38}_{-1.70})E42$	$4.19^{+0.94}_{-0.94}$	$2.00^{+0.10}_{-0.11}$	$0.60^{+0.28}_{-0.35}$	$5.07^{+0.90}_{-1.11}$	$6.35^{+0.15}_{-0.16}$	$21.27^{+6.32}_{-6.28}$	$158.00^{+48.00}_{-47.00}$
1997-06-25	0.45 (20.88/46)	$9.40^{+1.76}_{-2.18}$	$(7.45^{+1.40}_{-1.73})E42$	$3.85^{+1.01}_{-0.99}$	$1.98^{+0.11}_{-0.12}$	$0.72^{+0.33}_{-0.43}$	$4.48^{+0.86}_{-1.06}$	$6.45^{+0.15}_{-0.17}$	$20.46^{+5.98}_{-6.01}$	$168.00^{+50.00}_{-50.00}$
1997-06-27	0.65 (29.79/46)	$10.10^{+1.88}_{-2.29}$	$(8.01^{+1.49}_{-1.81})E42$	$3.73^{+1.00}_{-0.97}$	$1.98^{+0.11}_{-0.11}$	$0.62^{+0.31}_{-0.40}$	$4.84^{+0.92}_{-1.12}$	$6.36^{+0.11}_{-0.12}$	$26.50^{+6.32}_{-6.43}$	$201.00^{+49.00}_{-56.00}$
1997-06-29a	0.57 (26.37/46)	$9.39^{+1.63}_{-1.95}$	$(7.44^{+1.29}_{-1.54})E42$	$4.56^{+0.93}_{-0.90}$	$2.06^{+0.10}_{-0.11}$	$0.80^{+0.32}_{-0.40}$	$5.33^{+0.95}_{-1.13}$	$6.42^{+0.13}_{-0.14}$	$21.13^{+5.64}_{-5.80}$	$168.00^{+48.00}_{-47.00}$
1997-06-29b	0.55 (25.44/46)	$9.27^{+1.60}_{-1.94}$	$(7.34^{+1.27}_{-1.54})E42$	$4.29^{+0.94}_{-0.93}$	$1.95^{+0.10}_{-0.10}$	$0.56^{+0.27}_{-0.34}$	$4.42^{+0.78}_{-0.94}$	$6.44^{+0.16}_{-0.18}$	$17.95^{+5.61}_{-5.63}$	$145.00^{+45.73}_{-47.00}$
1997-07-06	0.64 (29.51/46)	$7.50^{+1.57}_{-1.99}$	$(5.94^{+1.25}_{-1.58})E42$	$3.38^{+1.18}_{-1.15}$	$1.88^{+0.13}_{-0.13}$	$0.42^{+0.31}_{-0.41}$	$3.00^{+0.65}_{-0.82}$	$6.34^{+0.11}_{-0.11}$	$23.74^{+5.39}_{-5.50}$	$246.00^{+63.00}_{-61.00}$
1997-07-21	0.54 (24.95/46)	$9.16^{+1.66}_{-2.06}$	$(7.26^{+1.31}_{-1.63})E42$	$3.76^{+0.98}_{-0.97}$	$1.97^{+0.11}_{-0.11}$	$0.80^{+0.32}_{-0.43}$	$4.25^{+0.79}_{-0.98}$	$6.36^{+0.12}_{-0.14}$	$22.91^{+5.94}_{-5.91}$	$189.00^{+50.00}_{-56.00}$
1998-05-27	0.73 (33.73/46)	$9.79^{+1.82}_{-2.32}$	$(7.76^{+1.44}_{-1.84})E42$	$3.65^{+1.01}_{-1.03}$	$1.92^{+0.11}_{-0.12}$	$0.44^{+0.27}_{-0.36}$	$4.29^{+0.81}_{-1.04}$	$6.35^{+0.16}_{-0.19}$	$21.72^{+6.62}_{-6.42}$	$169.00^{+53.00}_{-51.00}$
1998-09-14	0.39 (17.74/46)	$9.70^{+1.74}_{-2.11}$	$(7.68^{+1.38}_{-1.67})E42$	$5.12^{+0.91}_{-0.89}$	$2.17^{+0.11}_{-0.12}$	$1.36^{+0.46}_{-0.64}$	$6.52^{+1.19}_{-1.45}$	$6.57^{+0.15}_{-0.18}$	$20.69^{+5.98}_{-6.10}$	$157.00^{+46.00}_{-53.00}$
2000-03-18	0.59 (24.98/42)	$9.21^{+1.89}_{-2.35}$	$(7.29^{+1.49}_{-1.86})E42$	$3.69^{+1.13}_{-1.09}$	$2.03^{+0.12}_{-0.13}$	$0.88^{+0.39}_{-0.52}$	$4.66^{+0.98}_{-1.22}$	$6.44^{+0.14}_{-0.16}$	$20.61^{+6.22}_{-6.31}$	$175.00^{+54.00}_{-56.00}$
2000-03-21	0.53 (22.26/42)	$9.36^{+1.85}_{-2.35}$	$(7.41^{+1.47}_{-1.86})E42$	$3.43^{+1.12}_{-1.12}$	$1.96^{+0.12}_{-0.12}$	$0.53^{+0.30}_{-0.40}$	$4.28^{+0.87}_{-1.10}$	$6.44^{+0.14}_{-0.16}$	$22.10^{+6.21}_{-6.17}$	$188.00^{+54.00}_{-55.00}$
2000-03-25	0.54 (22.83/42)	$8.50^{+1.80}_{-2.31}$	$(6.74^{+1.43}_{-1.83})E42$	$4.03^{+1.15}_{-1.13}$	$2.12^{+0.13}_{-0.14}$	$1.10^{+0.46}_{-0.65}$	$5.01^{+1.08}_{-1.39}$	$6.42^{+0.15}_{-0.18}$	$20.09^{+6.21}_{-6.11}$	$182.00^{+58.00}_{-59.00}$
2000-03-30	0.82 (34.47/42)	$10.25^{+1.92}_{-2.47}$	$(8.12^{+1.52}_{-1.95})E42$	$3.49^{+1.08}_{-1.10}$	$1.98^{+0.11}_{-0.12}$	$0.54^{+0.28}_{-0.37}$	$4.83^{+0.93}_{-1.20}$	$6.37^{+0.12}_{-0.14}$	$27.82^{+6.90}_{-6.67}$	$211.00^{+53.00}_{-60.00}$
2000-04-03	0.57 (24.03/42)	$9.53^{+2.01}_{-2.56}$	$(7.54^{+1.59}_{-2.03})E42$	$4.10^{+1.15}_{-1.12}$	$2.09^{+0.13}_{-0.14}$	$1.01^{+0.43}_{-0.59}$	$5.46^{+1.18}_{-1.50}$	$6.39^{+0.15}_{-0.18}$	$22.67^{+6.90}_{-6.79}$	$178.00^{+56.00}_{-62.00}$
2000-04-09	0.46 (19.35/42)	$11.67^{+2.31}_{-2.91}$	$(9.24^{+1.82}_{-2.31})E42$	$4.33^{+1.10}_{-1.09}$	$2.10^{+0.12}_{-0.12}$	$0.79^{+0.35}_{-0.46}$	$6.96^{+1.40}_{-1.77}$	$6.30^{+0.15}_{-0.17}$	$24.92^{+8.44}_{-8.33}$	$155.00^{+54.00}_{-59.00}$
2000-04-14	0.57 (23.76/42)	$9.64^{+2.00}_{-2.54}$	$(7.63^{+1.58}_{-2.01})E42$	$4.60^{+1.13}_{-1.10}$	$2.12^{+0.13}_{-0.14}$	$1.18^{+0.46}_{-0.65}$	$5.92^{+1.25}_{-1.58}$	$6.44^{+0.19}_{-0.25}$	$17.85^{+7.04}_{-7.04}$	$137.00^{+55.23}_{-56.00}$
2000-04-20	0.48 (20.21/42)	$11.67^{+2.32}_{-2.87}$	$(9.24^{+1.84}_{-2.27})E42$	$4.09^{+1.07}_{-1.04}$	$2.11^{+0.12}_{-0.13}$	$1.06^{+0.41}_{-0.56}$	$6.93^{+1.40}_{-1.73}$	$6.41^{+0.17}_{-0.20}$	$21.44^{+7.93}_{-8.04}$	$141.00^{+55.53}_{-54.00}$
2000-04-24	0.53 (22.36/42)	$11.33^{+2.24}_{-2.90}$	$(8.98^{+1.77}_{-2.29})E42$	$2.48^{+1.11}_{-1.12}$	$1.96^{+0.12}_{-0.13}$	$0.61^{+0.31}_{-0.42}$	$4.76^{+0.97}_{-1.25}$	$6.33^{+0.11}_{-0.12}$	$34.09^{+7.45}_{-7.11}$	$250.00^{+62.00}_{-55.00}$
2000-04-29	0.64 (26.91/42)	$10.89^{+2.22}_{-2.68}$	$(8.63^{+1.76}_{-2.12})E42$	$4.19^{+1.07}_{-1.01}$	$2.17^{+0.13}_{-0.13}$	$1.43^{+0.52}_{-0.72}$	$6.93^{+1.44}_{-1.74}$	$6.46^{+0.16}_{-0.19}$	$20.66^{+7.31}_{-7.55}$	$144.00^{+52.20}_{-59.00}$
2000-05-03	0.59 (24.85/42)	$11.27^{+2.31}_{-2.94}$	$(8.93^{+1.83}_{-2.32})E42$	$3.86^{+1.13}_{-1.12}$	$2.06^{+0.12}_{-0.13}$	$0.78^{+0.36}_{-0.48}$	$6.09^{+1.27}_{-1.63}$	$6.32^{+0.14}_{-0.16}$	$26.88^{+8.11}_{-7.97}$	$182.00^{+60.00}_{-56.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
2000-05-07	0.56 (23.34/42)	$11.03^{+2.14}_{-2.76}$	$(8.73^{+1.70}_{-2.19})E42$	$2.96^{+1.06}_{-1.07}$	$2.07^{+0.12}_{-0.13}$	$1.00^{+0.39}_{-0.53}$	$5.62^{+1.12}_{-1.44}$	$6.36^{+0.14}_{-0.16}$	$26.36^{+7.41}_{-7.11}$	$192.00^{+55.00}_{-55.00}$
2000-05-16	0.78 (32.92/42)	$11.44^{+2.25}_{-2.92}$	$(9.06^{+1.78}_{-2.31})E42$	$3.97^{+1.09}_{-1.10}$	$2.08^{+0.12}_{-0.13}$	$0.81^{+0.35}_{-0.48}$	$6.45^{+1.29}_{-1.68}$	$6.32^{+0.17}_{-0.20}$	$23.65^{+8.28}_{-7.96}$	$156.00^{+56.00}_{-55.00}$
2000-05-20	0.50 (21.09/42)	$9.74^{+2.05}_{-2.55}$	$(7.72^{+1.62}_{-2.02})E42$	$3.79^{+1.17}_{-1.12}$	$2.02^{+0.13}_{-0.13}$	$0.83^{+0.38}_{-0.51}$	$4.96^{+1.07}_{-1.33}$	$6.36^{+0.14}_{-0.16}$	$21.76^{+6.94}_{-7.05}$	$169.00^{+55.00}_{-58.00}$
2000-07-19	0.44 (18.52/42)	$9.42^{+1.90}_{-2.42}$	$(7.46^{+1.51}_{-1.91})E42$	$3.35^{+1.11}_{-1.09}$	$2.04^{+0.12}_{-0.13}$	$0.96^{+0.40}_{-0.54}$	$4.69^{+0.97}_{-1.23}$	$6.38^{+0.12}_{-0.13}$	$25.15^{+6.45}_{-6.37}$	$209.00^{+56.00}_{-62.00}$
2000-12-31	0.53 (22.13/42)	$7.57^{+1.66}_{-2.17}$	$(6.00^{+1.31}_{-1.72})E42$	$4.33^{+1.21}_{-1.20}$	$2.09^{+0.14}_{-0.15}$	$1.08^{+0.46}_{-0.65}$	$4.37^{+0.98}_{-1.28}$	$6.27^{+0.15}_{-0.16}$	$19.15^{+6.36}_{-6.16}$	$182.00^{+63.00}_{-62.00}$
2001-01-23	0.49 (20.65/42)	$9.13^{+1.90}_{-2.46}$	$(7.23^{+1.50}_{-1.95})E42$	$3.82^{+1.14}_{-1.14}$	$2.04^{+0.13}_{-0.14}$	$0.94^{+0.40}_{-0.55}$	$4.76^{+1.01}_{-1.31}$	$6.35^{+0.15}_{-0.18}$	$21.36^{+6.81}_{-6.62}$	$177.00^{+58.00}_{-58.00}$
2001-03-02	0.47 (19.76/42)	$8.49^{+1.73}_{-2.25}$	$(6.72^{+1.37}_{-1.79})E42$	$2.42^{+1.18}_{-1.19}$	$1.82^{+0.12}_{-0.13}$	$0.42^{+0.27}_{-0.36}$	$2.90^{+0.61}_{-0.79}$	$6.25^{+0.11}_{-0.12}$	$25.61^{+6.11}_{-5.92}$	$241.00^{+65.00}_{-59.00}$
2001-04-09	0.46 (19.33/42)	$8.36^{+1.75}_{-2.30}$	$(6.62^{+1.39}_{-1.82})E42$	$3.80^{+1.15}_{-1.16}$	$2.05^{+0.13}_{-0.14}$	$1.00^{+0.42}_{-0.58}$	$4.36^{+0.94}_{-1.23}$	$6.32^{+0.15}_{-0.17}$	$20.71^{+6.50}_{-6.26}$	$187.00^{+63.00}_{-61.00}$
2001-05-19	0.52 (21.84/42)	$11.27^{+2.30}_{-2.88}$	$(8.93^{+1.82}_{-2.28})E42$	$3.46^{+1.12}_{-1.08}$	$2.04^{+0.12}_{-0.13}$	$0.87^{+0.37}_{-0.50}$	$5.78^{+1.20}_{-1.51}$	$6.27^{+0.13}_{-0.15}$	$26.08^{+8.03}_{-8.02}$	$175.00^{+55.00}_{-57.00}$
2001-06-18	0.49 (20.40/42)	$9.24^{+1.92}_{-2.42}$	$(7.32^{+1.52}_{-1.91})E42$	$3.84^{+1.13}_{-1.10}$	$2.06^{+0.13}_{-0.13}$	$0.99^{+0.41}_{-0.56}$	$4.94^{+1.04}_{-1.32}$	$6.35^{+0.15}_{-0.17}$	$19.98^{+6.71}_{-6.70}$	$163.00^{+56.00}_{-58.00}$
2001-07-26	0.45 (18.87/42)	$10.20^{+2.09}_{-2.67}$	$(8.08^{+1.65}_{-2.11})E42$	$3.48^{+1.13}_{-1.11}$	$2.02^{+0.12}_{-0.13}$	$0.81^{+0.37}_{-0.50}$	$5.04^{+1.06}_{-1.35}$	$6.38^{+0.13}_{-0.15}$	$26.86^{+7.07}_{-6.93}$	$204.00^{+55.00}_{-62.00}$
2001-09-02	0.69 (28.92/42)	$11.26^{+2.20}_{-2.69}$	$(8.92^{+1.74}_{-2.13})E42$	$4.23^{+1.04}_{-1.00}$	$2.13^{+0.12}_{-0.13}$	$1.14^{+0.42}_{-0.57}$	$6.88^{+1.36}_{-1.67}$	$6.41^{+0.20}_{-0.25}$	$16.89^{+7.55}_{-7.71}$	$113.00^{+50.86}_{-54.00}$
2001-11-23	0.58 (24.32/42)	$9.88^{+1.96}_{-2.49}$	$(7.82^{+1.55}_{-1.97})E42$	$3.19^{+1.09}_{-1.08}$	$2.01^{+0.12}_{-0.13}$	$0.80^{+0.35}_{-0.47}$	$4.72^{+0.96}_{-1.22}$	$6.29^{+0.12}_{-0.13}$	$27.38^{+6.89}_{-6.78}$	$214.00^{+56.00}_{-63.00}$
2001-12-03	0.68 (28.36/42)	$11.46^{+2.10}_{-2.71}$	$(9.08^{+1.66}_{-2.14})E42$	$3.80^{+0.99}_{-1.01}$	$2.09^{+0.11}_{-0.12}$	$0.99^{+0.36}_{-0.49}$	$6.42^{+1.20}_{-1.54}$	$6.38^{+0.19}_{-0.24}$	$20.53^{+7.73}_{-7.43}$	$136.00^{+52.11}_{-50.00}$
2001-12-04a	0.45 (18.94/42)	$11.79^{+2.35}_{-2.96}$	$(9.34^{+1.87}_{-2.34})E42$	$3.73^{+1.06}_{-1.04}$	$2.12^{+0.12}_{-0.13}$	$1.06^{+0.42}_{-0.57}$	$6.89^{+1.41}_{-1.77}$	$6.35^{+0.14}_{-0.15}$	$28.30^{+8.03}_{-7.93}$	$185.00^{+54.00}_{-54.00}$
2001-12-04b	0.85 (35.66/42)	$10.63^{+2.11}_{-2.59}$	$(8.42^{+1.67}_{-2.06})E42$	$4.03^{+1.05}_{-1.00}$	$2.14^{+0.12}_{-0.13}$	$1.16^{+0.44}_{-0.60}$	$6.50^{+1.32}_{-1.62}$	$6.46^{+0.17}_{-0.20}$	$20.50^{+6.86}_{-6.95}$	$148.00^{+50.24}_{-53.00}$
2001-12-05	0.69 (28.92/42)	$9.40^{+1.80}_{-2.31}$	$(7.44^{+1.42}_{-1.83})E42$	$3.36^{+1.02}_{-1.03}$	$2.10^{+0.12}_{-0.13}$	$1.24^{+0.43}_{-0.60}$	$5.13^{+1.01}_{-1.29}$	$6.30^{+0.12}_{-0.13}$	$25.59^{+6.59}_{-6.33}$	$208.00^{+55.00}_{-61.00}$
2002-01-02	0.48 (20.15/42)	$9.01^{+1.83}_{-2.31}$	$(7.14^{+1.44}_{-1.83})E42$	$3.29^{+1.12}_{-1.10}$	$2.00^{+0.12}_{-0.13}$	$0.83^{+0.37}_{-0.49}$	$4.24^{+0.88}_{-1.12}$	$6.35^{+0.13}_{-0.14}$	$22.89^{+6.31}_{-6.27}$	$198.00^{+60.00}_{-58.00}$
2002-02-05	0.53 (22.32/42)	$9.92^{+2.03}_{-2.58}$	$(7.85^{+1.61}_{-2.04})E42$	$3.83^{+1.08}_{-1.06}$	$2.15^{+0.13}_{-0.14}$	$1.19^{+0.46}_{-0.65}$	$6.03^{+1.26}_{-1.60}$	$6.36^{+0.16}_{-0.19}$	$21.54^{+7.11}_{-6.99}$	$166.00^{+56.00}_{-56.00}$
2002-03-19	0.68 (28.35/42)	$10.27^{+1.96}_{-2.45}$	$(8.14^{+1.55}_{-1.94})E42$	$3.59^{+1.03}_{-1.01}$	$2.08^{+0.12}_{-0.12}$	$0.93^{+0.38}_{-0.52}$	$5.59^{+1.09}_{-1.36}$	$6.54^{+0.15}_{-0.17}$	$23.21^{+6.26}_{-6.28}$	$183.00^{+50.00}_{-52.00}$
2004-07-11	0.46 (19.39/42)	$7.66^{+1.60}_{-2.08}$	$(6.08^{+1.29}_{-1.63})E42$	$3.23^{+1.13}_{-1.10}$	$1.99^{+0.13}_{-0.14}$	$0.96^{+0.41}_{-0.56}$	$3.52^{+0.76}_{-0.96}$	$6.29^{+0.14}_{-0.15}$	$18.21^{+5.69}_{-5.68}$	$180.00^{+58.00}_{-66.00}$
2004-07-22	0.43 (18.19/42)	$9.24^{+1.96}_{-2.58}$	$(7.32^{+1.55}_{-2.05})E42$	$4.35^{+1.12}_{-1.13}$	$2.14^{+0.14}_{-0.15}$	$1.24^{+0.50}_{-0.73}$	$5.73^{+1.24}_{-1.64}$	$6.41^{+0.18}_{-0.22}$	$20.57^{+7.32}_{-7.08}$	$168.00^{+61.00}_{-61.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^{2}_{ν}[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 5548					$Fe_{K}\alpha\sigma = 0.25$			
1996-05-05	0.54 (25.32/47)	$6.34^{+0.73}_{-1.29}$	$(4.09^{+0.47}_{-0.83})E43$	$0.64^{+0.64}_{-0.78}$	$1.75^{+0.05}_{-0.10}$	$0.00^{+0.00}_{-0.23}$	$1.77^{+0.21}_{-0.36}$	$5.94^{+0.29}_{-0.30}$	$8.71^{+4.16}_{-3.55}$	$113.00^{+54.37}_{-45.00}$
1996-06-30	0.32 (14.90/47)	$6.25^{+0.95}_{-1.31}$	$(4.04^{+0.61}_{-0.85})E43$	$0.86^{+0.76}_{-0.79}$	$1.76^{+0.08}_{-0.10}$	$0.09^{+0.09}_{-0.28}$	$1.80^{+0.28}_{-0.38}$	$6.24^{+0.24}_{-0.26}$	$8.43^{+3.72}_{-3.44}$	$119.00^{+53.95}_{-49.00}$
1996-07-07	0.75 (35.03/47)	$5.98^{+0.25}_{-0.85}$	$(3.87^{+0.16}_{-0.55})E43$	$0.00^{+0.00}_{-0.62}$	$1.73^{+0.02}_{-0.07}$	$0.00^{+0.00}_{-0.15}$	$1.53^{+0.07}_{-0.22}$	$6.21^{+0.21}_{-0.20}$	$8.21^{+3.24}_{-3.24}$	$127.00^{+49.63}_{-52.00}$
1996-07-16	0.97 (45.37/47)	$5.16^{+0.93}_{-1.22}$	$(3.33^{+0.60}_{-0.78})E43$	$1.20^{+0.84}_{-0.85}$	$1.82^{+0.10}_{-0.12}$	$0.17^{+0.17}_{-0.35}$	$1.67^{+0.30}_{-0.40}$	$6.26^{+0.26}_{-0.29}$	$6.62^{+3.30}_{-3.13}$	$112.00^{+56.29}_{-53.00}$
1996-11-12	0.52 (23.70/46)	$3.93^{+0.82}_{-1.33}$	$(2.54^{+0.53}_{-0.86})E43$	$1.01^{+1.01}_{-1.38}$	$1.75^{+0.14}_{-0.16}$	$0.30^{+0.30}_{-0.46}$	$1.09^{+0.23}_{-0.38}$	$6.26^{+0.20}_{-0.23}$	$8.06^{+3.10}_{-3.16}$	$178.00^{+71.00}_{-76.00}$
1997-06-21	0.37 (16.81/46)	$4.62^{+0.54}_{-1.35}$	$(2.98^{+0.35}_{-0.87})E43$	$0.32^{+0.32}_{-1.22}$	$1.74^{+0.07}_{-0.14}$	$0.13^{+0.13}_{-0.36}$	$1.23^{+0.14}_{-0.36}$	$6.34^{+0.23}_{-0.27}$	$6.38^{+3.08}_{-3.13}$	$130.00^{+63.46}_{-63.00}$
1998-05-22	0.78 (35.76/46)	$7.07^{+0.43}_{-1.63}$	$(4.58^{+0.28}_{-1.06})E43$	$0.00^{+0.00}_{-0.96}$	$1.75^{+0.04}_{-0.11}$	$0.07^{+0.07}_{-0.28}$	$1.86^{+0.11}_{-0.43}$	$6.24^{+0.24}_{-0.25}$	$9.89^{+3.92}_{-3.72}$	$133.00^{+55.00}_{-47.00}$
1998-06-15a	0.61 (28.03/46)	$7.63^{+0.90}_{-2.00}$	$(4.94^{+0.59}_{-1.29})E43$	$0.33^{+0.33}_{-1.08}$	$1.82^{+0.07}_{-0.12}$	$0.14^{+0.14}_{-0.32}$	$2.31^{+0.28}_{-0.61}$	$6.14^{+0.27}_{-0.31}$	$8.46^{+4.66}_{-3.92}$	$98.93^{+55.11}_{-48.07}$
1998-06-15b	0.78 (35.74/46)	$7.88^{+0.34}_{-1.62}$	$(5.11^{+0.22}_{-1.05})E43$	$0.00^{+0.00}_{-0.87}$	$1.75^{+0.02}_{-0.10}$	$0.01^{+0.01}_{-0.24}$	$2.07^{+0.09}_{-0.43}$	$6.21^{+0.20}_{-0.20}$	$11.08^{+4.12}_{-3.98}$	$131.00^{+49.02}_{-48.00}$
1998-06-19	0.55 (25.09/46)	$7.88^{+0.92}_{-1.73}$	$(5.10^{+0.60}_{-1.12})E43$	$0.35^{+0.35}_{-0.94}$	$1.83^{+0.07}_{-0.11}$	$0.15^{+0.15}_{-0.28}$	$2.40^{+0.28}_{-0.53}$	$6.37^{+0.24}_{-0.26}$	$8.56^{+3.73}_{-3.74}$	$104.00^{+45.33}_{-48.00}$
1998-06-20a	0.59 (27.31/46)	$7.52^{+0.42}_{-1.47}$	$(4.87^{+0.27}_{-0.95})E43$	$0.00^{+0.00}_{-0.85}$	$1.76^{+0.04}_{-0.09}$	$0.07^{+0.07}_{-0.23}$	$2.01^{+0.11}_{-0.40}$	$6.21^{+0.21}_{-0.21}$	$11.15^{+3.77}_{-3.62}$	$138.00^{+46.64}_{-46.00}$
1998-06-20b	0.52 (23.81/46)	$8.85^{+1.26}_{-2.01}$	$(5.73^{+0.82}_{-1.30})E43$	$0.54^{+0.54}_{-0.94}$	$1.88^{+0.08}_{-0.11}$	$0.15^{+0.15}_{-0.29}$	$2.96^{+0.43}_{-0.68}$	$6.38^{+0.36}_{-0.44}$	$8.20^{+4.85}_{-4.02}$	$88.40^{+51.46}_{-43.60}$
1998-06-21a	0.58 (26.62/46)	$8.43^{+1.81}_{-1.79}$	$(5.45^{+1.17}_{-1.16})E43$	$1.15^{+1.04}_{-0.81}$	$2.01^{+0.13}_{-0.12}$	$0.58^{+0.37}_{-0.48}$	$3.56^{+0.77}_{-0.76}$	$6.87^{+1.37}_{-0.63}$	$2.63^{+2.63}_{-3.52}$	$33.61^{+33.61}_{-34.89}$
1998-06-21b	0.49 (22.43/46)	$9.27^{+1.66}_{-2.03}$	$(6.00^{+1.07}_{-1.31})E43$	$0.93^{+0.92}_{-0.91}$	$1.91^{+0.10}_{-0.11}$	$0.32^{+0.24}_{-0.30}$	$3.35^{+0.60}_{-0.74}$	$6.21^{+0.38}_{-0.46}$	$6.85^{+4.98}_{-4.14}$	$64.83^{+46.77}_{-39.17}$
1998-06-21c	0.41 (18.65/46)	$9.00^{+1.56}_{-1.90}$	$(5.82^{+1.01}_{-1.23})E43$	$0.86^{+0.86}_{-0.87}$	$1.92^{+0.10}_{-0.10}$	$0.33^{+0.24}_{-0.32}$	$3.29^{+0.58}_{-0.70}$	$6.45^{+0.36}_{-0.47}$	$7.23^{+4.43}_{-3.98}$	$76.69^{+46.17}_{-42.31}$
1998-06-22a	0.44 (20.46/46)	$9.02^{+1.46}_{-1.95}$	$(5.84^{+0.94}_{-1.26})E43$	$0.67^{+0.67}_{-0.92}$	$1.88^{+0.09}_{-0.10}$	$0.19^{+0.19}_{-0.29}$	$3.06^{+0.50}_{-0.67}$	$6.36^{+0.30}_{-0.36}$	$7.35^{+4.66}_{-4.30}$	$76.73^{+48.75}_{-44.27}$
1998-06-22b	0.58 (26.54/46)	$9.08^{+1.48}_{-1.87}$	$(5.87^{+0.95}_{-1.21})E43$	$0.89^{+0.89}_{-0.90}$	$1.86^{+0.09}_{-0.10}$	$0.12^{+0.12}_{-0.24}$	$3.07^{+0.50}_{-0.64}$	$6.29^{+0.31}_{-0.35}$	$8.15^{+5.00}_{-4.09}$	$80.96^{+49.01}_{-41.04}$
1998-06-22c	0.38 (17.67/46)	$9.57^{+1.52}_{-2.10}$	$(6.19^{+0.98}_{-1.36})E43$	$0.62^{+0.62}_{-0.93}$	$1.89^{+0.10}_{-0.11}$	$0.31^{+0.25}_{-0.33}$	$3.22^{+0.52}_{-0.72}$	$6.49^{+0.28}_{-0.30}$	$10.58^{+5.21}_{-4.55}$	$109.00^{+54.95}_{-44.00}$
1998-06-24	0.60 (27.55/46)	$7.95^{+0.41}_{-1.07}$	$(5.15^{+0.27}_{-0.69})E43$	$0.00^{+0.00}_{-0.56}$	$1.76^{+0.03}_{-0.07}$	$0.04^{+0.04}_{-0.20}$	$2.13^{+0.11}_{-0.29}$	$6.20^{+0.20}_{-0.20}$	$10.27^{+3.46}_{-3.97}$	$120.00^{+39.19}_{-48.00}$
1998-06-29	0.56 (25.97/46)	$6.42^{+0.65}_{-1.68}$	$(4.16^{+0.42}_{-1.09})E43$	$0.20^{+0.20}_{-1.10}$	$1.76^{+0.07}_{-0.12}$	$0.18^{+0.18}_{-0.32}$	$1.72^{+0.18}_{-0.46}$	$6.26^{+0.20}_{-0.22}$	$9.64^{+3.93}_{-3.50}$	$140.00^{+58.22}_{-49.00}$
1998-07-01a	0.37 (16.92/46)	$5.28^{+0.77}_{-1.45}$	$(3.41^{+0.49}_{-0.93})E43$	$0.51^{+0.51}_{-1.16}$	$1.75^{+0.08}_{-0.13}$	$0.13^{+0.13}_{-0.34}$	$1.43^{+0.21}_{-0.40}$	$6.39^{+0.24}_{-0.28}$	$7.69^{+3.66}_{-3.28}$	$135.00^{+64.99}_{-63.00}$
1998-07-01b	0.40 (18.63/46)	$5.78^{+0.42}_{-1.58}$	$(3.74^{+0.27}_{-1.02})E43$	$0.01^{+0.01}_{-1.13}$	$1.77^{+0.05}_{-0.13}$	$0.27^{+0.21}_{-0.36}$	$1.53^{+0.11}_{-0.43}$	$6.21^{+0.20}_{-0.23}$	$9.54^{+3.68}_{-3.22}$	$153.00^{+60.58}_{-53.00}$
1998-07-02	0.51 (23.33/46)	$6.56^{+1.10}_{-1.83}$	$(4.25^{+0.71}_{-1.19})E43$	$0.58^{+0.58}_{-1.13}$	$1.85^{+0.11}_{-0.14}$	$0.34^{+0.31}_{-0.42}$	$2.09^{+0.35}_{-0.59}$	$6.31^{+0.28}_{-0.30}$	$7.30^{+4.63}_{-3.77}$	$102.00^{+65.41}_{-57.00}$
1998-07-07	0.54 (24.82/46)	$5.78^{+0.84}_{-1.47}$	$(3.74^{+0.54}_{-0.95})E43$	$0.48^{+0.48}_{-1.07}$	$1.78^{+0.09}_{-0.12}$	$0.20^{+0.20}_{-0.32}$	$1.64^{+0.24}_{-0.42}$	$6.25^{+0.25}_{-0.28}$	$7.19^{+3.53}_{-3.21}$	$113.00^{+56.01}_{-51.00}$
1998-08-16	0.55 (25.45/46)	$7.19^{+0.45}_{-1.87}$	$(4.66^{+0.29}_{-1.21})E43$	$0.04^{+0.04}_{-1.10}$	$1.75^{+0.04}_{-0.12}$	$0.05^{+0.05}_{-0.28}$	$1.91^{+0.12}_{-0.50}$	$6.11^{+0.21}_{-0.23}$	$10.47^{+4.92}_{-3.76}$	$132.00^{+62.98}_{-45.00}$
1998-08-17	0.55 (25.12/46)	$7.07^{+0.83}_{-1.91}$	$(4.57^{+0.54}_{-1.23})E43$	$0.30^{+0.30}_{-1.13}$	$1.78^{+0.07}_{-0.13}$	$0.15^{+0.15}_{-0.33}$	$1.99^{+0.24}_{-0.54}$	$6.24^{+0.24}_{-0.29}$	$8.94^{+4.01}_{-3.84}$	$117.00^{+53.04}_{-50.00}$
1998-08-18	0.51 (23.66/46)	$6.99^{+1.05}_{-1.81}$	$(4.53^{+0.68}_{-1.17})E43$	$0.51^{+0.51}_{-1.06}$	$1.86^{+0.09}_{-0.13}$	$0.35^{+0.27}_{-0.37}$	$2.24^{+0.34}_{-0.59}$	$6.18^{+0.24}_{-0.27}$	$7.93^{+4.11}_{-3.70}$	$102.00^{+53.42}_{-48.00}$
1999-01-05	0.57 (26.42/46)	$5.75^{+0.81}_{-1.65}$	$(3.72^{+0.52}_{-1.06})E43$	$0.40^{+0.40}_{-1.18}$	$1.79^{+0.09}_{-0.14}$	$0.31^{+0.27}_{-0.40}$	$1.62^{+0.23}_{-0.47}$	$6.37^{+0.25}_{-0.30}$	$9.33^{+4.03}_{-3.41}$	$152.00^{+66.69}_{-56.00}$
1999-05-13	0.49 (20.40/42)	$6.27^{+1.31}_{-2.22}$	$(4.02^{+0.84}_{-1.43})E43$	$0.90^{+0.90}_{-1.47}$	$1.85^{+0.13}_{-0.16}$	$0.32^{+0.31}_{-0.45}$	$2.03^{+0.43}_{-0.73}$	$6.03^{+0.30}_{-0.34}$	$8.22^{+5.25}_{-4.02}$	$108.00^{+69.92}_{-56.00}$
1999-07-12	0.35 (14.67/42)	$5.23^{+0.78}_{-1.71}$	$(3.36^{+0.50}_{-1.10})E43$	$0.49^{+0.49}_{-1.41}$	$1.77^{+0.09}_{-0.15}$	$0.19^{+0.19}_{-0.39}$	$1.46^{+0.22}_{-0.48}$	$6.29^{+0.25}_{-0.31}$	$7.39^{+3.80}_{-3.59}$	$128.00^{+67.17}_{-63.00}$
1999-10-14	0.50 (21.05/42)	$5.40^{+0.63}_{-1.89}$	$(3.46^{+0.40}_{-1.21})E43$	$0.22^{+0.22}_{-1.48}$	$1.75^{+0.08}_{-0.16}$	$0.26^{+0.25}_{-0.42}$	$1.42^{+0.17}_{-0.51}$	$6.13^{+0.24}_{-0.28}$	$8.84^{+4.32}_{-3.65}$	$144.00^{+72.34}_{-63.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
1999-12-25	0.53 (22.28/42)	$4.44^{+1.07}_{-1.66}$	$(2.85^{+0.68}_{-1.06})E43$	$1.15^{+1.15}_{-1.55}$	$1.87^{+0.15}_{-0.17}$	$0.39^{+0.38}_{-0.56}$	$1.51^{+0.37}_{-0.57}$	$6.29^{+0.26}_{-0.33}$	$6.71^{+3.78}_{-3.71}$	$132.00^{+75.64}_{-78.00}$
2000-10-15	0.62 (25.94/42)	$4.31^{+0.37}_{-1.12}$	$(2.77^{+0.24}_{-0.72})E43$	$0.00^{+0.00}_{-1.08}$	$1.78^{+0.06}_{-0.12}$	$0.24^{+0.24}_{-0.36}$	$1.17^{+0.10}_{-0.31}$	$6.09^{+0.23}_{-0.24}$	$7.09^{+2.90}_{-3.32}$	$149.00^{+61.90}_{-67.00}$
2001-01-25	0.39 (16.51/42)	$3.13^{+0.29}_{-1.23}$	$(2.01^{+0.19}_{-0.79})E43$	$0.00^{+0.00}_{-1.56}$	$1.76^{+0.07}_{-0.18}$	$0.28^{+0.28}_{-0.53}$	$0.82^{+0.08}_{-0.33}$	$6.21^{+0.24}_{-0.28}$	$5.83^{+2.66}_{-3.26}$	$172.00^{+80.82}_{-94.00}$
2001-07-03	0.64 (26.80/42)	$5.67^{+1.00}_{-1.99}$	$(3.64^{+0.64}_{-1.28})E43$	$0.68^{+0.68}_{-1.42}$	$1.84^{+0.10}_{-0.16}$	$0.16^{+0.16}_{-0.40}$	$1.82^{+0.33}_{-0.65}$	$5.74^{+0.24}_{-0.41}$	$7.37^{+5.28}_{-3.76}$	$99.80^{+72.38}_{-56.20}$
2001-07-07	0.66 (27.87/42)	$5.63^{+0.49}_{-1.80}$	$(3.62^{+0.32}_{-1.15})E43$	$0.07^{+0.07}_{-1.34}$	$1.81^{+0.06}_{-0.15}$	$0.18^{+0.18}_{-0.39}$	$1.62^{+0.14}_{-0.52}$	$6.14^{+0.26}_{-0.29}$	$7.46^{+4.05}_{-3.57}$	$120.00^{+66.27}_{-60.00}$
2001-07-11	0.49 (20.72/42)	$6.47^{+0.54}_{-1.82}$	$(4.15^{+0.35}_{-1.17})E43$	$0.09^{+0.09}_{-1.23}$	$1.77^{+0.06}_{-0.13}$	$0.13^{+0.13}_{-0.32}$	$1.76^{+0.15}_{-0.50}$	$6.30^{+0.31}_{-0.35}$	$7.41^{+4.50}_{-3.71}$	$107.00^{+64.38}_{-52.00}$
2001-07-14	0.67 (28.05/42)	$4.85^{+0.43}_{-1.53}$	$(3.11^{+0.28}_{-0.98})E43$	$0.05^{+0.05}_{-1.33}$	$1.77^{+0.06}_{-0.15}$	$0.24^{+0.24}_{-0.41}$	$1.30^{+0.12}_{-0.42}$	$6.33^{+0.22}_{-0.26}$	$6.98^{+3.32}_{-3.32}$	$138.00^{+66.73}_{-64.00}$
2001-07-19	0.45 (18.72/42)	$4.25^{+0.37}_{-1.30}$	$(2.73^{+0.23}_{-0.84})E43$	$0.00^{+0.00}_{-1.28}$	$1.75^{+0.06}_{-0.15}$	$0.37^{+0.26}_{-0.44}$	$1.09^{+0.10}_{-0.34}$	$6.32^{+0.23}_{-0.25}$	$6.97^{+2.94}_{-3.26}$	$153.00^{+65.91}_{-74.00}$
2001-07-25	0.47 (19.87/42)	$3.22^{+0.32}_{-0.85}$	$(2.07^{+0.20}_{-0.54})E43$	$0.00^{+0.00}_{-1.10}$	$1.74^{+0.07}_{-0.13}$	$0.19^{+0.19}_{-0.37}$	$0.82^{+0.08}_{-0.22}$	$6.20^{+0.23}_{-0.23}$	$6.02^{+2.26}_{-3.29}$	$172.00^{+65.00}_{-92.00}$
2004-03-02	0.35 (14.74/42)	$2.57^{+0.50}_{-1.08}$	$(1.66^{+0.33}_{-0.68})E43$	$0.76^{+0.76}_{-1.64}$	$1.84^{+0.11}_{-0.18}$	$0.16^{+0.16}_{-0.54}$	$0.82^{+0.17}_{-0.34}$	$6.19^{+0.69}_{-1.31}$	$2.14^{+1.67}_{-3.20}$	$73.06^{+57.17}_{-112.94}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 7314						$\mathrm{Fe}_K\alpha\sigma = 0.21$		
1999-09-13	0.44 (18.61/42)	$4.10^{+1.08}_{-1.57}$	$(2.25^{+0.60}_{-0.86})E42$	$1.72^{+1.47}_{-1.47}$	$2.08^{+0.17}_{-0.19}$	$0.69^{+0.51}_{-0.81}$	$1.98^{+0.54}_{-0.78}$	$6.31^{+0.16}_{-0.18}$	$10.19^{+3.33}_{-3.39}$	$219.00^{+75.00}_{-86.00}$
1999-09-16	0.46 (19.17/42)	$5.06^{+0.91}_{-1.59}$	$(2.78^{+0.50}_{-0.88})E42$	$0.68^{+0.68}_{-1.31}$	$1.94^{+0.12}_{-0.15}$	$0.30^{+0.30}_{-0.49}$	$1.86^{+0.34}_{-0.60}$	$6.40^{+0.17}_{-0.18}$	$10.79^{+3.36}_{-3.41}$	$205.00^{+66.00}_{-74.00}$
2002-07-19	0.59 (24.99/42)	$3.12^{+0.78}_{-1.18}$	$(1.72^{+0.43}_{-0.65})E42$	$1.12^{+1.12}_{-1.43}$	$1.97^{+0.17}_{-0.19}$	$0.74^{+0.51}_{-0.82}$	$1.20^{+0.31}_{-0.46}$	$6.46^{+0.22}_{-0.25}$	$6.37^{+2.42}_{-3.12}$	$190.00^{+74.00}_{-103.00}$
2002-07-20	0.40 (16.84/42)	$3.48^{+0.79}_{-1.29}$	$(1.91^{+0.43}_{-0.71})E42$	$0.92^{+0.92}_{-1.43}$	$2.00^{+0.15}_{-0.18}$	$0.71^{+0.49}_{-0.77}$	$1.39^{+0.32}_{-0.53}$	$6.32^{+0.19}_{-0.22}$	$7.41^{+2.80}_{-3.15}$	$200.00^{+81.00}_{-91.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		NGC 7469						$\mathrm{Fe}_K\alpha\sigma = 0.17$		
1996-04-12	0.39 (19.98/51)	$4.16^{+0.37}_{-0.71}$	$(2.39^{+0.21}_{-0.41})E43$	$0.00^{+0.00}_{-0.56}$	$2.00^{+0.07}_{-0.11}$	$1.15^{+0.45}_{-0.63}$	$1.50^{+0.14}_{-0.26}$	$6.09^{+0.19}_{-0.20}$	$6.68^{+2.12}_{-2.04}$	$149.00^{+49.00}_{-42.00}$
1996-04-17	0.61 (28.44/47)	$3.91^{+0.55}_{-0.99}$	$(2.24^{+0.32}_{-0.57})E43$	$0.32^{+0.32}_{-0.84}$	$1.96^{+0.10}_{-0.13}$	$0.34^{+0.34}_{-0.51}$	$1.43^{+0.20}_{-0.36}$	$6.40^{+0.27}_{-0.31}$	$4.80^{+2.23}_{-2.21}$	$125.00^{+59.96}_{-56.00}$
1996-04-18	0.55 (25.87/47)	$3.67^{+0.60}_{-1.06}$	$(2.11^{+0.34}_{-0.61})E43$	$0.43^{+0.43}_{-0.96}$	$1.91^{+0.11}_{-0.15}$	$0.31^{+0.31}_{-0.55}$	$1.26^{+0.21}_{-0.37}$	$6.31^{+0.20}_{-0.21}$	$6.49^{+2.38}_{-2.34}$	$168.00^{+62.00}_{-66.00}$
1996-04-25	0.69 (32.54/47)	$2.97^{+0.37}_{-0.85}$	$(1.70^{+0.21}_{-0.49})E43$	$0.19^{+0.19}_{-0.97}$	$1.89^{+0.09}_{-0.15}$	$0.46^{+0.37}_{-0.58}$	$0.95^{+0.12}_{-0.28}$	$6.25^{+0.20}_{-0.22}$	$5.47^{+2.06}_{-1.87}$	$176.00^{+70.00}_{-59.00}$
1996-04-27	0.56 (26.44/47)	$3.00^{+0.65}_{-0.86}$	$(1.72^{+0.37}_{-0.49})E43$	$0.89^{+0.89}_{-0.96}$	$1.92^{+0.14}_{-0.15}$	$0.37^{+0.37}_{-0.58}$	$1.08^{+0.24}_{-0.31}$	$6.40^{+0.22}_{-0.24}$	$4.74^{+1.99}_{-2.02}$	$151.00^{+66.03}_{-65.00}$
1996-04-30	0.39 (18.40/47)	$4.65^{+1.01}_{-1.40}$	$(2.67^{+0.58}_{-0.80})E43$	$0.88^{+0.88}_{-0.94}$	$2.04^{+0.14}_{-0.16}$	$0.53^{+0.45}_{-0.70}$	$2.01^{+0.44}_{-0.61}$	$6.24^{+0.31}_{-0.34}$	$6.05^{+3.14}_{-3.09}$	$121.00^{+63.03}_{-63.00}$
1996-06-10a	0.38 (17.75/47)	$3.08^{+0.60}_{-0.94}$	$(1.76^{+0.35}_{-0.54})E43$	$0.61^{+0.61}_{-0.99}$	$1.95^{+0.13}_{-0.16}$	$0.55^{+0.45}_{-0.69}$	$1.11^{+0.22}_{-0.35}$	$6.38^{+0.20}_{-0.22}$	$6.10^{+2.11}_{-2.07}$	$190.00^{+67.00}_{-71.00}$
1996-06-10b	0.52 (24.42/47)	$3.14^{+0.29}_{-0.97}$	$(1.80^{+0.16}_{-0.56})E43$	$0.06^{+0.06}_{-1.04}$	$1.82^{+0.06}_{-0.15}$	$0.15^{+0.15}_{-0.50}$	$0.91^{+0.08}_{-0.29}$	$6.20^{+0.24}_{-0.27}$	$5.47^{+2.25}_{-1.83}$	$164.00^{+68.33}_{-57.00}$
1996-06-11	0.58 (27.05/47)	$2.72^{+0.25}_{-0.50}$	$(1.56^{+0.14}_{-0.29})E43$	$0.00^{+0.00}_{-0.60}$	$1.78^{+0.07}_{-0.10}$	$0.21^{+0.21}_{-0.41}$	$0.73^{+0.07}_{-0.14}$	$6.28^{+0.19}_{-0.19}$	$5.34^{+1.61}_{-1.63}$	$188.00^{+58.00}_{-59.00}$
1996-06-12	0.53 (24.68/47)	$3.19^{+0.38}_{-0.92}$	$(1.83^{+0.22}_{-0.53})E43$	$0.31^{+0.31}_{-0.99}$	$1.83^{+0.07}_{-0.15}$	$0.07^{+0.07}_{-0.46}$	$0.97^{+0.12}_{-0.29}$	$6.27^{+0.29}_{-0.23}$	$5.44^{+2.15}_{-2.07}$	$162.00^{+64.59}_{-66.00}$
1996-06-13	0.44 (20.73/47)	$3.40^{+0.32}_{-0.97}$	$(1.95^{+0.19}_{-0.56})E43$	$0.19^{+0.19}_{-1.00}$	$1.76^{+0.06}_{-0.14}$	$0.06^{+0.06}_{-0.42}$	$0.92^{+0.09}_{-0.27}$	$6.28^{+0.25}_{-0.28}$	$5.29^{+2.27}_{-2.05}$	$147.00^{+63.83}_{-59.00}$
1996-06-14	0.40 (18.61/47)	$3.51^{+0.34}_{-0.96}$	$(2.01^{+0.19}_{-0.55})E43$	$0.15^{+0.15}_{-0.95}$	$1.81^{+0.06}_{-0.14}$	$0.09^{+0.09}_{-0.41}$	$1.02^{+0.10}_{-0.28}$	$6.18^{+0.29}_{-0.30}$	$4.72^{+2.36}_{-2.09}$	$125.00^{+62.91}_{-53.00}$
1996-06-16	0.49 (22.88/47)	$3.15^{+0.67}_{-0.88}$	$(1.80^{+0.38}_{-0.50})E43$	$1.16^{+0.97}_{-0.96}$	$1.87^{+0.13}_{-0.15}$	$0.27^{+0.27}_{-0.52}$	$1.08^{+0.23}_{-0.31}$	$6.50^{+0.23}_{-0.26}$	$4.61^{+2.01}_{-2.07}$	$139.00^{+62.66}_{-63.00}$
1996-06-17a	0.48 (22.78/47)	$3.14^{+0.53}_{-0.87}$	$(1.79^{+0.30}_{-0.49})E43$	$0.53^{+0.53}_{-0.97}$	$1.77^{+0.11}_{-0.14}$	$0.22^{+0.22}_{-0.46}$	$0.87^{+0.15}_{-0.24}$	$6.41^{+0.19}_{-0.20}$	$5.63^{+2.05}_{-2.08}$	$171.00^{+65.00}_{-63.00}$
1996-06-17b	0.48 (22.37/47)	$2.27^{+0.40}_{-0.77}$	$(1.30^{+0.23}_{-0.44})E43$	$0.59^{+0.59}_{-1.21}$	$1.68^{+0.10}_{-0.16}$	$0.13^{+0.13}_{-0.48}$	$0.56^{+0.10}_{-0.19}$	$6.23^{+0.23}_{-0.25}$	$4.50^{+1.94}_{-1.89}$	$172.00^{+75.58}_{-81.00}$
1996-06-19	0.45 (21.35/47)	$2.78^{+0.60}_{-0.84}$	$(1.59^{+0.34}_{-0.48})E43$	$0.93^{+0.93}_{-1.04}$	$1.83^{+0.13}_{-0.15}$	$0.24^{+0.24}_{-0.52}$	$0.88^{+0.19}_{-0.27}$	$6.32^{+0.19}_{-0.21}$	$5.18^{+2.03}_{-2.06}$	$171.00^{+70.00}_{-69.00}$
1996-06-20	0.48 (22.74/47)	$2.48^{+0.44}_{-0.82}$	$(1.42^{+0.25}_{-0.47})E43$	$0.46^{+0.46}_{-1.11}$	$1.82^{+0.12}_{-0.17}$	$0.35^{+0.35}_{-0.62}$	$0.73^{+0.13}_{-0.25}$	$6.33^{+0.18}_{-0.20}$	$5.50^{+1.88}_{-1.84}$	$210.00^{+76.00}_{-72.00}$
1996-06-22	0.42 (19.87/47)	$2.53^{+0.64}_{-0.88}$	$(1.45^{+0.36}_{-0.50})E43$	$1.22^{+1.14}_{-1.12}$	$1.91^{+0.16}_{-0.18}$	$0.57^{+0.49}_{-0.77}$	$0.90^{+0.23}_{-0.32}$	$6.29^{+0.27}_{-0.31}$	$3.45^{+2.06}_{-2.11}$	$119.00^{+71.76}_{-75.00}$
1996-06-23	0.64 (30.12/47)	$2.24^{+0.62}_{-0.91}$	$(1.28^{+0.35}_{-0.52})E43$	$1.84^{+1.24}_{-1.21}$	$2.00^{+0.18}_{-0.21}$	$0.64^{+0.59}_{-1.04}$	$0.97^{+0.27}_{-0.40}$	$6.33^{+0.31}_{-0.35}$	$3.10^{+1.95}_{-1.98}$	$120.00^{+76.21}_{-79.00}$
1996-06-24	0.59 (27.86/47)	$2.57^{+0.45}_{-0.93}$	$(1.47^{+0.26}_{-0.53})E43$	$0.41^{+0.41}_{-1.16}$	$1.85^{+0.12}_{-0.18}$	$0.40^{+0.40}_{-0.71}$	$0.79^{+0.14}_{-0.29}$	$6.24^{+0.25}_{-0.27}$	$4.87^{+2.08}_{-1.93}$	$176.00^{+76.63}_{-71.00}$
1996-06-26	0.60 (28.43/47)	$2.42^{+0.52}_{-0.91}$	$(1.39^{+0.30}_{-0.52})E43$	$0.67^{+0.67}_{-1.19}$	$1.88^{+0.15}_{-0.19}$	$0.44^{+0.44}_{-0.77}$	$0.79^{+0.18}_{-0.30}$	$6.18^{+0.21}_{-0.22}$	$4.74^{+2.05}_{-2.02}$	$175.00^{+77.27}_{-78.00}$
1996-06-27	0.30 (13.91/47)	$2.67^{+0.65}_{-0.93}$	$(1.53^{+0.37}_{-0.53})E43$	$1.02^{+1.02}_{-1.10}$	$1.96^{+0.16}_{-0.18}$	$0.57^{+0.49}_{-0.79}$	$1.01^{+0.25}_{-0.36}$	$6.27^{+0.27}_{-0.31}$	$4.40^{+2.12}_{-2.07}$	$148.00^{+72.31}_{-73.00}$
1996-06-28	0.63 (29.72/47)	$2.78^{+0.63}_{-0.87}$	$(1.59^{+0.36}_{-0.50})E43$	$0.88^{+0.88}_{-1.00}$	$1.96^{+0.15}_{-0.17}$	$0.42^{+0.42}_{-0.69}$	$1.06^{+0.24}_{-0.34}$	$6.36^{+0.18}_{-0.19}$	$5.12^{+1.90}_{-1.96}$	$173.00^{+65.00}_{-74.00}$
1996-06-29	0.51 (23.95/47)	$3.20^{+0.63}_{-0.91}$	$(1.83^{+0.36}_{-0.52})E43$	$0.74^{+0.74}_{-0.96}$	$1.91^{+0.12}_{-0.15}$	$0.24^{+0.24}_{-0.52}$	$1.14^{+0.23}_{-0.33}$	$6.30^{+0.26}_{-0.28}$	$4.02^{+2.13}_{-2.18}$	$116.00^{+61.72}_{-68.00}$
1996-06-30	0.78 (36.81/47)	$3.41^{+0.62}_{-0.95}$	$(1.95^{+0.36}_{-0.55})E43$	$0.58^{+0.58}_{-0.95}$	$1.90^{+0.12}_{-0.14}$	$0.31^{+0.31}_{-0.51}$	$1.17^{+0.22}_{-0.33}$	$6.22^{+0.33}_{-0.35}$	$4.26^{+2.32}_{-2.29}$	$113.00^{+61.78}_{-62.00}$
1996-07-01	0.76 (35.60/47)	$3.47^{+0.57}_{-0.99}$	$(1.99^{+0.33}_{-0.57})E43$	$0.45^{+0.45}_{-0.95}$	$1.84^{+0.11}_{-0.15}$	$0.32^{+0.32}_{-0.52}$	$1.07^{+0.18}_{-0.31}$	$6.31^{+0.19}_{-0.20}$	$6.00^{+2.26}_{-2.28}$	$161.00^{+61.44}_{-67.00}$
1996-07-02	0.73 (34.24/47)	$3.87^{+0.46}_{-1.00}$	$(2.22^{+0.26}_{-0.57})E43$	$0.44^{+0.44}_{-0.90}$	$1.83^{+0.06}_{-0.13}$	$0.02^{+0.02}_{-0.39}$	$1.20^{+0.14}_{-0.31}$	$6.30^{+0.22}_{-0.24}$	$5.63^{+2.38}_{-2.36}$	$137.00^{+58.40}_{-61.00}$
1996-07-03	0.42 (19.70/47)	$3.53^{+0.67}_{-0.95}$	$(2.02^{+0.38}_{-0.54})E43$	$0.63^{+0.63}_{-0.89}$	$1.91^{+0.13}_{-0.14}$	$0.51^{+0.40}_{-0.59}$	$1.22^{+0.24}_{-0.33}$	$6.44^{+0.23}_{-0.25}$	$5.00^{+2.13}_{-2.17}$	$137.00^{+58.81}_{-59.00}$
1996-07-04	0.66 (30.95/47)	$3.52^{+0.52}_{-0.86}$	$(2.01^{+0.30}_{-0.49})E43$	$0.77^{+0.77}_{-0.88}$	$1.82^{+0.07}_{-0.12}$	$0.04^{+0.04}_{-0.35}$	$1.10^{+0.17}_{-0.27}$	$6.30^{+0.19}_{-0.20}$	$6.61^{+2.19}_{-2.15}$	$172.00^{+57.00}_{-61.00}$
1996-07-05a	0.60 (28.22/47)	$2.93^{+0.17}_{-0.74}$	$(1.68^{+0.10}_{-0.42})E43$	$0.00^{+0.00}_{-0.92}$	$1.70^{+0.04}_{-0.13}$	$0.02^{+0.02}_{-0.36}$	$0.71^{+0.04}_{-0.18}$	$6.35^{+0.17}_{-0.17}$	$6.22^{+1.88}_{-1.67}$	$206.00^{+66.00}_{-57.00}$
1996-07-05b	0.49 (23.12/47)	$3.29^{+0.44}_{-0.89}$	$(1.88^{+0.25}_{-0.51})E43$	$0.42^{+0.42}_{-0.96}$	$1.78^{+0.08}_{-0.13}$	$0.09^{+0.09}_{-0.40}$	$0.94^{+0.13}_{-0.26}$	$6.25^{+0.26}_{-0.28}$	$4.73^{+2.21}_{-2.19}$	$133.00^{+64.43}_{-62.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν [b]	$\mathbf{F}_{2-10KeV}$ [c]	L_x [d]	N_H [e]	Γ [f]	R [g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
1996-07-06	0.56 (26.11/47)	$2.79^{+0.37}_{-0.82}$	$(1.59^{+0.21}_{-0.47})E43$	$0.37^{+0.37}_{-1.05}$	$1.69^{+0.08}_{-0.14}$	$0.11^{+0.11}_{-0.42}$	$0.68^{+0.09}_{-0.20}$	$6.32^{+0.21}_{-0.22}$	$5.50^{+2.00}_{-1.91}$	$184.00^{+71.00}_{-64.00}$
1996-07-07	0.46 (21.49/47)	$2.23^{+0.18}_{-0.63}$	$(1.27^{+0.10}_{-0.36})E43$	$0.00^{+0.00}_{-0.98}$	$1.64^{+0.05}_{-0.14}$	$0.08^{+0.08}_{-0.42}$	$0.49^{+0.04}_{-0.14}$	$6.31^{+0.29}_{-0.28}$	$3.44^{+1.61}_{-1.46}$	$142.00^{+66.67}_{-63.00}$
1996-07-09	0.56 (26.41/47)	$2.89^{+0.35}_{-0.94}$	$(1.66^{+0.20}_{-0.54})E43$	$0.16^{+0.16}_{-1.06}$	$1.83^{+0.08}_{-0.16}$	$0.24^{+0.24}_{-0.58}$	$0.85^{+0.10}_{-0.28}$	$6.37^{+0.26}_{-0.31}$	$4.60^{+1.99}_{-1.78}$	$155.00^{+67.68}_{-63.00}$
1996-07-10	0.72 (33.98/47)	$2.86^{+0.41}_{-0.93}$	$(1.64^{+0.24}_{-0.53})E43$	$0.29^{+0.29}_{-1.07}$	$1.83^{+0.10}_{-0.16}$	$0.25^{+0.25}_{-0.58}$	$0.85^{+0.12}_{-0.28}$	$6.28^{+0.20}_{-0.22}$	$5.56^{+2.07}_{-1.94}$	$183.00^{+69.00}_{-69.00}$
1996-07-11	0.42 (19.61/47)	$3.09^{+0.61}_{-0.89}$	$(1.77^{+0.35}_{-0.51})E43$	$0.64^{+0.64}_{-0.91}$	$1.99^{+0.14}_{-0.16}$	$0.71^{+0.49}_{-0.75}$	$1.19^{+0.24}_{-0.35}$	$6.41^{+0.19}_{-0.22}$	$5.23^{+1.93}_{-1.95}$	$166.00^{+64.00}_{-64.00}$
2004-04-08	0.44 (18.40/42)	$3.00^{+0.32}_{-1.13}$	$(1.71^{+0.18}_{-0.64})E43$	$0.00^{+0.00}_{-1.41}$	$1.92^{+0.09}_{-0.18}$	$0.71^{+0.42}_{-0.76}$	$0.97^{+0.11}_{-0.37}$	$6.15^{+0.16}_{-0.17}$	$7.00^{+2.38}_{-1.86}$	$223.00^{+83.00}_{-55.00}$

				wabs	pexrav			gaussian		
Spectrum[a]	χ^2_ν[b]	$\mathbf{F}_{2-10KeV}$[c]	L_x[d]	N_H[e]	Γ[f]	R[g]	**Norm.**[h]	**Energy**[i]	**Norm.**[j]	**EW**[k]
		PKS 0558-504						$\mathrm{Fe}_K\alpha\sigma = 0.81$		
1997-10-13	0.40 (18.34/46)	$1.31^{+0.25}_{-0.73}$	$(6.21^{+1.29}_{-3.30})E44$	$0.72^{+0.72}_{-1.84}$	$2.16^{+0.12}_{-0.27}$	$0.00^{+0.00}_{-0.87}$	$0.69^{+0.15}_{-0.37}$	$6.78^{+1.27}_{-0.72}$	$1.70^{+1.70}_{-3.85}$	$157.00^{+157.00}_{-536.00}$
2005-03-04	0.62 (26.15/42)	$1.71^{+0.38}_{-1.43}$	$(8.01^{+1.76}_{-6.71})E44$	$0.00^{+0.00}_{-1.40}$	$2.33^{+0.21}_{-0.54}$	$0.84^{+0.84}_{-4.16}$	$0.99^{+0.22}_{-0.84}$	$7.16^{+1.66}_{-0.34}$	$2.15^{+2.15}_{-3.50}$	$196.00^{+196.00}_{-423.00}$

[a] Spectrum name, based on start date of the observation, in the form of YYYY-MM-DDx, where "x" takes on values "a", "b", etc. for spectra which start on the same date for the same source.

[b] Reduced χ^2 for the best fit spectrum, with (χ^2/(degrees of freedom)). The χ^2 values are small because we did not regroup the spectra prior to fitting; however, the listed χ^2 values are still instructive in the sense that a lower χ^2 indicates a better fit than a higher χ^2. To apply χ^2 fully, the spectra should be regrouped.

[c] The 2 to 10 keV flux in units of 10^{-11} ergs cm^{-2} s^{-1}.

[d] The 2 to 10 keV luminosity in units of ergs s^{-1}.

[e] Absorbing column density in units of 10^{22} cm^{-2}.

[f] Photon index of the intrinsic power-law spectrum.

[g] Reflection fraction.

[h] Power-law normalization in units of 10^{-2} photons keV^{-1} cm $^{-2}$ s^{-1} at 1 keV.

[i] Energy of the Fe Kα line, in units of keV.

[j] Normalization of the Fe Kα line in units of 10^{-4} photons cm^{-2} s^{-1}.

[k] Equivalent width of Fe Kα line, in units of eV.

C.2 Parameter Statistics by Galaxy

Table C.2 lists the mean value and standard deviation for the sample of spectra for each galaxy.

Table C.2: Spectral fit statistics for each galaxy, including the mean and standard deviation for each spectral fit parameter.

Galaxy	F_{2-10} [a]		L_x [b]		N_H [c]		Γ [d]		R [e]		E_{Fe} [f]		A_{Fe} [g]		EW [h]	
	$\overline{F_{2-10}}$	σ	$\overline{L_x}$	σ	$\overline{N_H}$	σ	$\overline{\Gamma}$	σ	$\overline{R}$	σ	$\overline{E_{Fe}}$	σ	$\overline{A_{Fe}}$	σ	$\overline{EW}$	σ
3C 111	5.19	1.31	2.83e+44	7.17e+43	1.27	0.61	1.74	0.06	0.01	0.03	6.07	0.08	6.42	2.20	101	33
3C 120	5.56	2.68	1.37e+44	6.57e+43	0.22	0.30	1.79	0.05	0.19	0.13	6.19	0.11	8.67	5.41	141	23
3C 273	12.89	9.63	7.83e+45	5.82e+45	0.61	0.40	1.69	0.07	0.03	0.05	6.01	0.60	5.70	4.27	37	17
3C 382	5.12	0.53	3.97e+44	3.96e+43	0.22	0.32	1.79	0.04	0.09	0.10	6.01	0.05	7.41	1.23	126	24
3C 390.3	3.52	1.22	2.54e+44	8.72e+43	0.54	0.53	1.72	0.05	0.05	0.07	6.05	0.07	4.31	1.02	111	29
4U 0241+61	3.09	0.02	1.36e+44	1.60e+42	1.46	0.70	1.75	0.08	0.28	0.13	6.22	0.02	6.97	0.21	189	18
Akn 120	3.73	0.58	8.72e+43	1.34e+43	0.53	0.54	2.01	0.09	0.60	0.23	6.34	0.06	8.75	1.01	233	38
Akn 564	2.10	0.12	2.99e+43	2.14e+42	1.21	1.06	2.84	0.19	0.63	0.61	6.31	0.24	3.34	0.74	201	52
Cen A	23.00	6.50	5.04e+41	1.42e+41	13.97	2.60	1.84	0.03	0.01	0.01	6.35	0.11	58.37	12.36	129	34
Cyg A	9.79	0.54	7.06e+44	3.91e+43	3.85	0.30	1.98	0.10	0.00	0.01	6.26	0.05	47.63	2.50	378	27
ESO 103-G035	2.78	0.19	7.54e+42	5.92e+41	24.06	0.49	2.12	0.07	1.23	0.47	6.31	0.06	9.76	0.74	169	16
Fairall 9	2.51	0.37	1.27e+44	1.90e+43	0.20	0.28	1.86	0.08	0.15	0.15	6.24	0.09	5.22	1.00	200	32
IC 4329A	13.78	2.22	7.86e+43	1.26e+43	0.52	0.46	1.82	0.06	0.28	0.13	6.30	0.08	21.12	4.02	143	25
IRAS 04575-7537	2.03	0.16	1.47e+43	1.17e+42	3.79	0.78	2.53	0.11	1.54	0.86	6.59	0.26	3.74	1.41	165	45
IRAS 18325-5926	2.01	0.37	1.81e+43	3.38e+42	1.04	0.97	2.24	0.25	0.72	1.52	6.47	0.31	10.03	2.08	556	89
MCG −2-58-22	2.60	0.70	1.31e+44	3.58e+43	1.45	0.89	1.71	0.09	0.09	0.23	6.16	0.10	4.20	1.04	144	63
MCG −5-23-16	9.30	1.18	1.31e+43	1.68e+42	2.58	0.33	1.77	0.07	0.12	0.15	6.36	0.06	18.80	1.83	164	25
MCG −6-30-15	4.60	0.66	6.51e+42	9.33e+41	2.31	0.85	2.23	0.16	1.65	0.83	6.11	0.13	8.74	2.12	154	43
Mkn 79	2.64	0.54	2.85e+43	5.88e+42	0.48	0.39	1.94	0.11	0.81	0.44	6.09	0.04	6.48	0.57	230	56
Mkn 110	9.05	0.17	2.52e+44	4.30e+42	0.13	0.13	1.84	0.03	0.25	0.08	5.98	0.00	21.68	1.43	210	8
Mkn 279	2.63	0.80	5.36e+43	1.66e+43	0.40	0.41	1.82	0.09	0.02	0.04	6.22	0.04	5.24	1.17	195	37
Mkn 348	1.48	0.99	6.62e+42	3.46e+42	18.86	4.52	1.43	0.08	0.01	0.02	6.01	0.07	6.81	0.45	236	62
Mkn 509	5.63	0.83	1.47e+44	2.19e+43	0.13	0.20	1.77	0.04	0.20	0.16	6.18	0.09	6.39	1.01	105	17
Mkn 766	3.20	0.60	1.20e+43	2.24e+42	0.23	0.27	2.18	0.06	0.43	0.11	6.13	0.25	5.62	1.31	175	29
MR 2251-178	3.94	1.13	3.69e+44	1.08e+44	2.43	1.34	1.73	0.05	0.00	0.00	6.02	0.20	2.82	1.24	53	19
NGC 2110	3.68	0.30	5.19e+42	4.22e+41	4.98	0.45	1.75	0.06	0.15	0.13	6.40	0.06	9.22	1.21	179	33
NGC 3227	4.65	1.27	1.64e+42	4.50e+41	0.71	0.68	1.74	0.09	0.23	0.18	6.29	0.12	8.24	1.87	168	45
NGC 3516	4.64	3.31	8.30e+42	5.93e+42	3.09	1.09	1.81	0.10	0.50	0.27	6.16	0.07	13.42	4.18	235	55
NGC 3783	6.57	1.04	1.45e+43	2.29e+42	1.80	0.61	1.84	0.07	0.50	0.20	6.20	0.10	14.40	2.62	178	24
NGC 4051	1.86	0.50	1.64e+41	4.42e+40	2.11	0.52	2.20	0.18	1.70	1.10	6.13	0.09	4.10	1.10	196	96
NGC 4151	17.11	7.18	3.38e+42	1.42e+42	6.96	1.94	1.51	0.14	0.15	0.18	6.17	0.10	70.39	18.04	279	95
NGC 4258	1.09	0.27	2.39e+40	5.93e+39	8.86	1.20	1.91	0.04	0.05	0.08	6.43	0.20	1.27	0.47	75	35
NGC 4388	4.59	0.70	6.47e+42	9.71e+41	0.88	1.42	1.12	0.08	0.08	0.14	6.36	0.04	23.25	6.94	411	24
NGC 4593	4.33	0.36	7.75e+42	6.40e+41	0.24	0.31	1.86	0.09	0.41	0.26	6.32	0.04	10.18	0.96	227	26
NGC 5506	9.51	1.32	7.54e+42	1.05e+42	3.91	0.55	2.04	0.07	0.88	0.25	6.39	0.07	22.21	3.42	179	27
NGC 5548	6.33	1.77	4.09e+43	1.15e+43	0.43	0.38	1.80	0.06	0.20	0.12	6.25	0.16	7.88	1.82	118	29
NGC 7314	3.94	0.73	2.17e+42	4.04e+41	1.11	0.39	2.00	0.05	0.61	0.18	6.37	0.06	8.69	1.85	203	10

Galaxy	F_{2-10}[a]		L_x[b]		N_H[c]		Γ[d]		R[e]		E_{Fe}[f]		A_{Fe}[g]		EW[h]	
	$\overline{F_{2-10}}$	σ	$\overline{L_x}$	σ	$\overline{N_H}$	σ	$\overline{\Gamma}$	σ	$\overline{R}$	σ	$\overline{E_{Fe}}$	σ	$\overline{A_{Fe}}$	σ	$\overline{EW}$	σ
NGC 7469	3.09	0.53	1.77e+43	3.06e+42	0.52	0.40	1.86	0.09	0.33	0.24	6.30	0.08	5.18	0.89	158	27
PKS 0558-504	1.51	0.20	7.11e+44	8.98e+43	0.36	0.36	2.24	0.08	0.42	0.42	6.97	0.19	1.93	0.23	176	19

[a]The 2 to 10 keV flux in units of 10^{-11} ergs cm^{-2} s^{-1}.

[b]The 2 to 10 keV luminosity in units of ergs s^{-1}.

[c]Absorbing column density in units of 10^{22} cm^{-2}.

[d]Photon index of the intrinsic power-law spectrum.

[e]Reflection fraction.

[f]Energy of the Fe Kα line, in units of keV.

[g]Normalization of the Fe Kα line in units of 10^{-4} photons cm^{-2} s^{-1}.

[h]Equivalent width of Fe Kα line, in units of eV.

C.3 Parameter Comparison Plots

The figures in this section show the spectral parameter comparison plots for the 2 to 10 keV luminosity (L_x), absorbing column density (N_H), photon index (Γ), reflection fraction (R), and Fe Kα equivalent width (EW). Section C.3.1 presents the plots for the Seyfert 1 sample, Section C.3.2 presents the plots for the Seyfert 2 sample, and Section C.3.3 presents comparative plots for the Seyfert 1 and 2 samples.

C.3.1 Seyfert 1 Plots

This section presents spectral parameter comparison plots for the Seyfert 1 sample as listed in Table 4.1. A few of these plots are discussed in more detail in Chapter 4, Sections 4.2.1, 4.2.2, and 4.2.3.

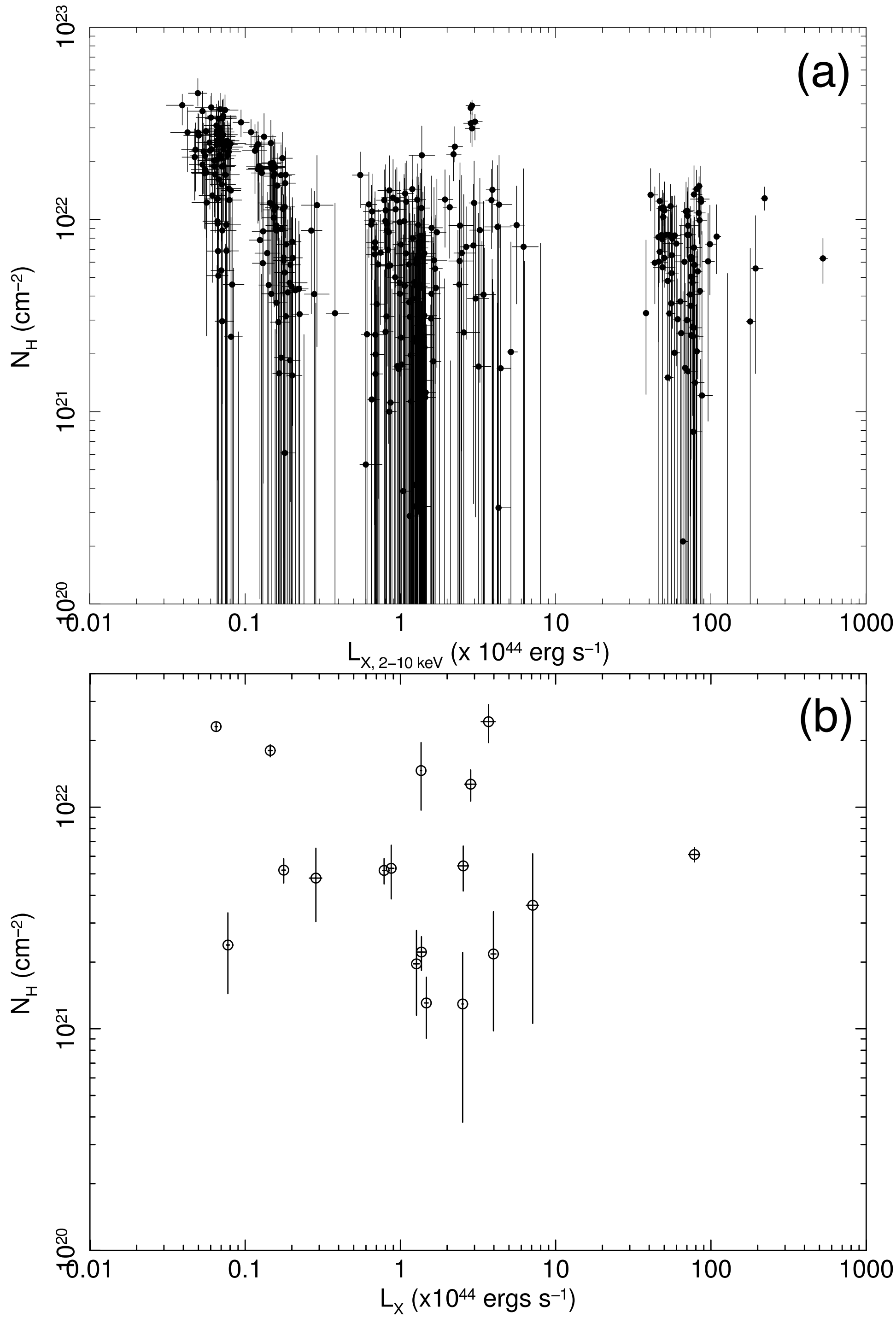

Figure C.1: Absorbing column density (N_H) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

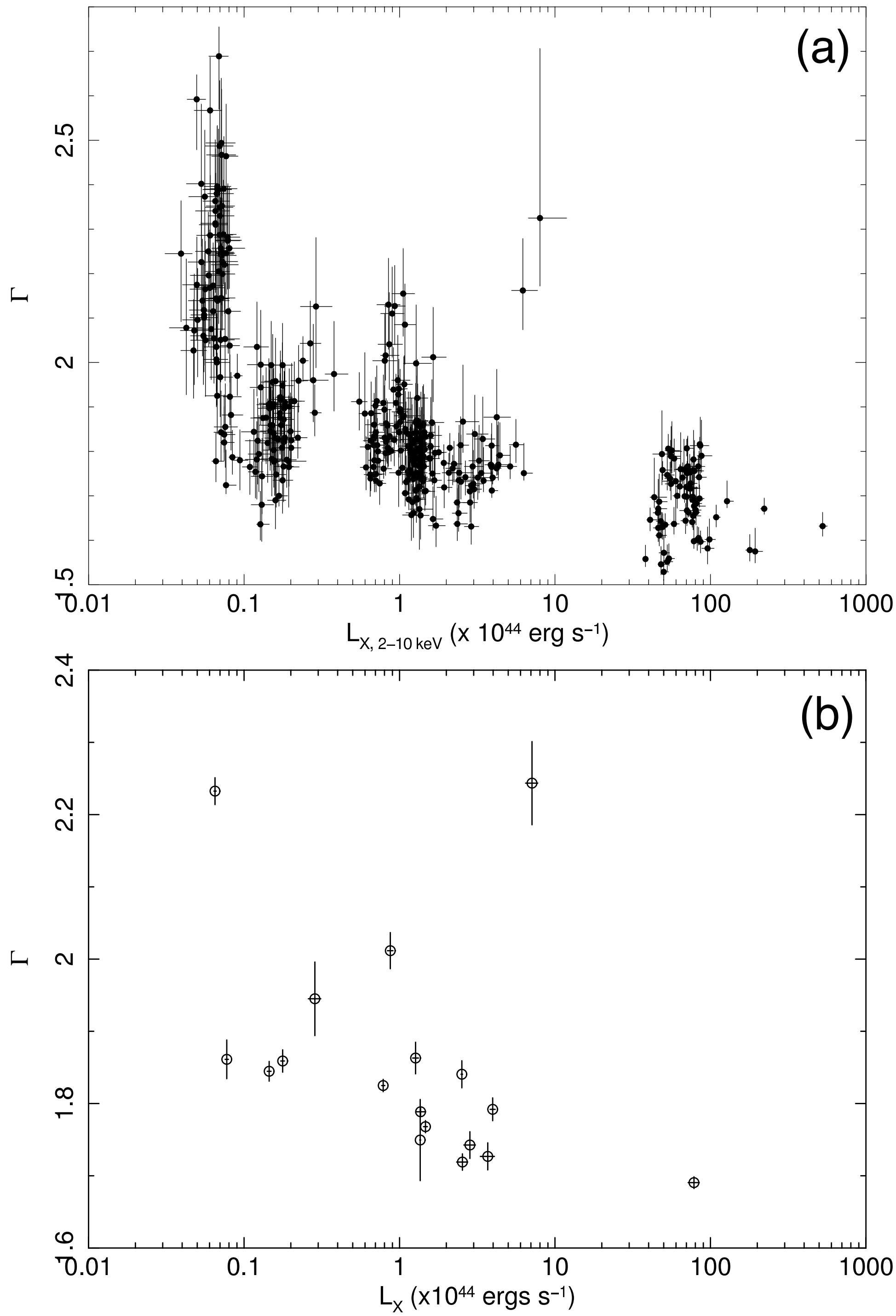

Figure C.2: Photon index (Γ) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

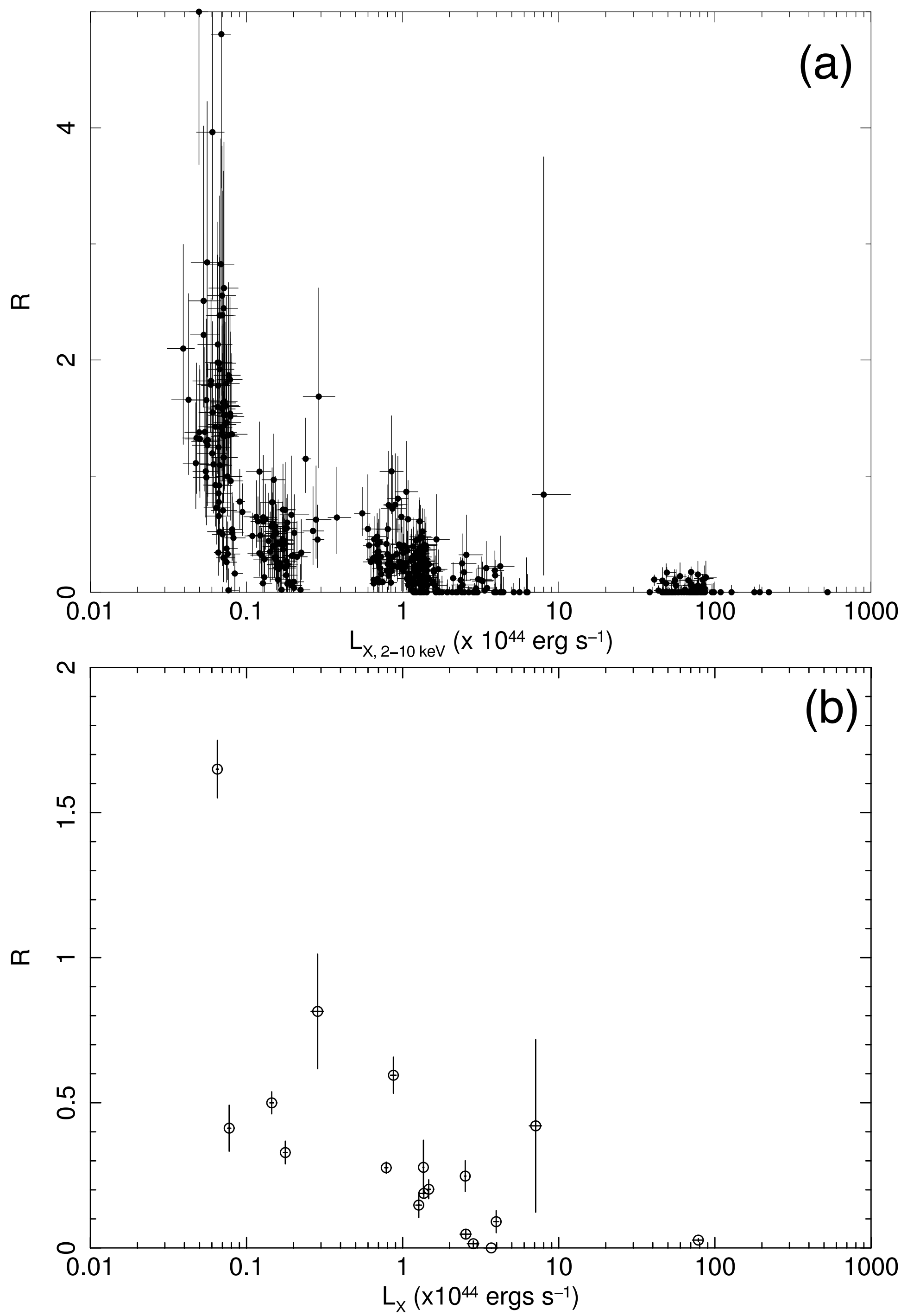

Figure C.3: Reflection fraction (R) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

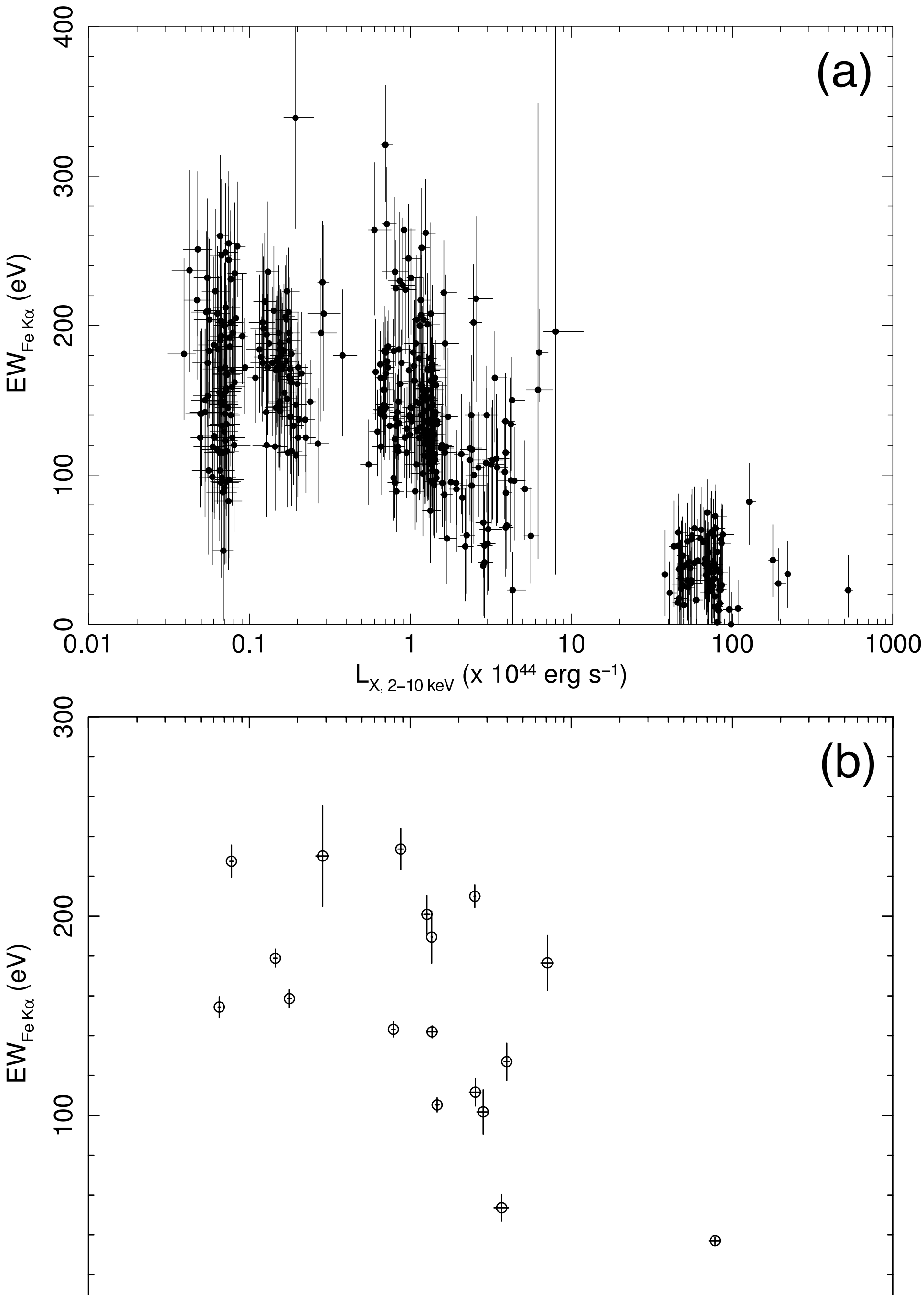

Figure C.4: Iron line equivalent width in eV (EW) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

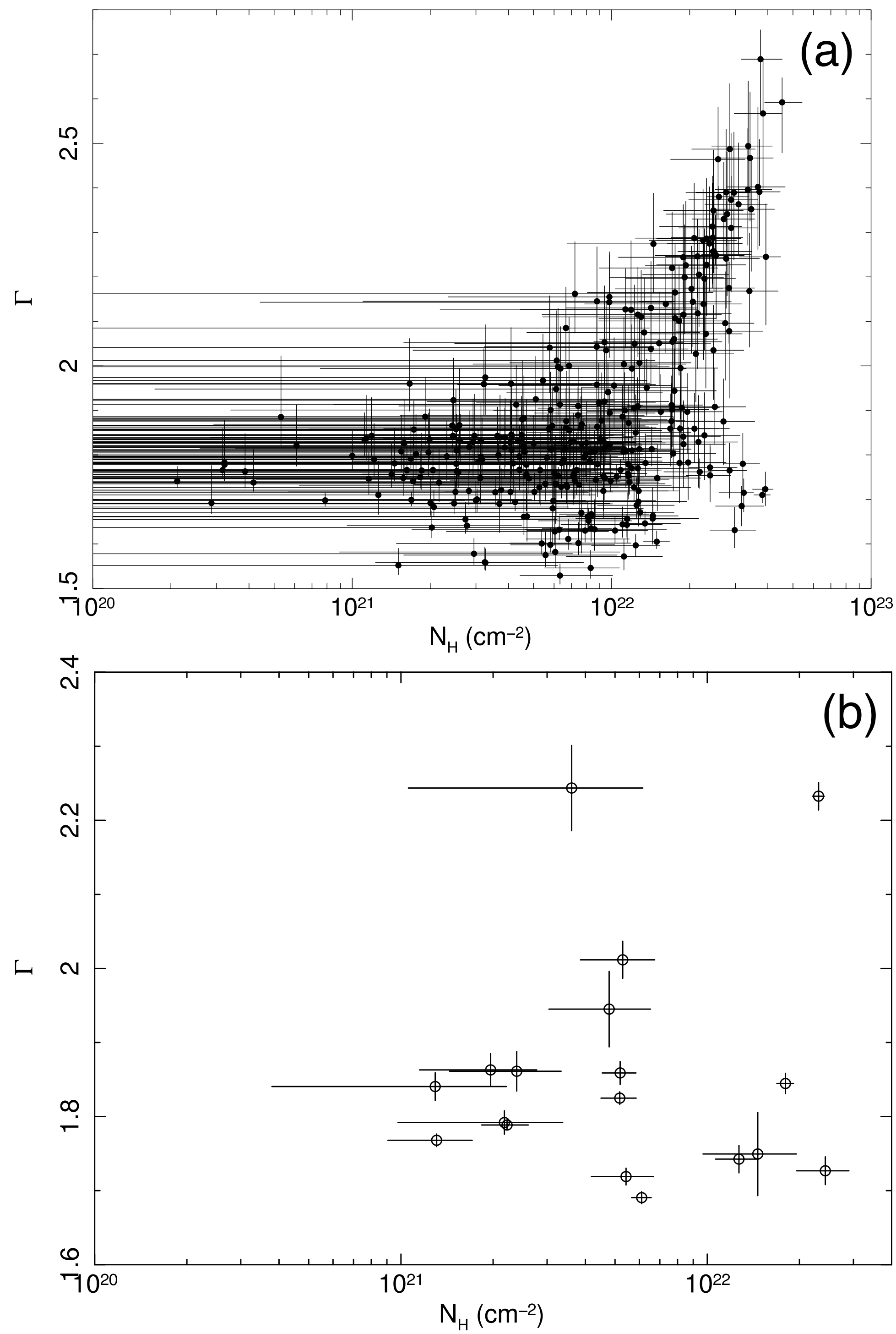

Figure C.5: Photon index (Γ) versus absorbing column density (N_H) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

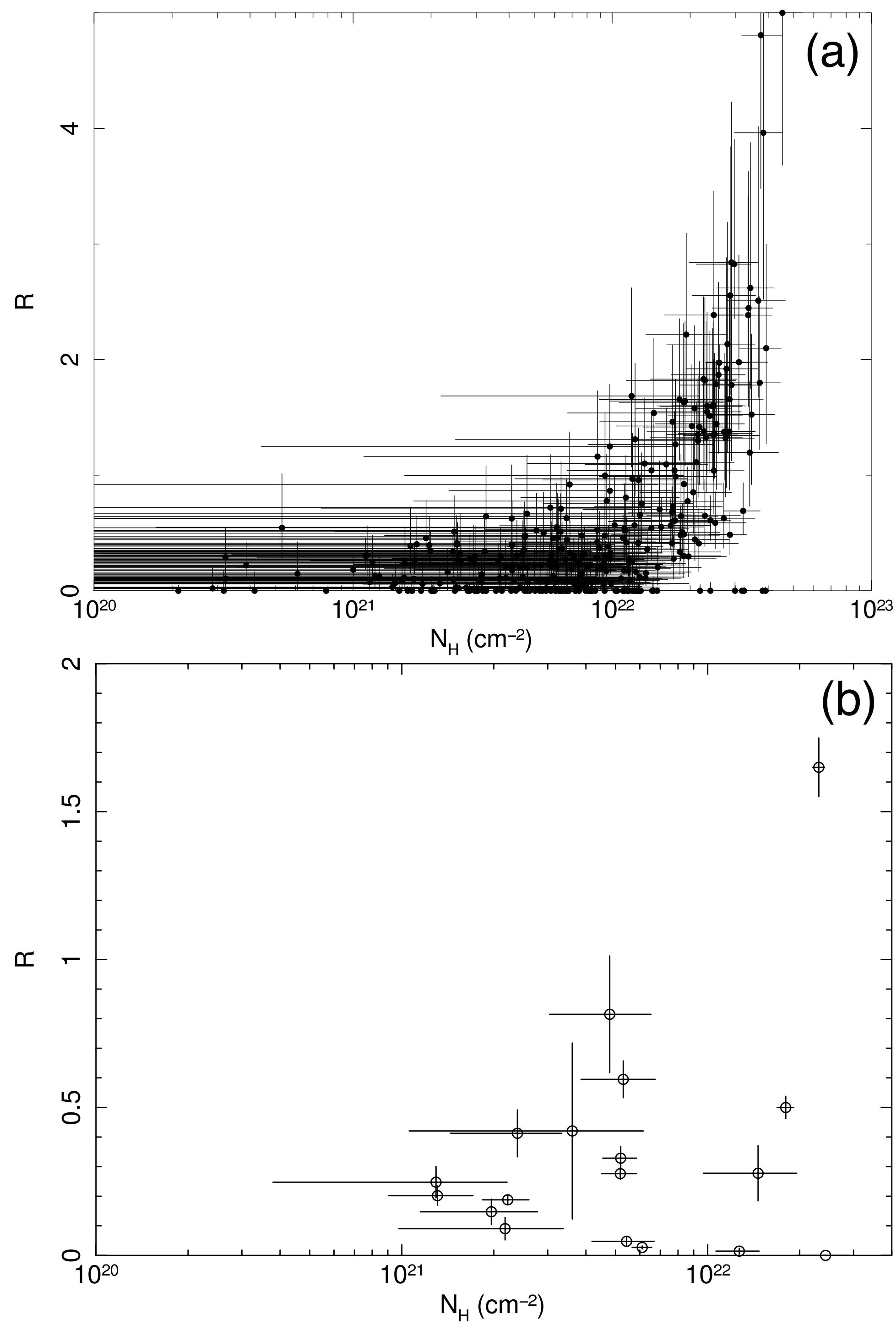

Figure C.6: Reflection fraction (R) versus absorbing column density (N_H) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

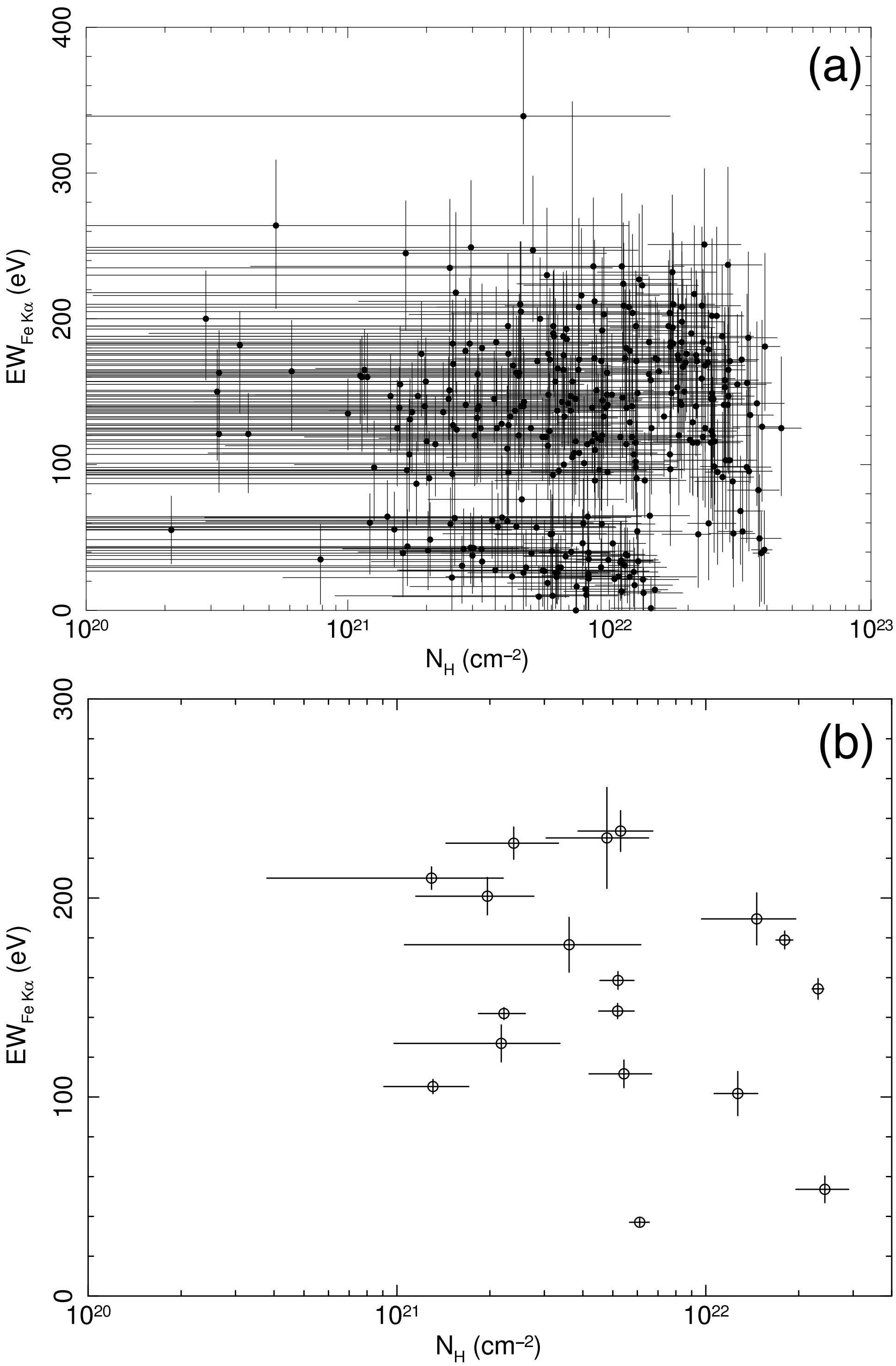

Figure C.7: Iron line equivalent width in eV (EW) versus absorbing column density (N_H) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

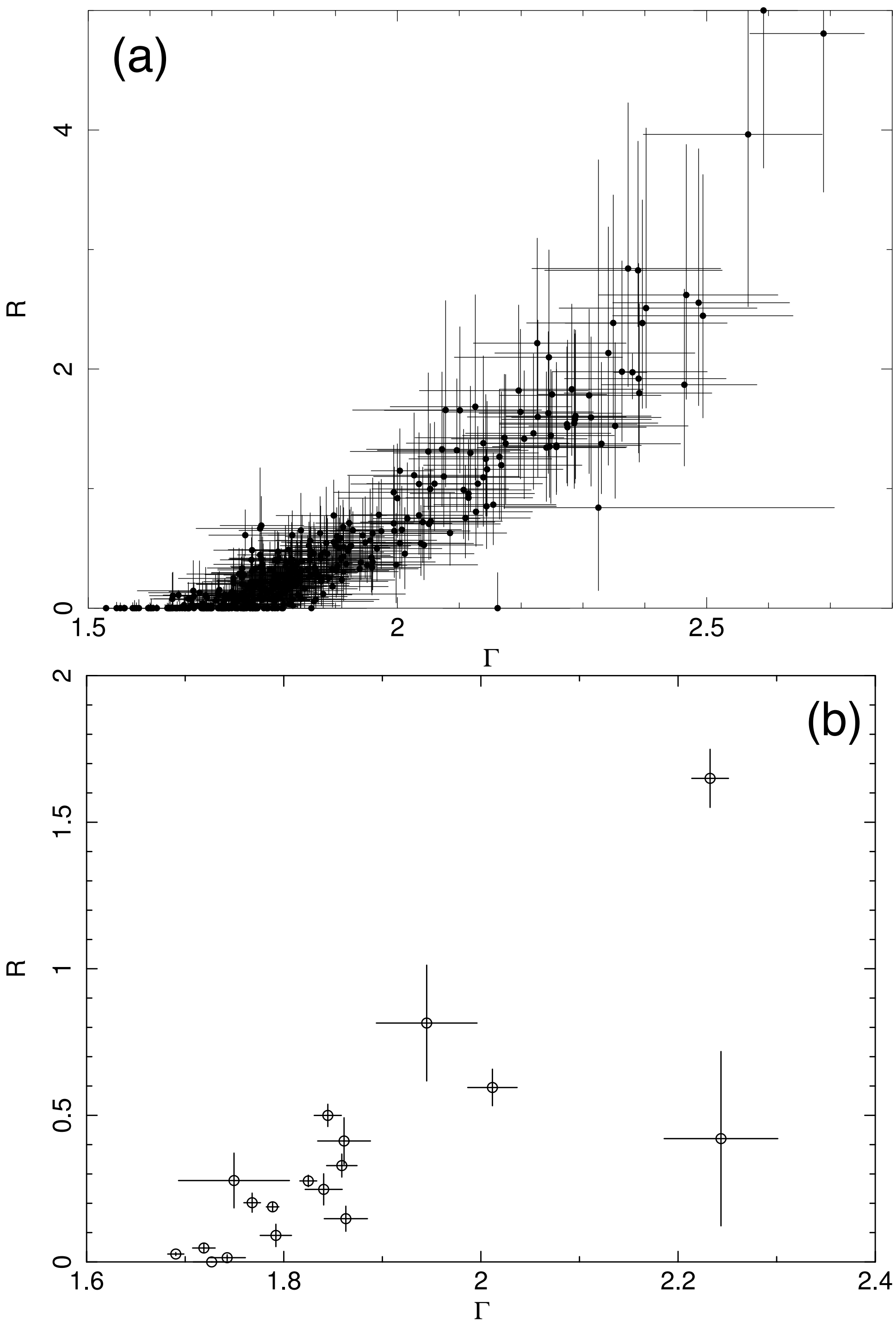

Figure C.8: Reflection fraction (R) versus power-law photon index (Γ) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

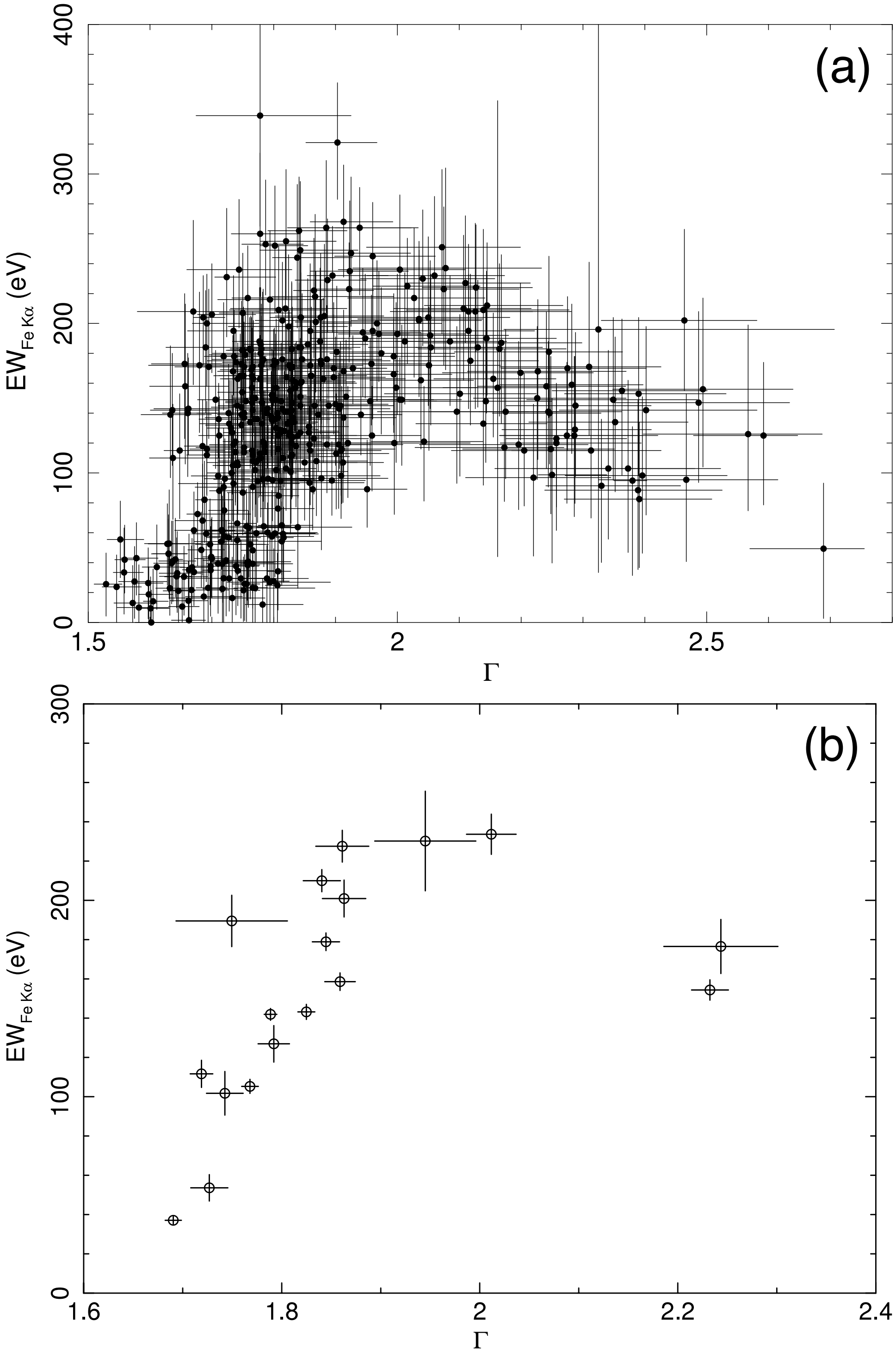

Figure C.9: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the Seyfert 1 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

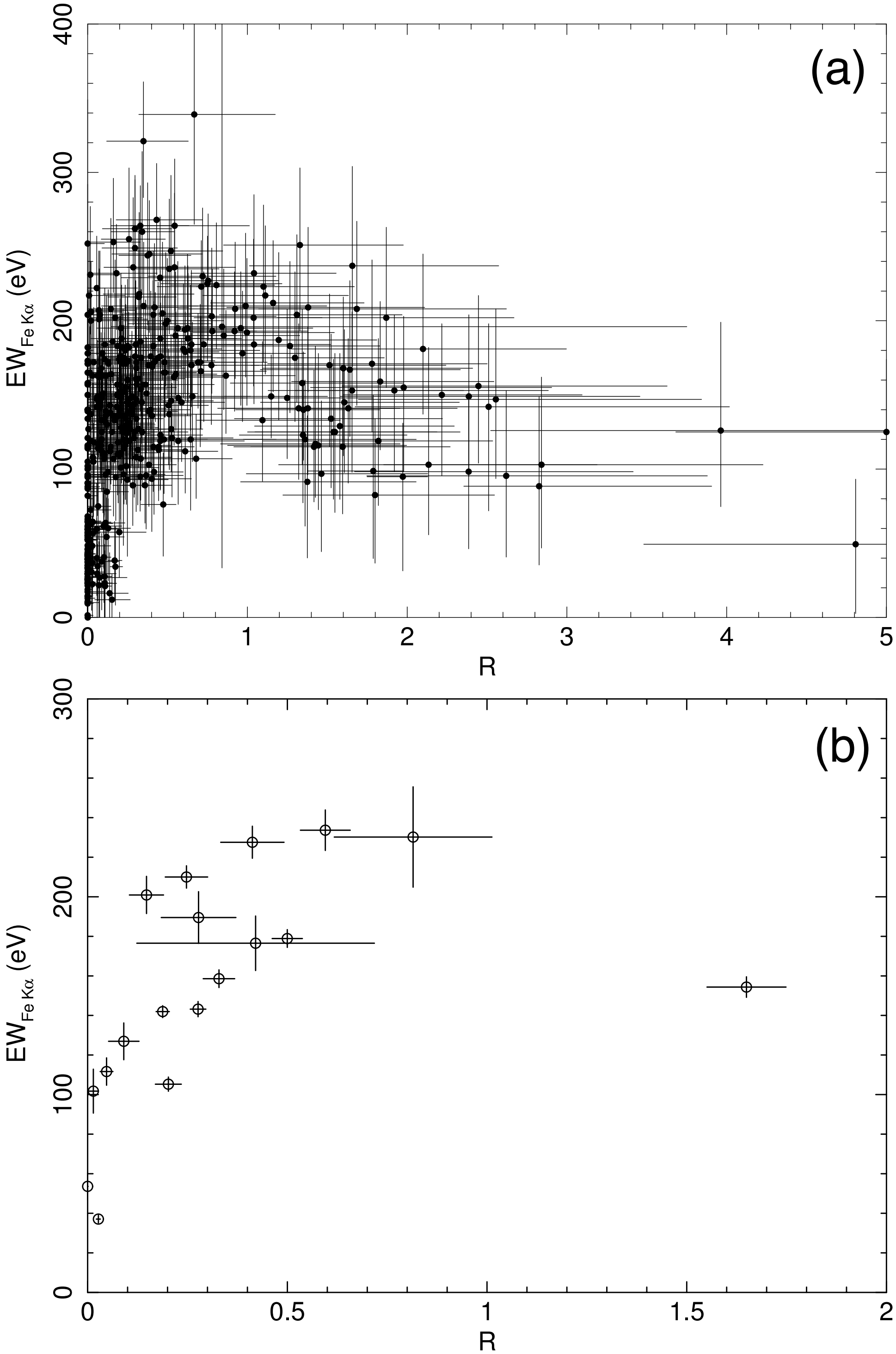

Figure C.10: Iron line equivalent width in eV (EW) versus reflection fraction (R) for the Seyfert 1. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

C.3.2 Seyfert 2 Plots

This section presents spectral parameter comparison plots for the Seyfert 2 sample as listed in Table 5.1. A few of these plots are discussed in more detail in Chapter 5, Sections 5.2.1, 5.2.2, and 5.2.3.

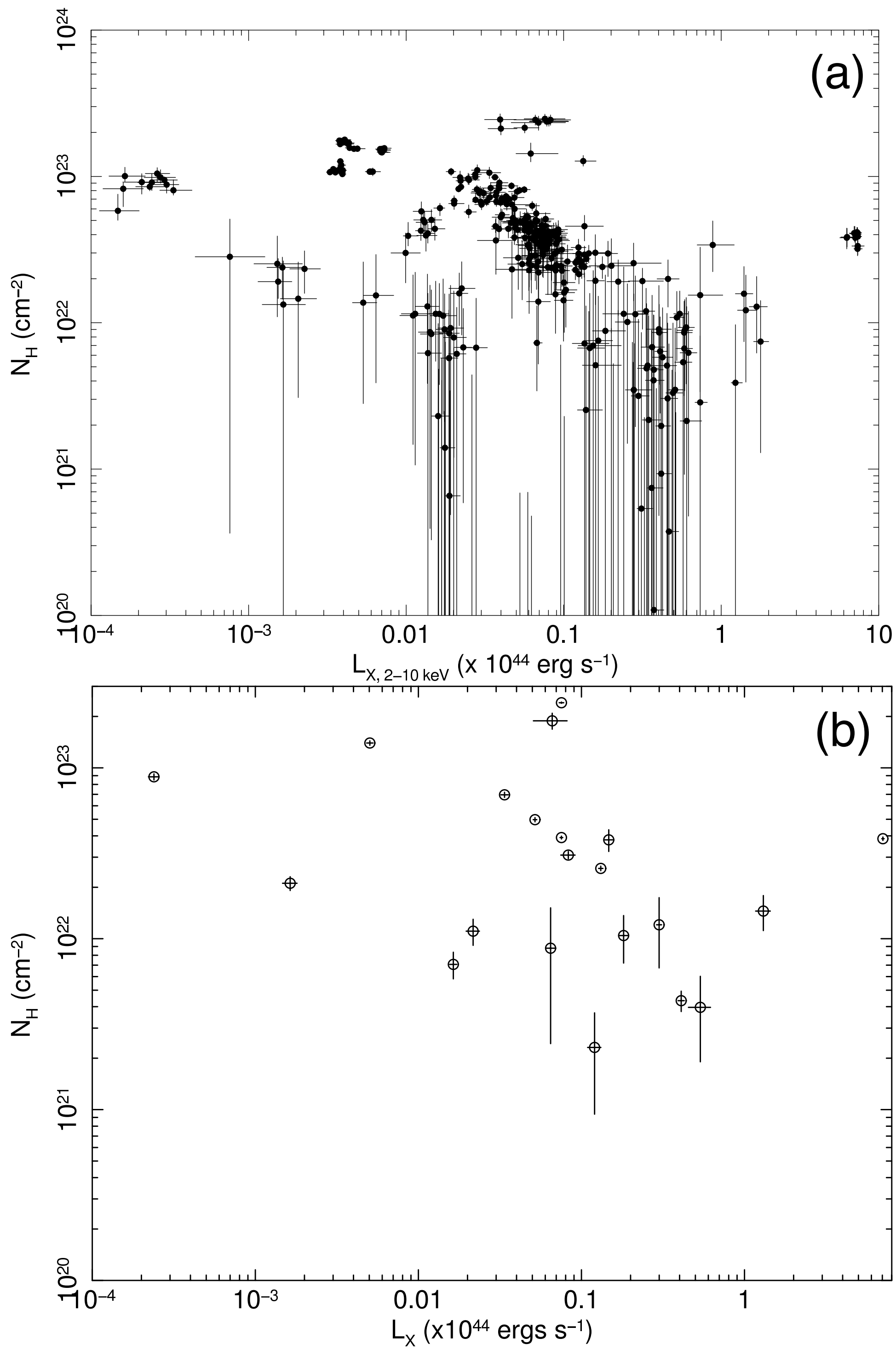

Figure C.11: Absorbing column density (N_H) versus 2 to 10 keV luminosity (L_x) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

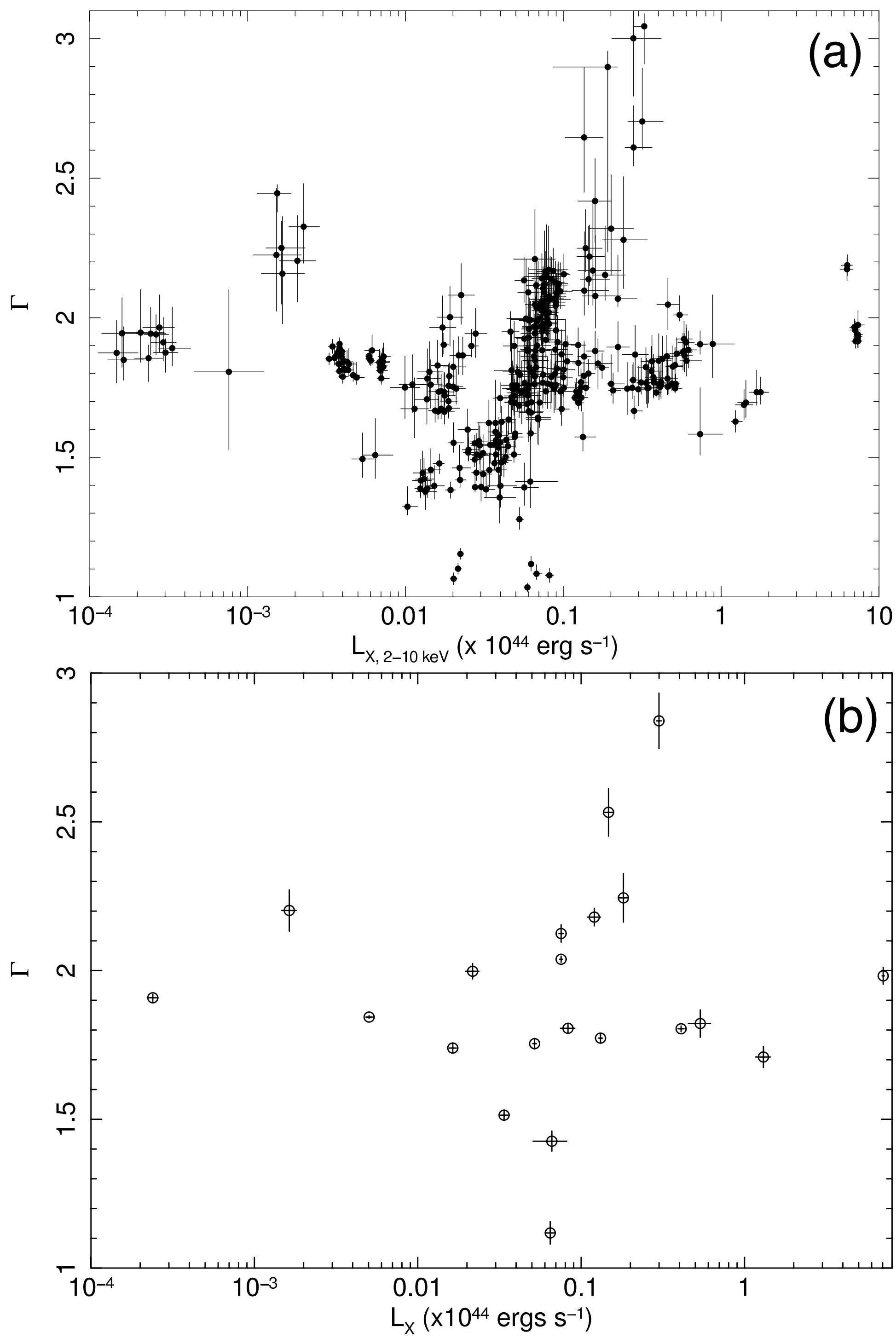

Figure C.12: Photon index (Γ) versus 2 to 10 keV luminosity (L_x) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

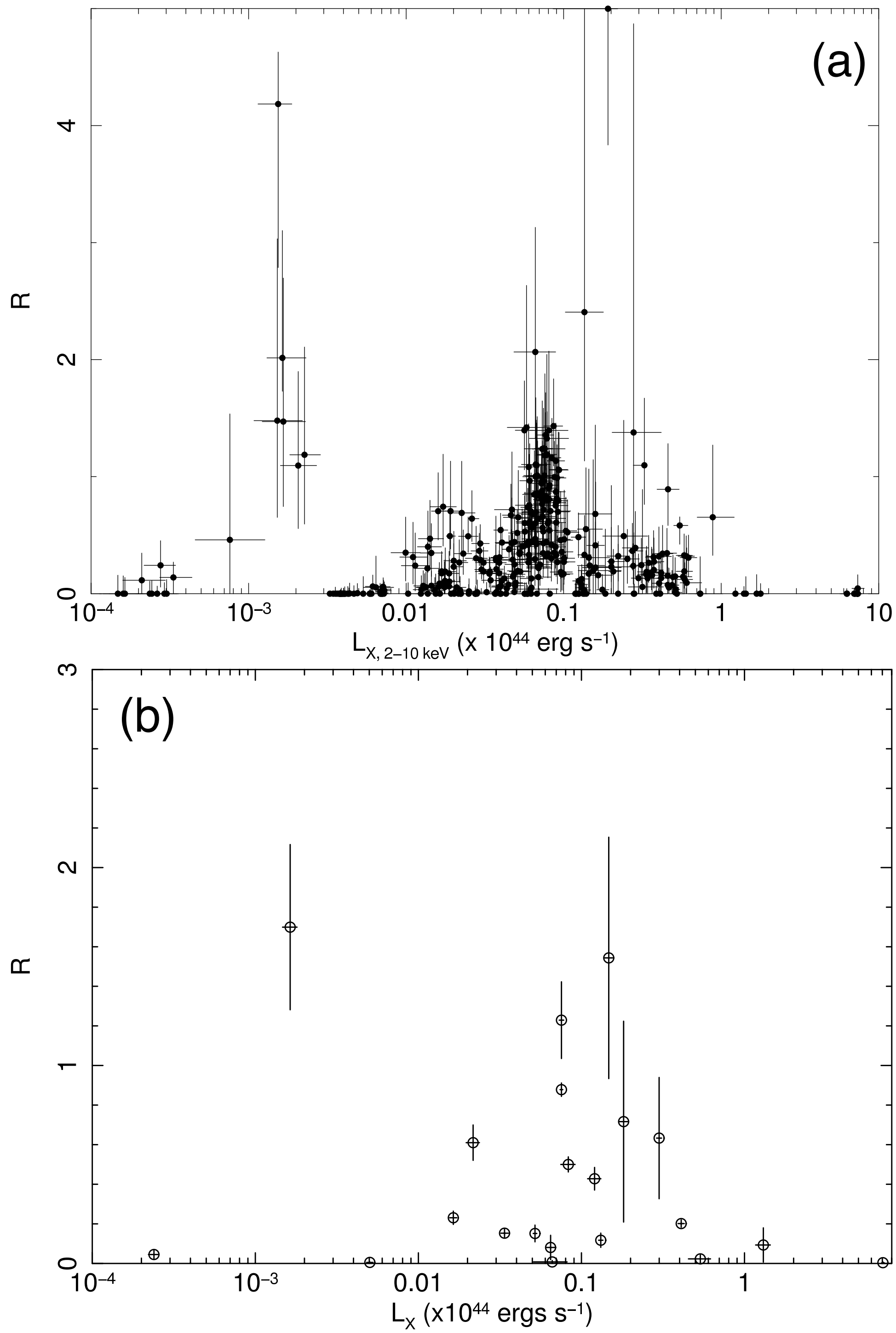

Figure C.13: Reflection fraction (R) versus 2 to 10 keV luminosity (L_x) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

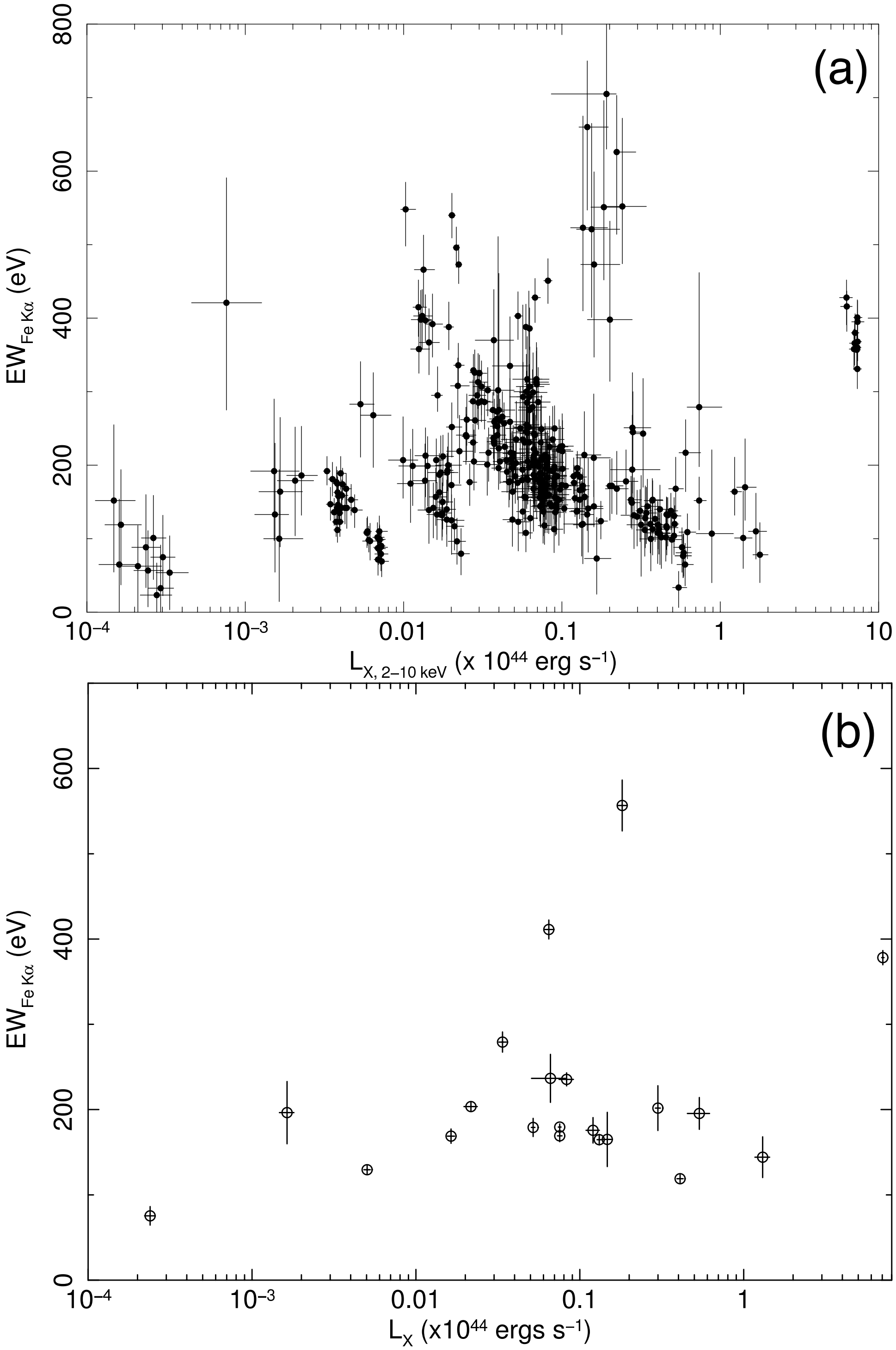

Figure C.14: Iron line equivalent width in eV (EW) versus 2 to 10 keV luminosity (L_x) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

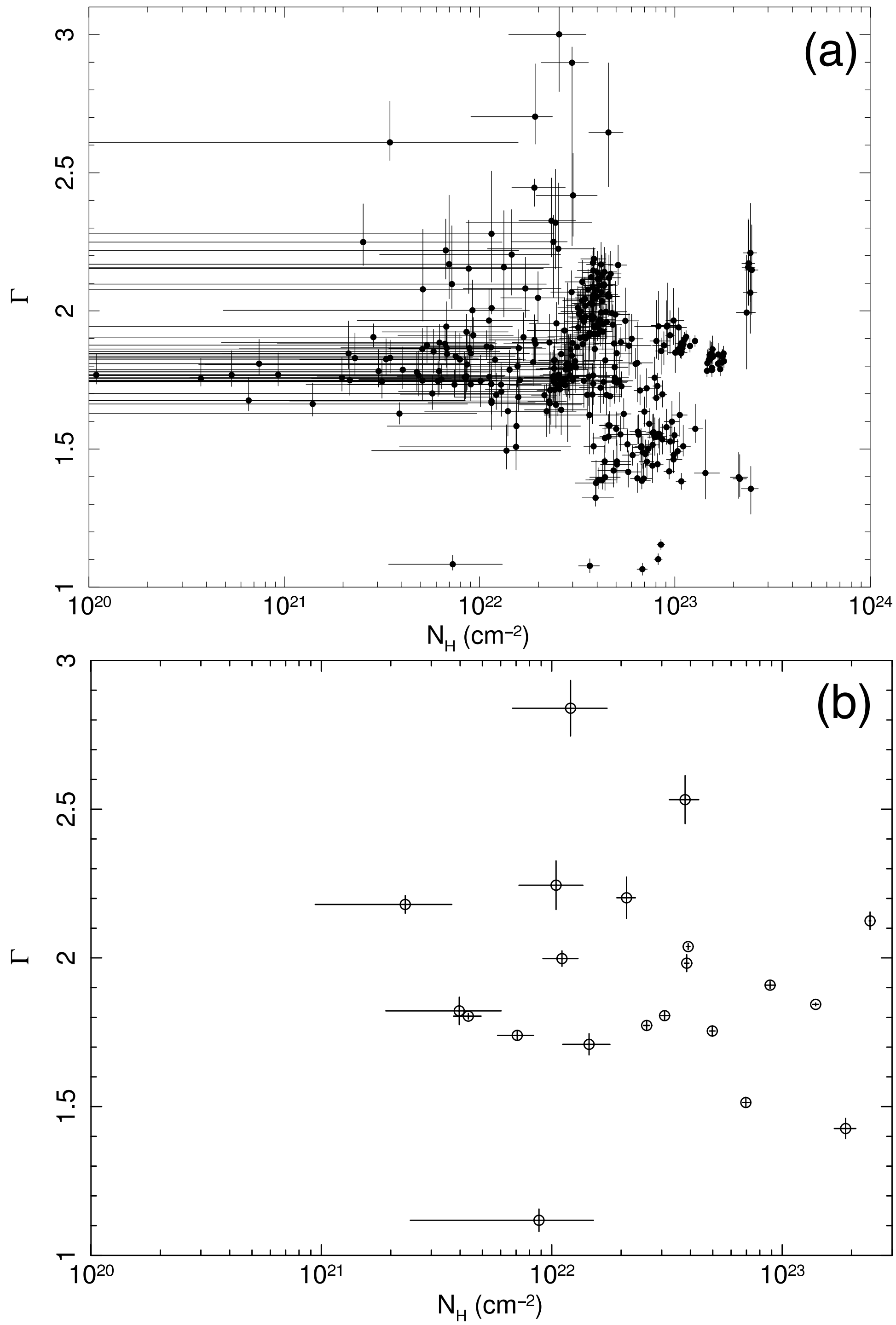

Figure C.15: Photon index (Γ) versus absorbing column density (N_H) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

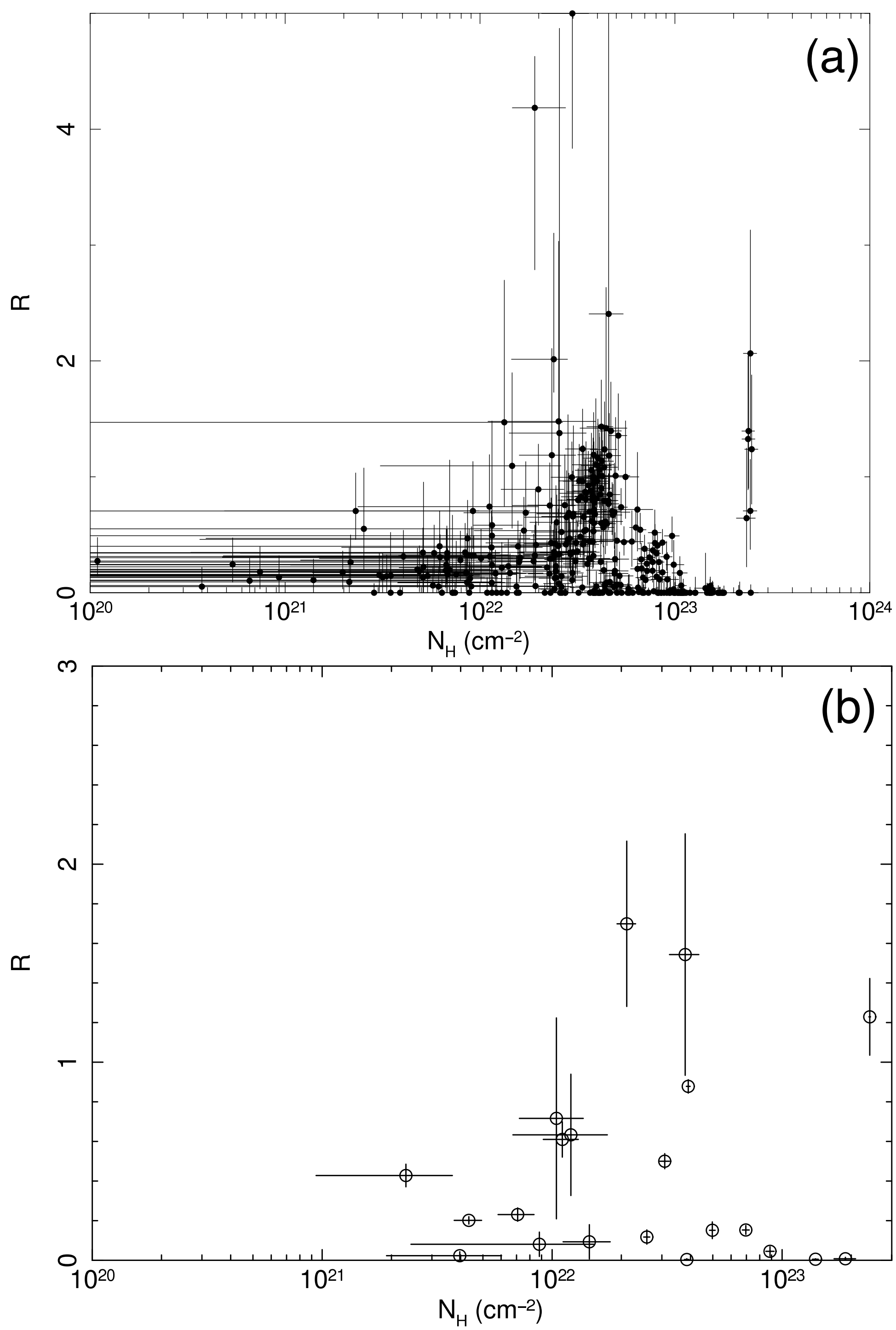

Figure C.16: Reflection fraction (R) versus absorbing column density (N_H) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

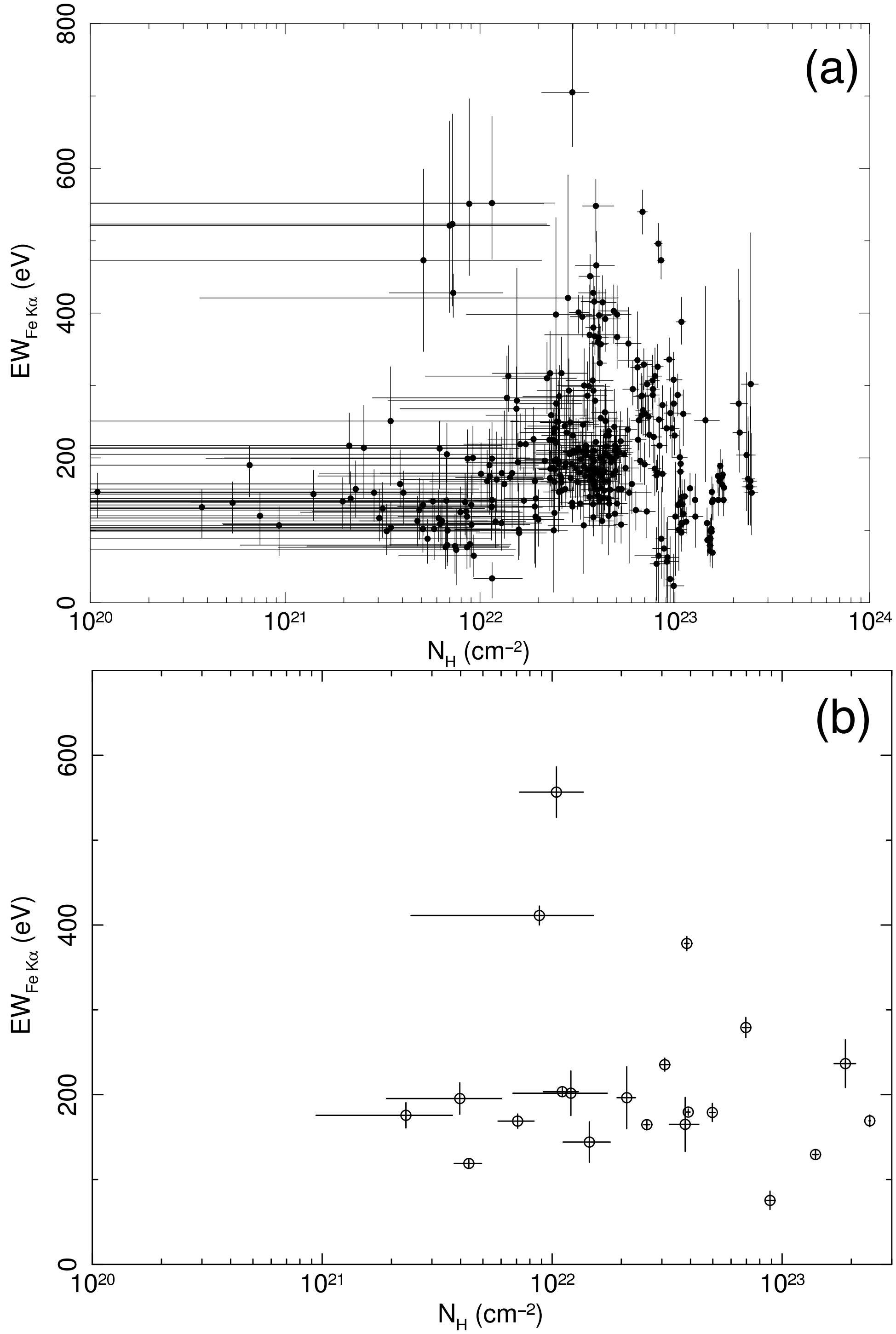

Figure C.17: Iron line equivalent width in eV (EW) versus absorbing column density (N_H) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

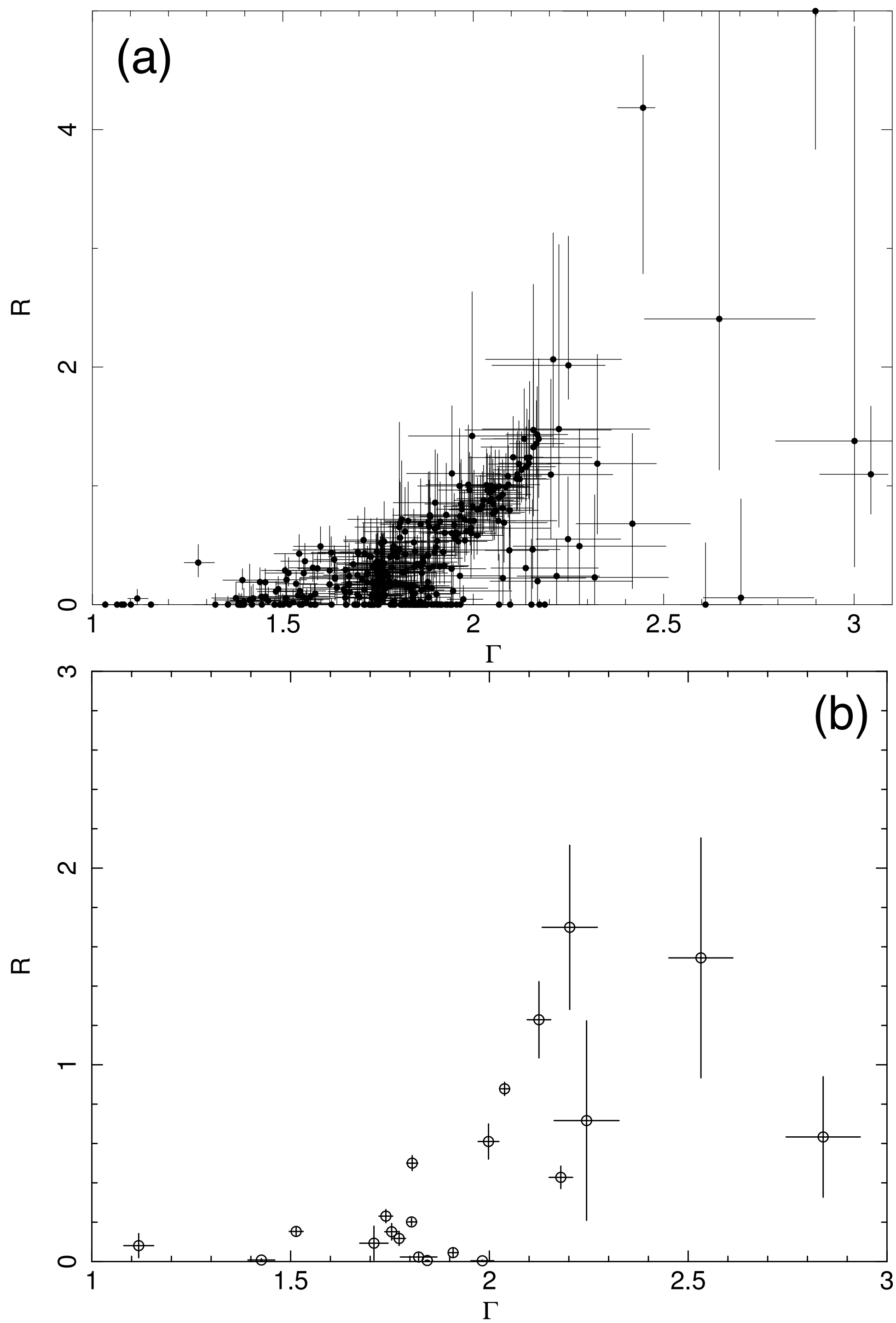

Figure C.18: Reflection fraction (R) versus power-law photon index (Γ) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

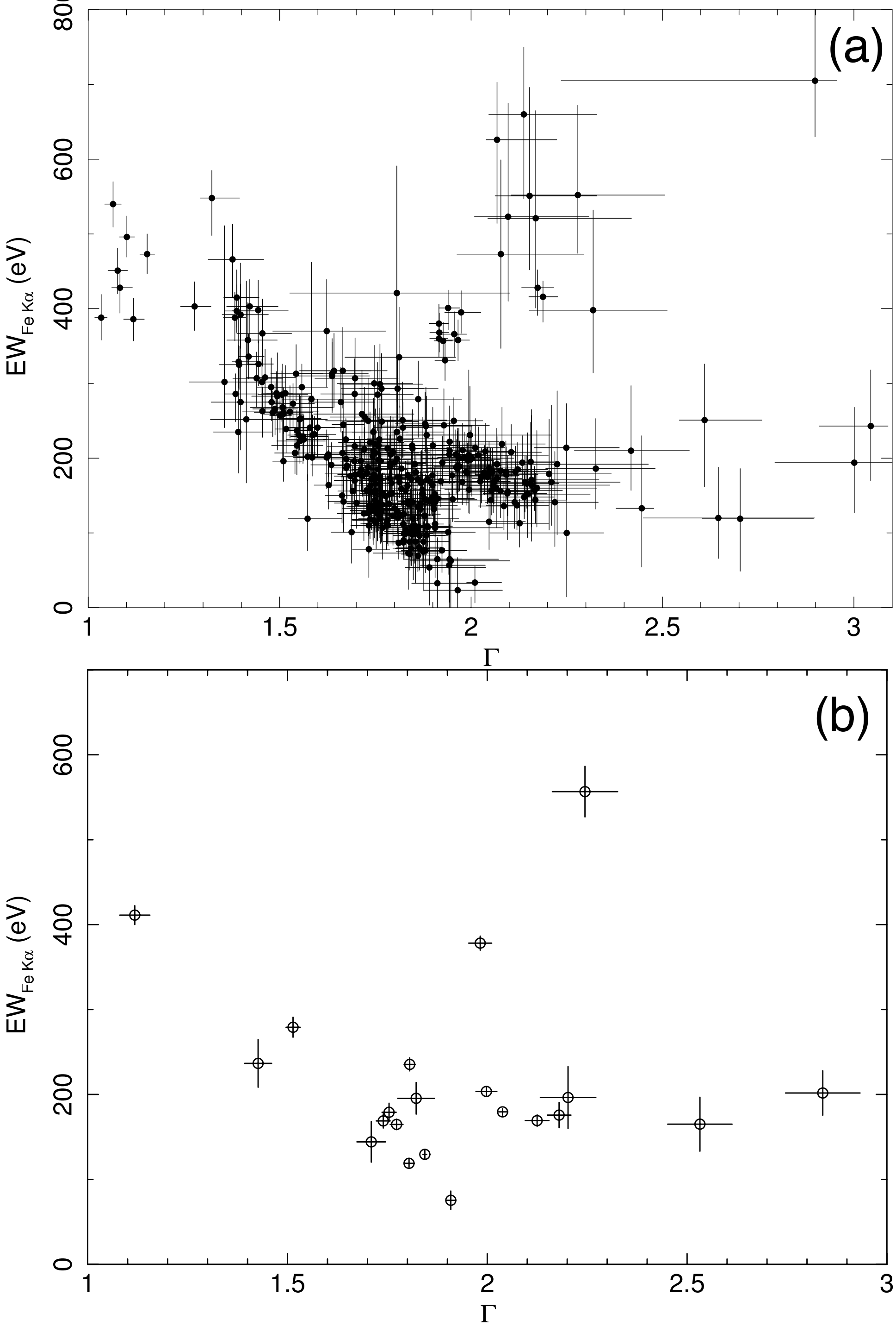

Figure C.19: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the Seyfert 2 sample. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

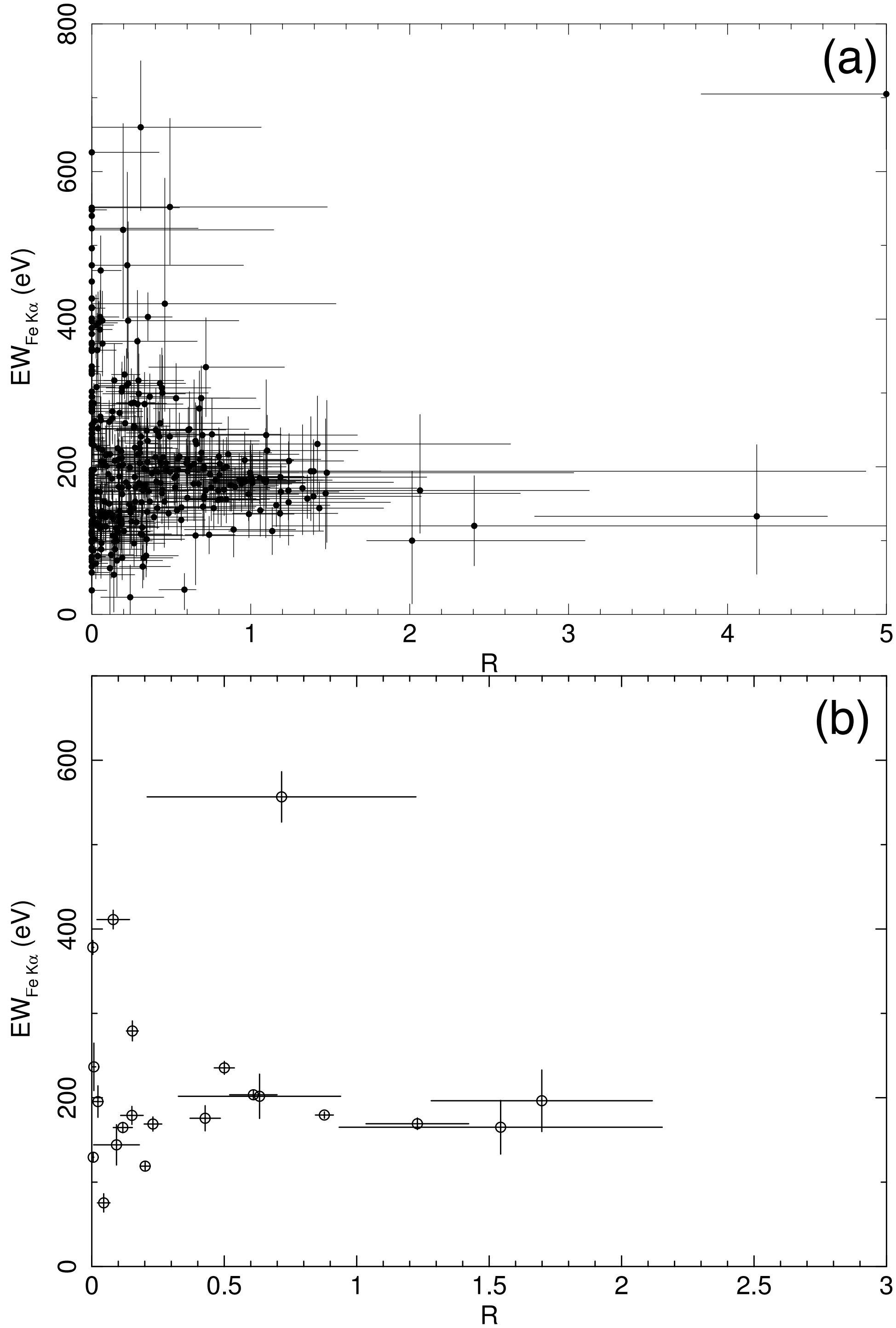

Figure C.20: Iron line equivalent width in eV (EW) versus reflection fraction (R) for the Seyfert 2. Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

C.3.3 Comparative Seyfert 1 and 2 Plots

This section presents comparative spectral parameter plots for the Seyfert 1 and Seyfert 2 samples as listed in Tables 4.1 and 5.1. In all plots, the Seyfert 1 sample is shown in black and the Seyfert 2 sample in red.

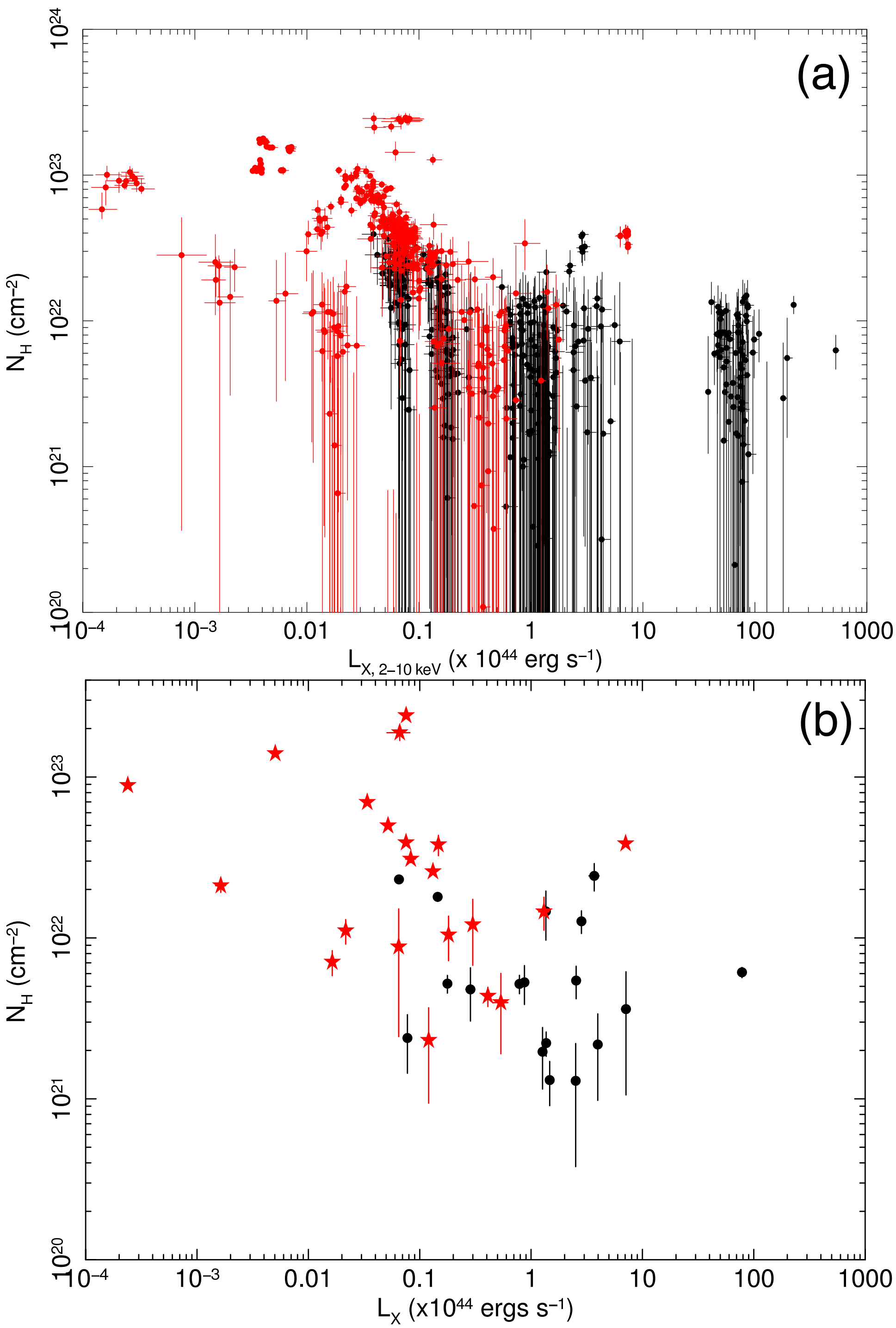

Figure C.21: Absorbing column density (N_H) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

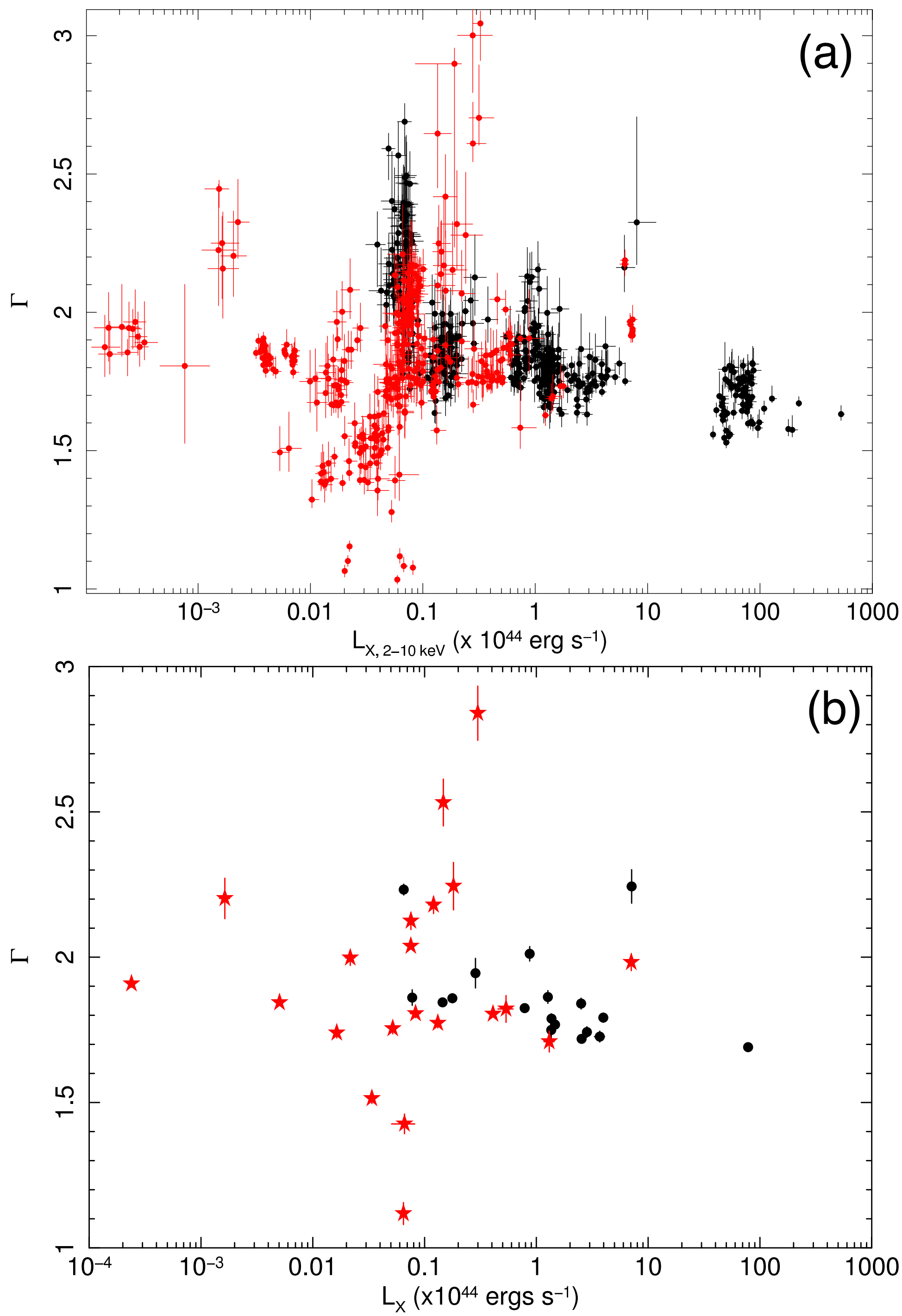

Figure C.22: Photon index (Γ) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

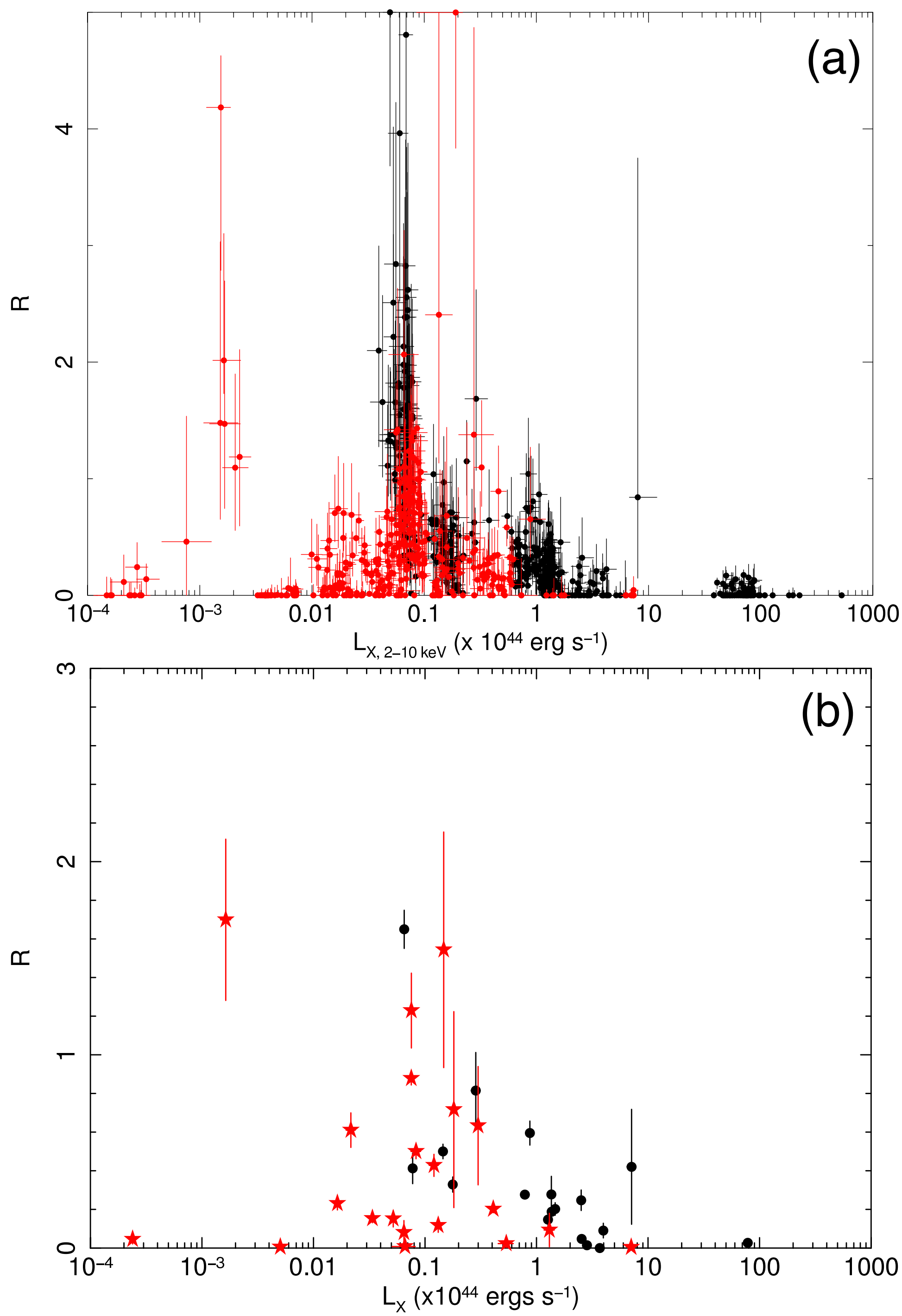

Figure C.23: Reflection fraction (R) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

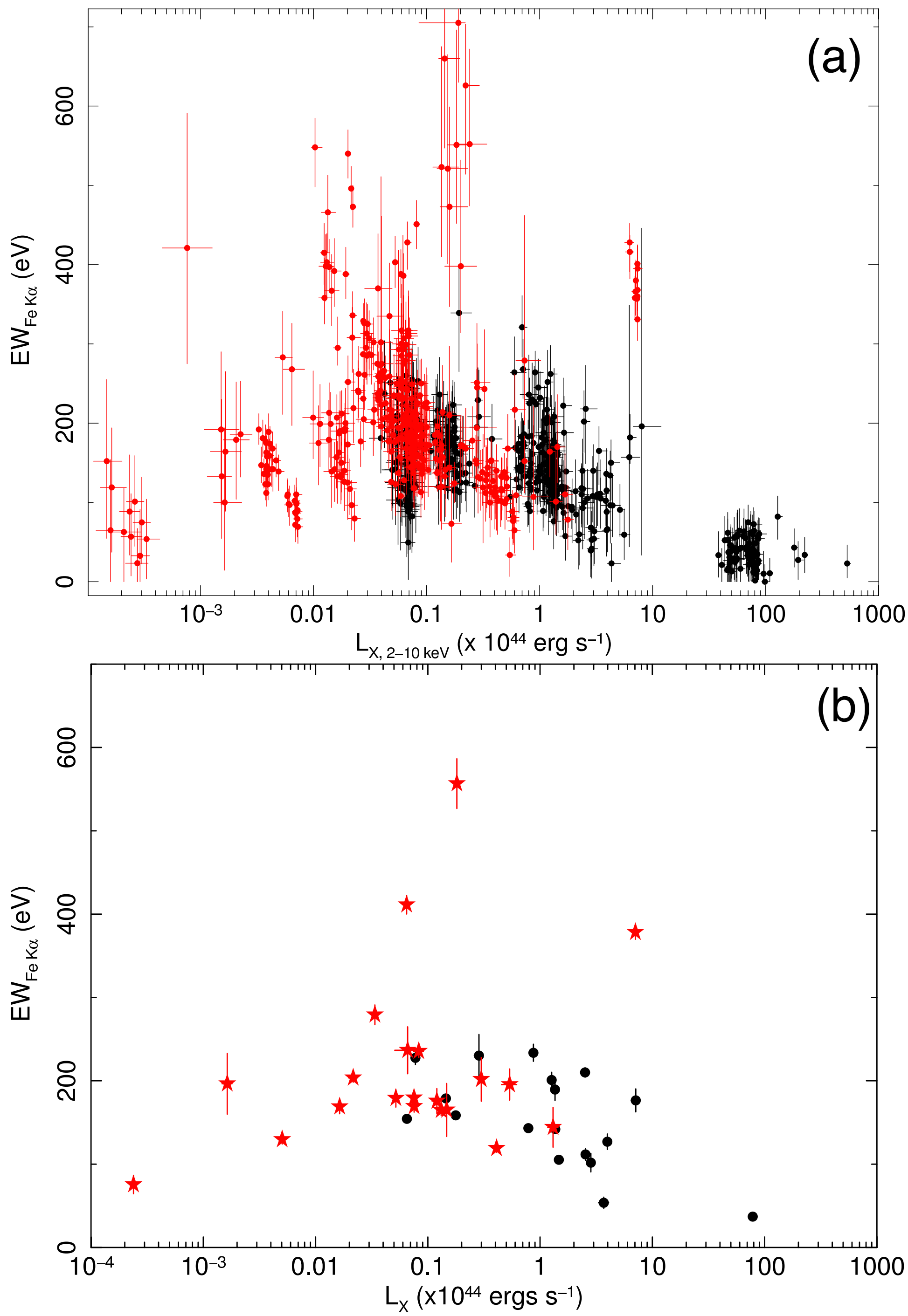

Figure C.24: Iron line equivalent width in eV (EW) versus 2 to 10 keV luminosity (L_x) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

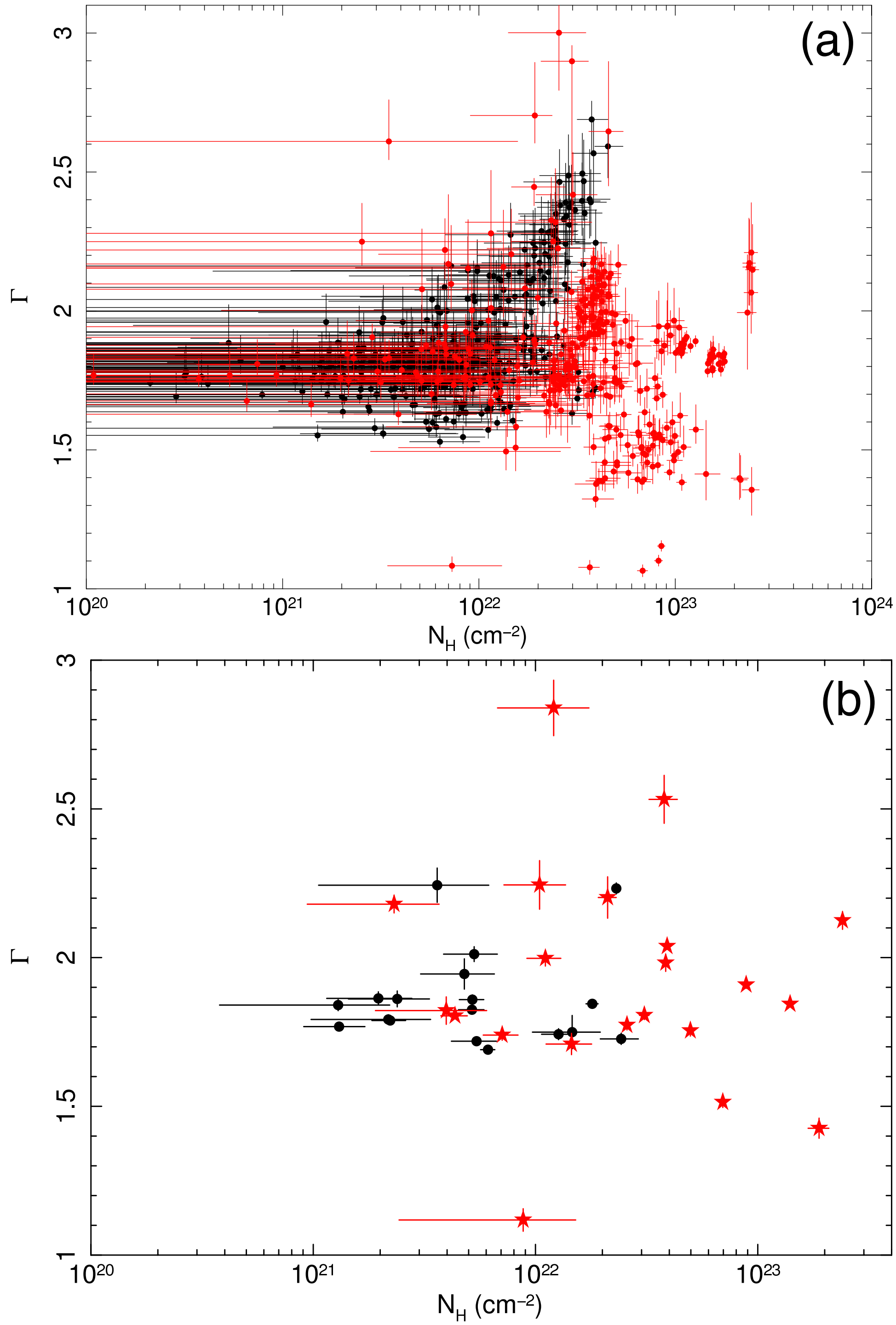

Figure C.25: Photon index (Γ) versus absorbing column density (N_H) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

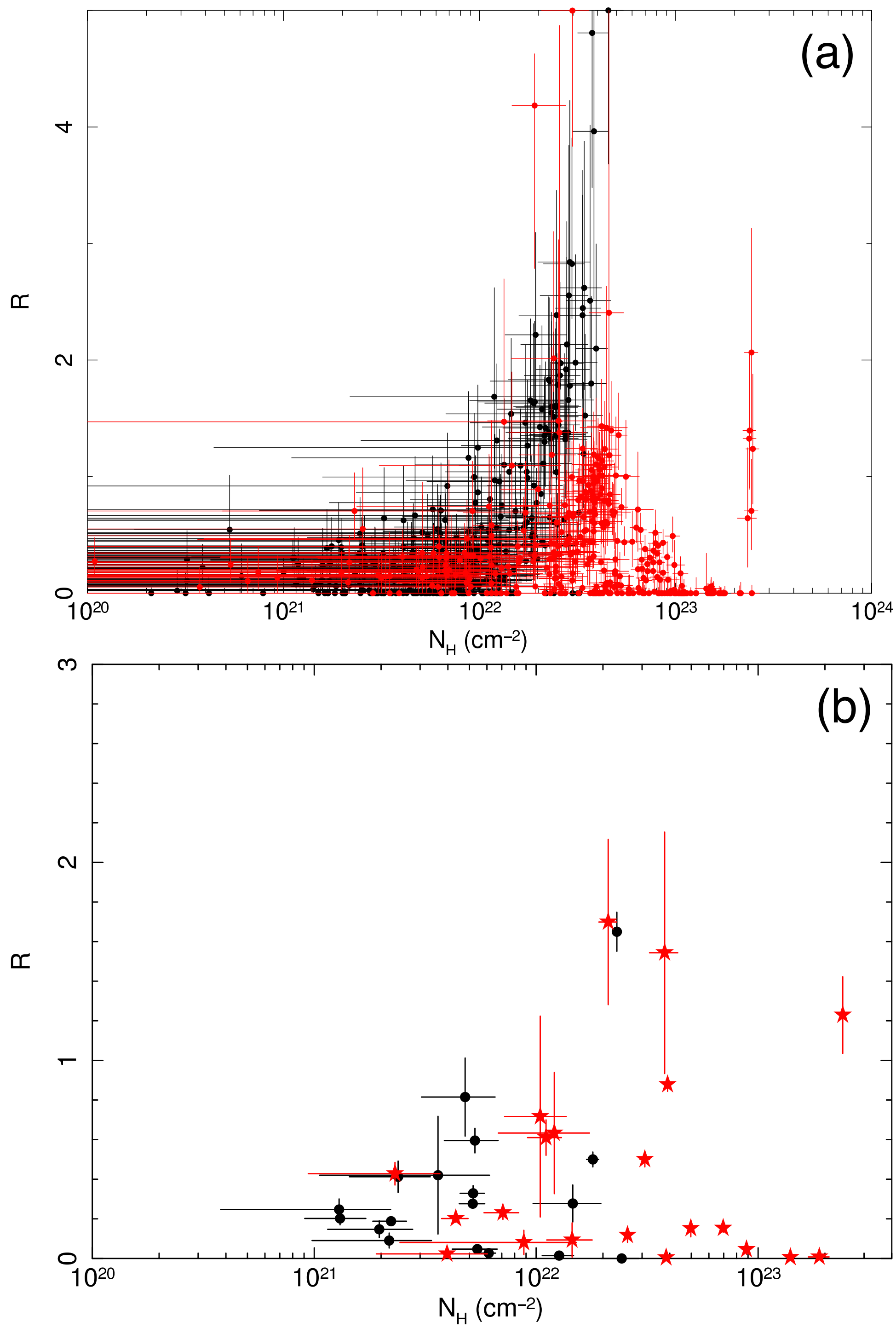

Figure C.26: Reflection fraction (R) versus absorbing column density (N_H) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

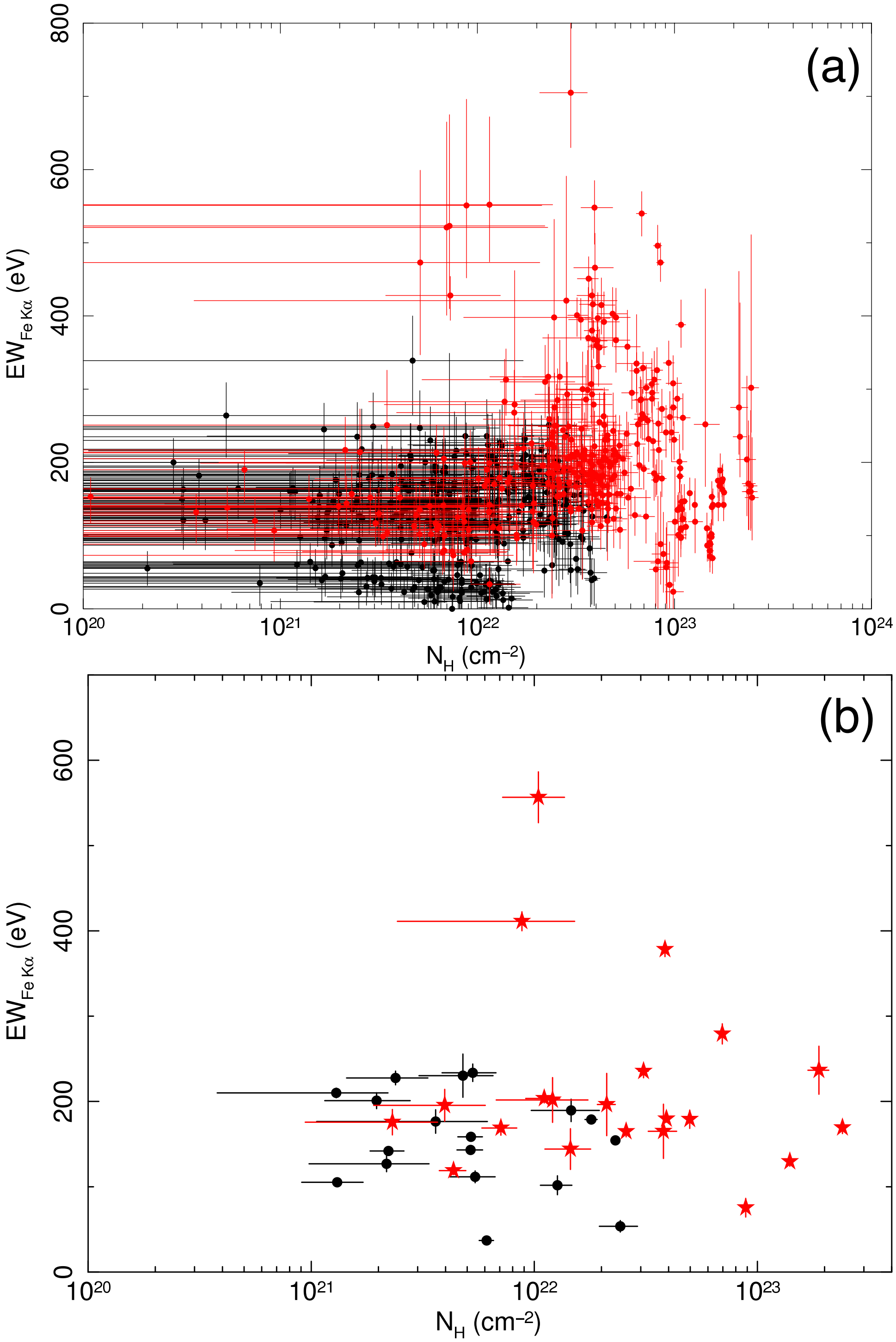

Figure C.27: Iron line equivalent width in eV (EW) versus absorbing column density (N_H) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

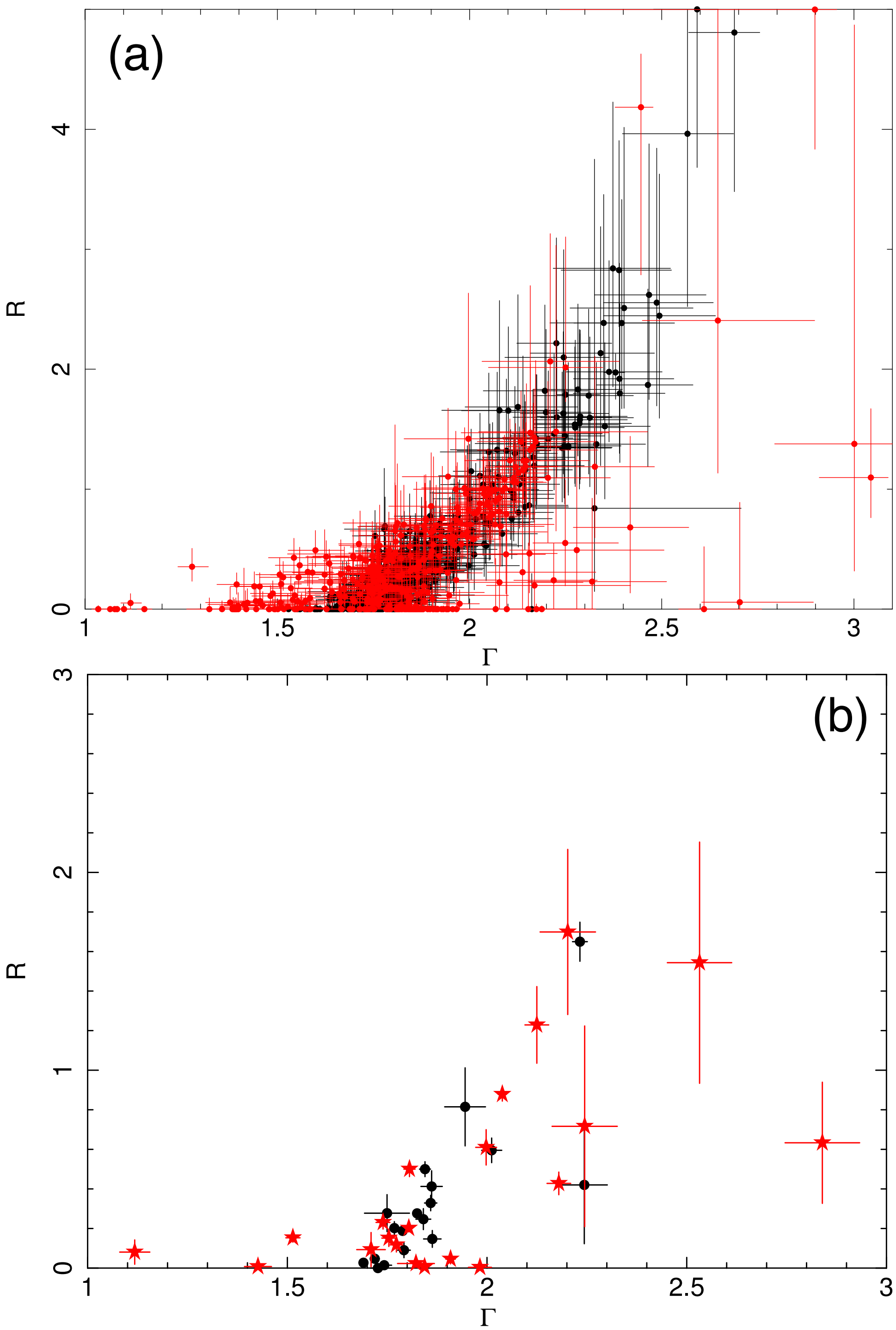

Figure C.28: Reflection fraction (R) versus power-law photon index (Γ) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

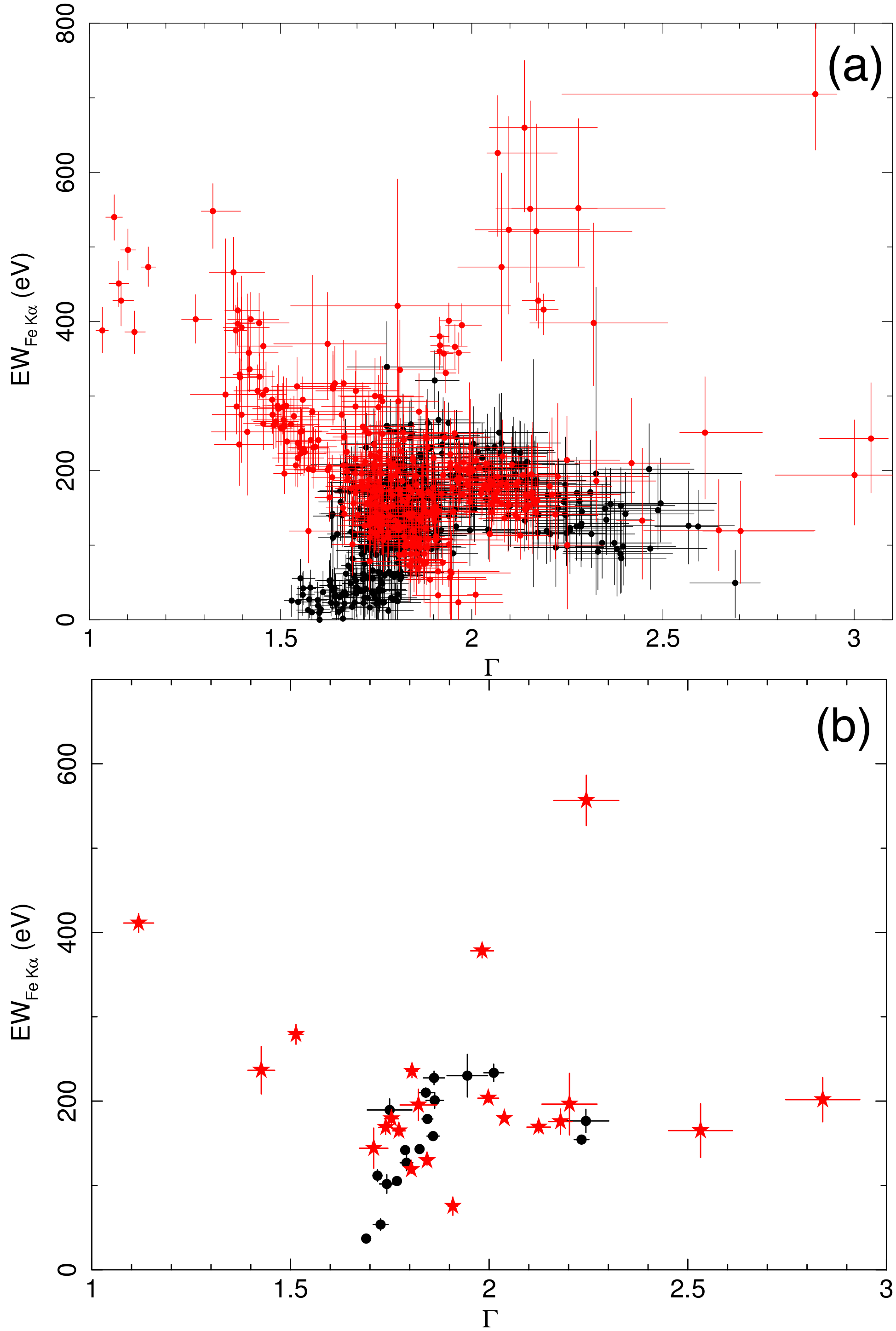

Figure C.29: Iron line equivalent width in eV (EW) versus power-law photon index (Γ) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

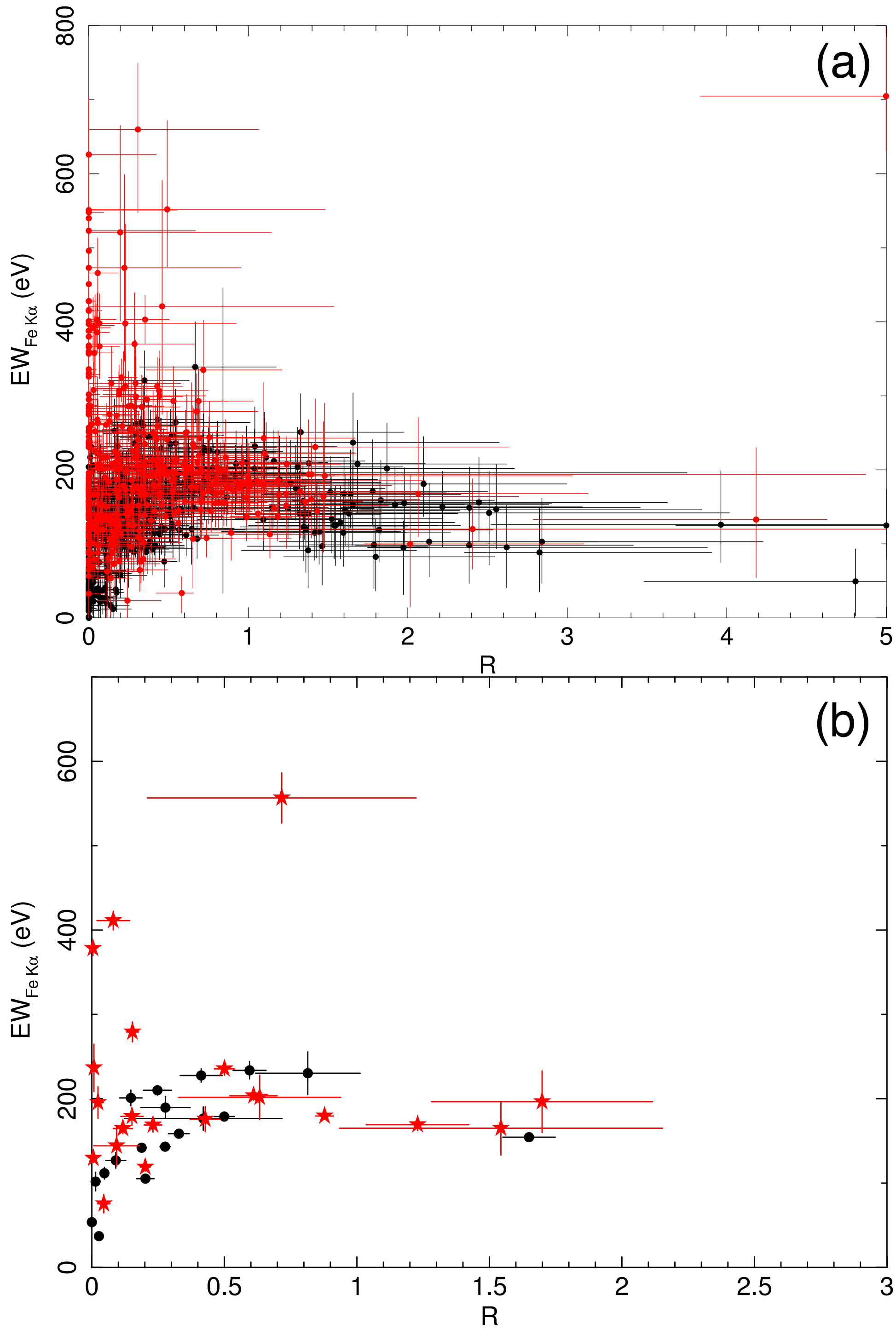

Figure C.30: Iron line equivalent width in eV (EW) versus reflection fraction (R) for the Seyfert 1 sample (black) and Seyfert 2 sample (red). Panel (a) shows one point for each spectrum in the sample. Panel (b) shows one point per galaxy, based on the mean value for all spectra for that galaxy and the error bars are the standard error of the mean.

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