

Key points from Lecture 16 of ASTR 350

1. *Active galactic nuclei*, or AGN, are the nuclei (i.e., the centers) of galaxies that are unusually luminous and have other signature properties. These are believed to be powered by gas accreting onto supermassive black holes.
2. In the current universe, only about 1 in each 100 galaxies is active by this definition. However, most to all big galaxies (including our own!) are thought to have had a phase in which they were active.
3. But AGN look very different from each other. This is understood via the “unified model” of AGN. In this model, the *intrinsic* differences between AGN are just the mass and rotation of the black hole as well as the accretion rate in units of the Eddington rate. However, the orientation by which we look at them (that is, where in the range between face-on and edge-on to the accretion disk) and whether we see jets accounts for the apparent differences.
4. Atomic spectra are extremely helpful in astronomy in figuring out the nature of systems, but near an accreting black hole the only features that survive (since most atoms are fully ionized) are from iron. The effects of general and special relativity can be used to figure out our orientation relative to the disk as well as the spin parameter of the black hole.