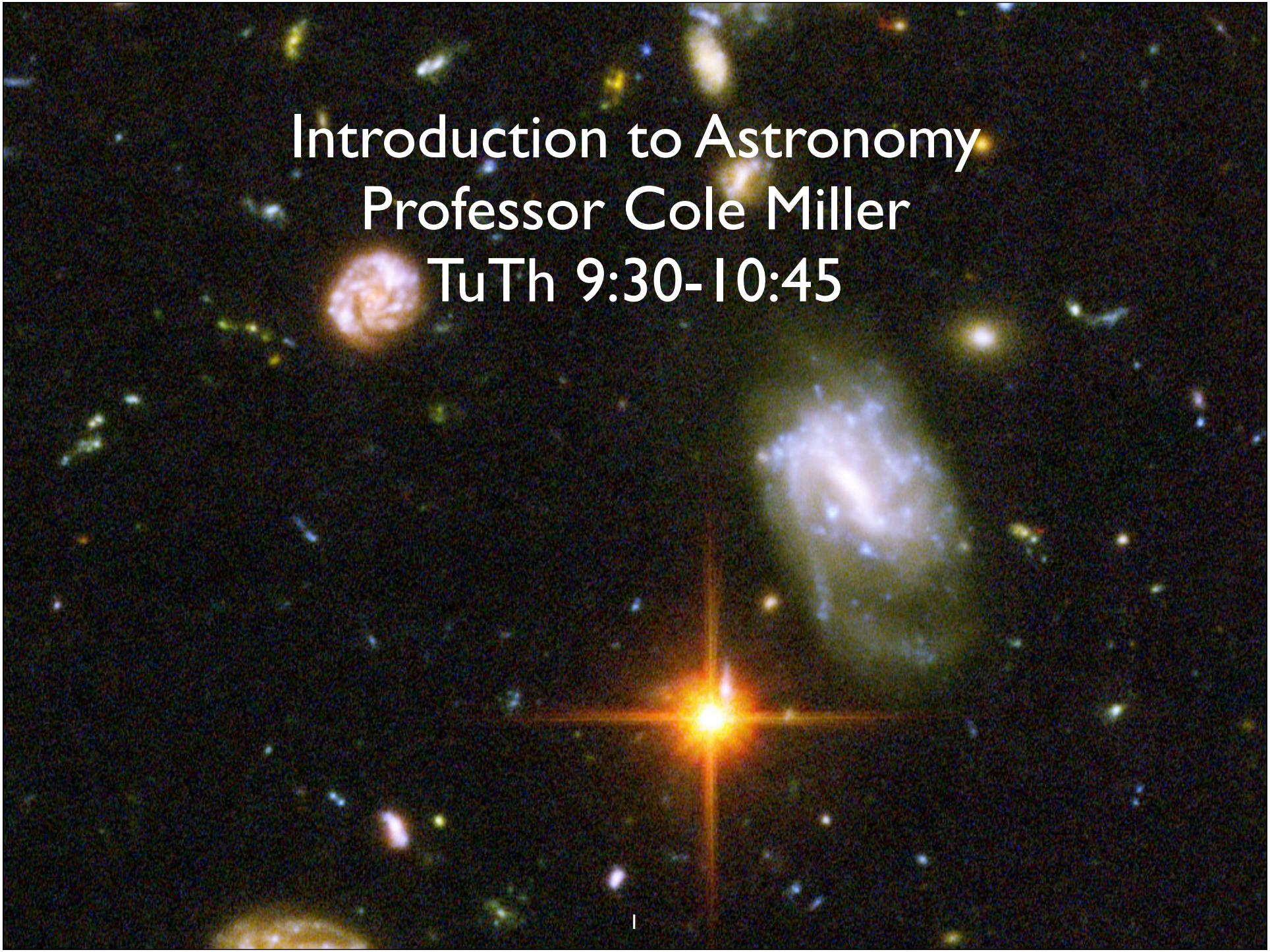
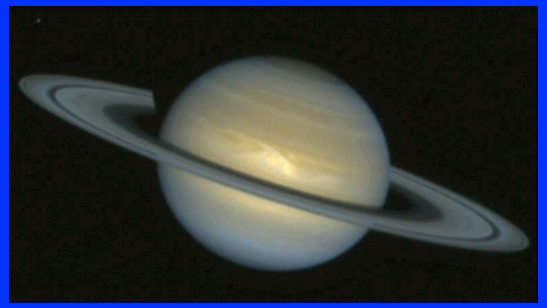

Introduction to Astronomy
Professor Cole Miller
TuTh 9:30-10:45

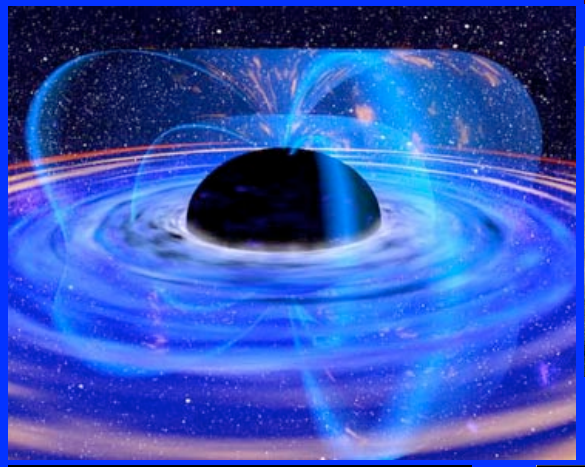
# Plan

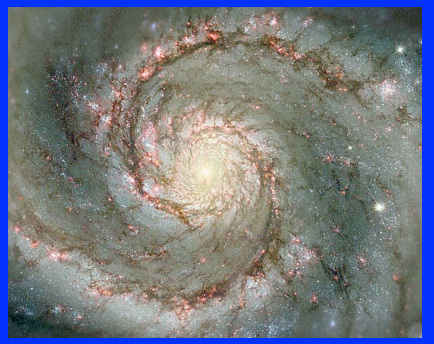
- The scope of astronomy
- Syllabus; administrative details
- An idea of scale

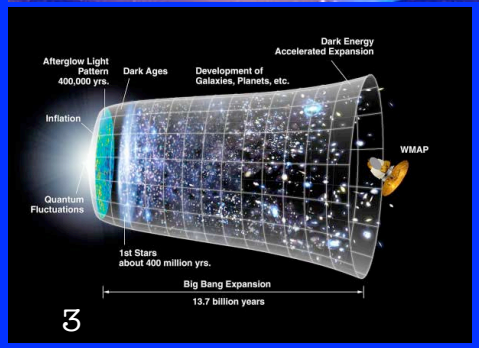
# What is Astronomy?

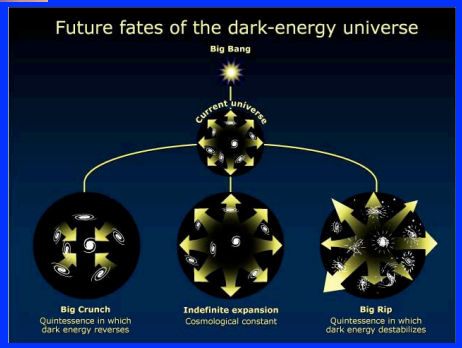
- Astronomy is the study of the universe
  - Planets, stars, black holes, galaxies…
  - The beginning and end!
- There is a vast cosmos out there…









# Our Goal in ASTR 100

- We will survey the universe in a semester
- I hope that you learn:
  - How to ask good questions, and that you can figure things out
  - The relation of astronomy to some eternal questions
  - The majesty of the universe!

# How the Course is Set Up

- Lectures: TuTh, 9:30-10:45
- Discussion sections: see yours for time
- Components of grade include homework, your section grade, and exams
- http://www.astro.umd.edu/~miller/ASTR100

| Assignment | Homeworks | Section | Exam I | Exam II | Final | Total |
|---|---|---|---|---|---|---|
| Points | 150 | 150 | 100 | 100 | 200 | 700 |

| Letter | Total | Percentage |
|---|---|---|
| A | 630-700 | 90-100% |
| B | 560-629 | 80-90% |
| C | 490-559 | 70-80% |
| D | 420-489 | 60-70% |
| F | 0-419 | 0-60% |

I might curve to give you a better letter grade than this, but your letter grade will be no worse.

Individual assignments/exams will not be given a letter grade

# Homeworks

- Homeworks will be turned in electronically, in PDF format (typed, not scanned; scans are often tough to read!) Easy to make PDF; ask TA if you need help
- E-mail to your section: astro100-0l0?@astro.umd.edu, e.g., astro100-0l05@astro.umd.edu if you are in section 0l05

# Extra Credit

There are a few ways to earn extra credit in this class:

- Extra credit questions on HW
- Extra credit questions in class
- Extra credit questions in sections

I expect the total extra credit in the class to be about 50-60 points. Thus you can earn **nearly a full extra letter grade** by working hard.
But there will be **no** other ways to get extra credit, for missed assignments etc.

# Example Extra Credit (2 points)

- What are the years that the Maryland men's and women's basketball teams won the national basketball championship? [okay, a real one would be about astronomy!]
- Be sure to include your name and section number

You would get two points for a correct answer, one for an incorrect answer, and zero if you don't answer

# Academic Integrity

- All work must be in your own words!
- Copying (from friend, our textbook, website, …), or allowing copying, is a violation
- So would be submitting forged excuses, filling in an absent friend's extra credit, etc.
- If found responsible, standard penalty is an XF on your transcript: indicates that you failed the course because you cheated
- Class is curved; someone who cheats might push you to a lower letter grade!


CSS 2400
Preinkert Drive
D
051
042
Journalism
059
H1
Symons
076
Campus Drive
Animal Sciences
142
Agricultural Engineering
CC1
PP2
110
148
225
092
E
EE
T

Discussion sections start **next** week!

# Thought Questions

- During a class, I may ask you a question with several possible answers
- You will think about it, talk with nearby people, then on my signal will hold up the card with your answer
- We will then discuss the question

# Example Question

Mr. Spock is:

A. A Dalek in disguise

B. First mate to Ahab

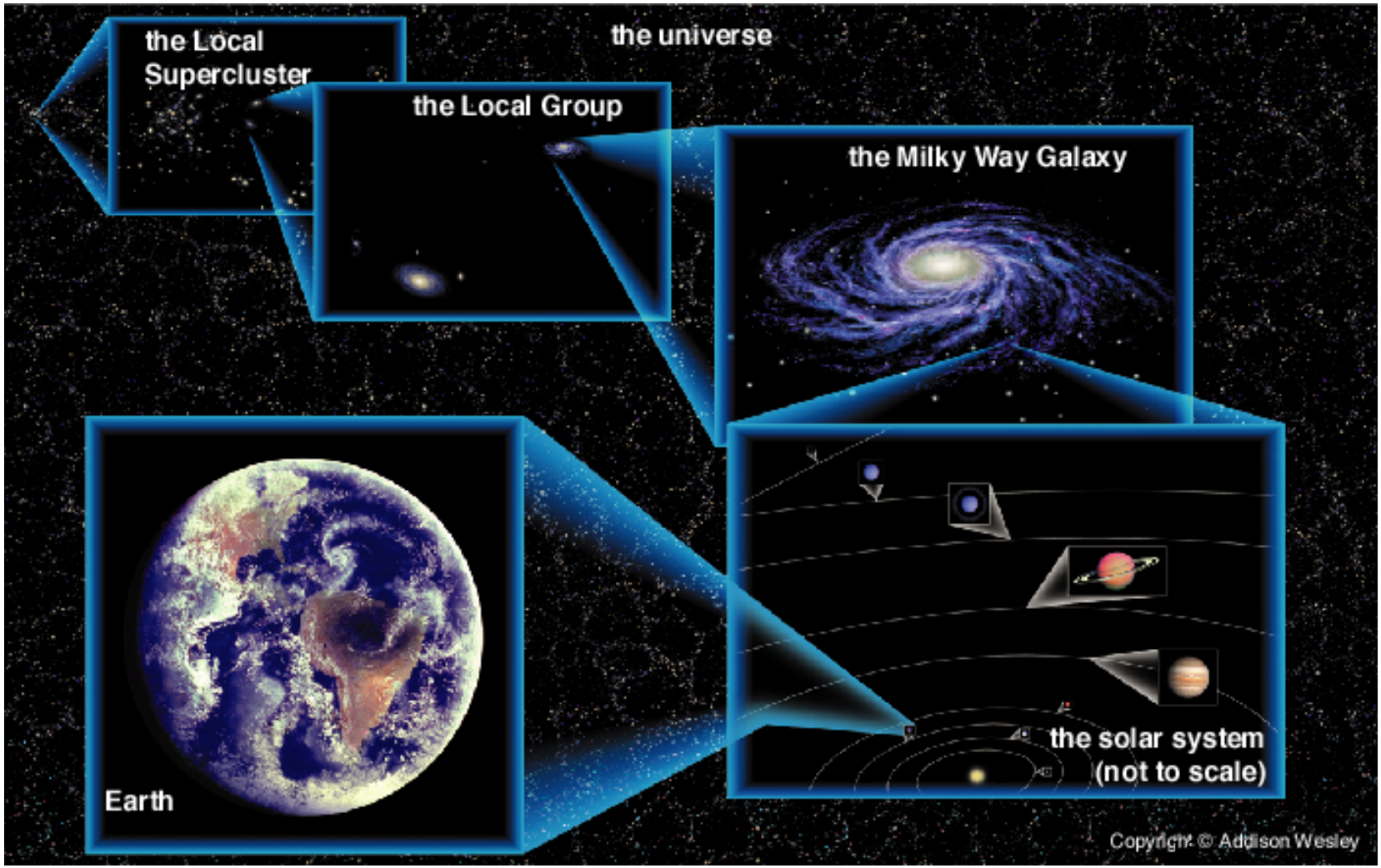
C. From Vulcan

D. The author of a child care manual

E. I don't know

# What is our place in the universe?

Our "Cosmic Address"



# The Scale of the Universe

The universe is so vast that it is difficult to comprehend. We can start with some distances that might be familiar.

What is the farthest you have ever run?
Driven?
Flown?
How do these distances compare to astronomical distance?

# Size of the Earth

- The Earth is 40,000 km in circumference
- That would take about a year to walk, 24/7!
- But the Earth is small by astronomical standards

http://rsd.gsfc.nasa.gov/rsd/images/goes8_lg.jpg

# Distance to the Moon

- The Moon is much farther from the Earth than the size of the Earth
- Its average distance is roughly 400,000 km
- It would take a jet roughly 20 days nonstop to go that distance

http://nssdc.gsfc.nasa.gov/image/planetary/moon/gal_moon_color.jpg

# Size of the Solar System

- Our Solar System is much larger yet
- Average distance of Earth from Sun, which is called an Astronomical Unit (AU), is about 150,000,000 km
- But to see what that means, we need a scale model
- On a scale where the Sun is a basketball, how does the Solar System look?

# Distances to Stars

- On the sun=basketball scale, where Pluto averages 1 km away, the closest star to our Sun is 6700 km away!!!
- That's the distance between DC and Berlin
- But we have barely scratched the surface...

The nearest star: Proxima Centauri

http://www.daviddarling.info/images/Proxima_Centauri.jpg

# Size of a Galaxy

- Galaxies contain billions of stars, hence they are much bigger than the distance to the closest star

- If the Solar System out to Pluto was a basketball… our Milky Way galaxy would be about 20,000 km in diameter!

Andromeda Galaxy

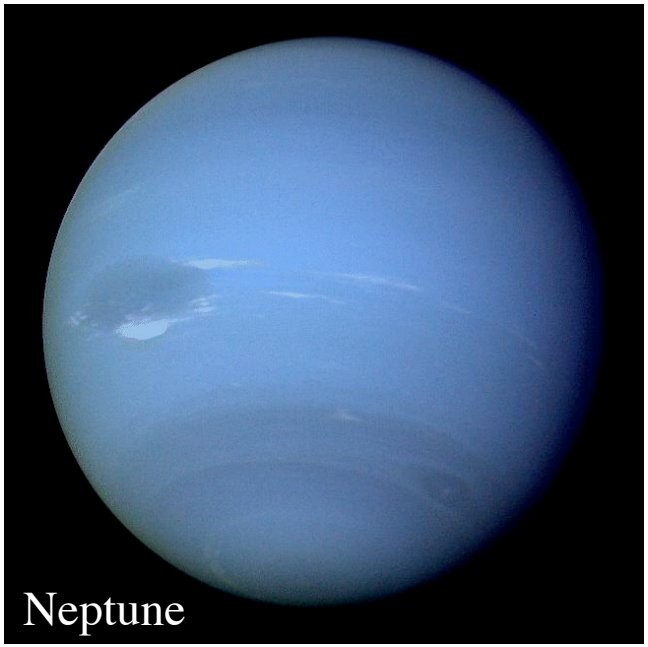
http://www.solstation.com/x-objects/and2disk.jpg

# Size of the Visible Universe

- The visible universe contains tens of billions of galaxies
- On a scale where our galaxy is a basketball, the visible universe would be about 200 km in diameter
- Why “visible” universe? Because the totality of the cosmos could be infinite...

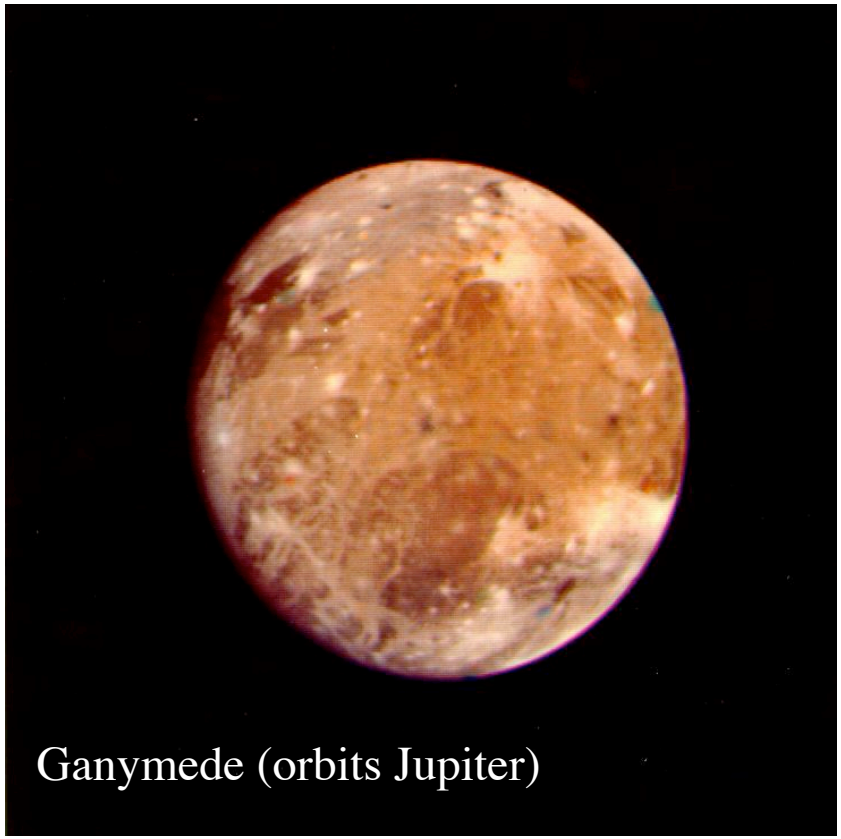
# Planet


Mars


Neptune

A moderately large object that orbits a star; it shines by reflected light. Planets may be rocky, icy, or gaseous in composition.

# Moon (or satellite)

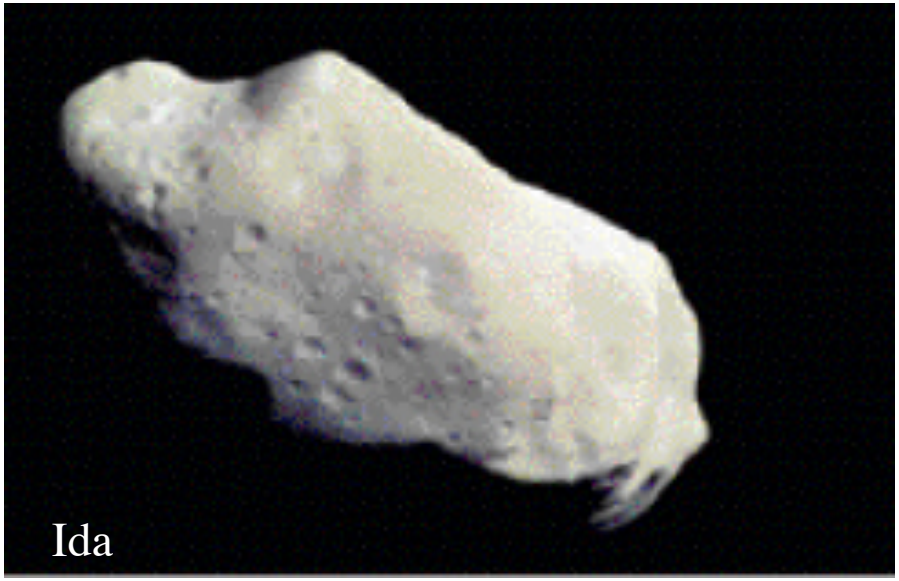


Ganymede (orbits Jupiter)

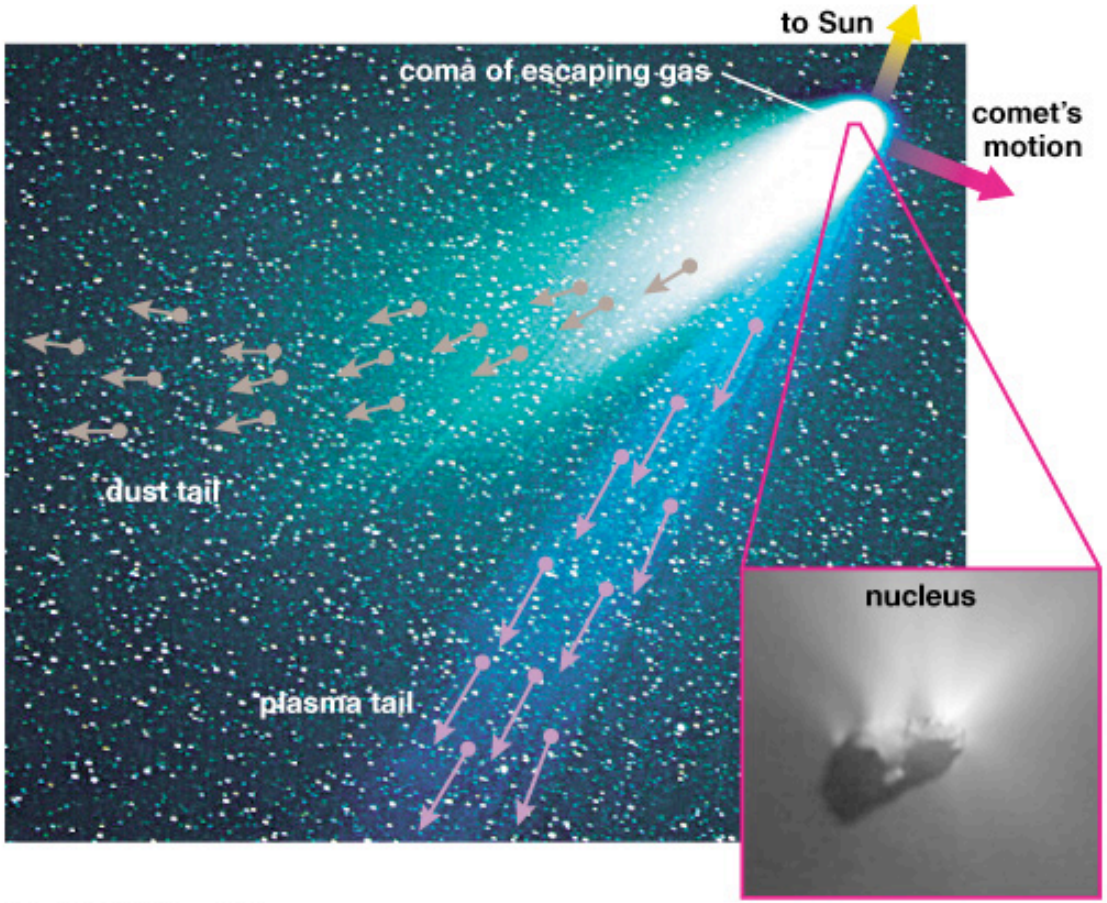
An object that orbits a planet.

# Asteroid

A relatively small and rocky object that orbits a star.



# Comet

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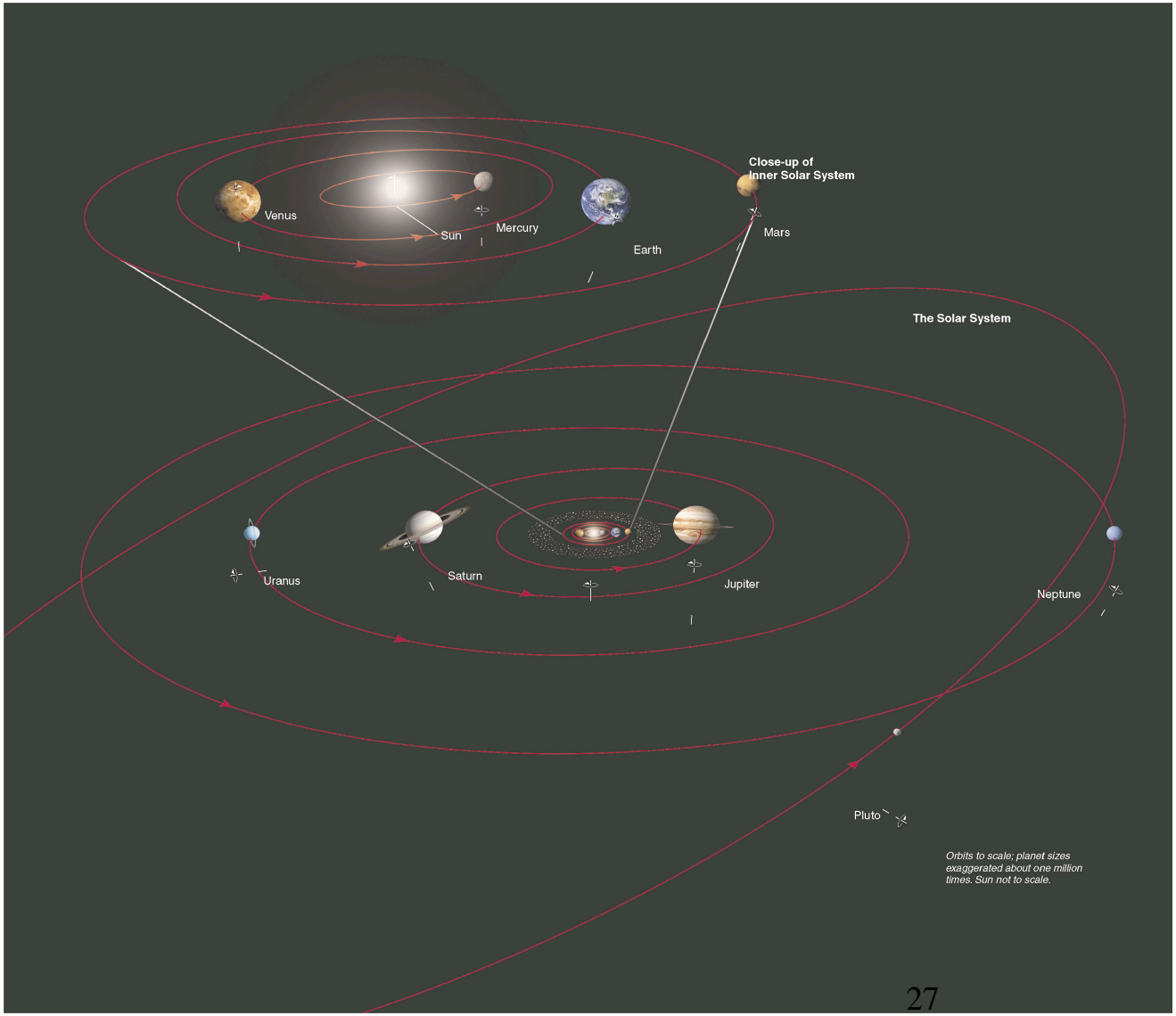
A relatively small and icy object that orbits a star.

# Solar (Star) System

A star and all the material that orbits it, including its planets and moons



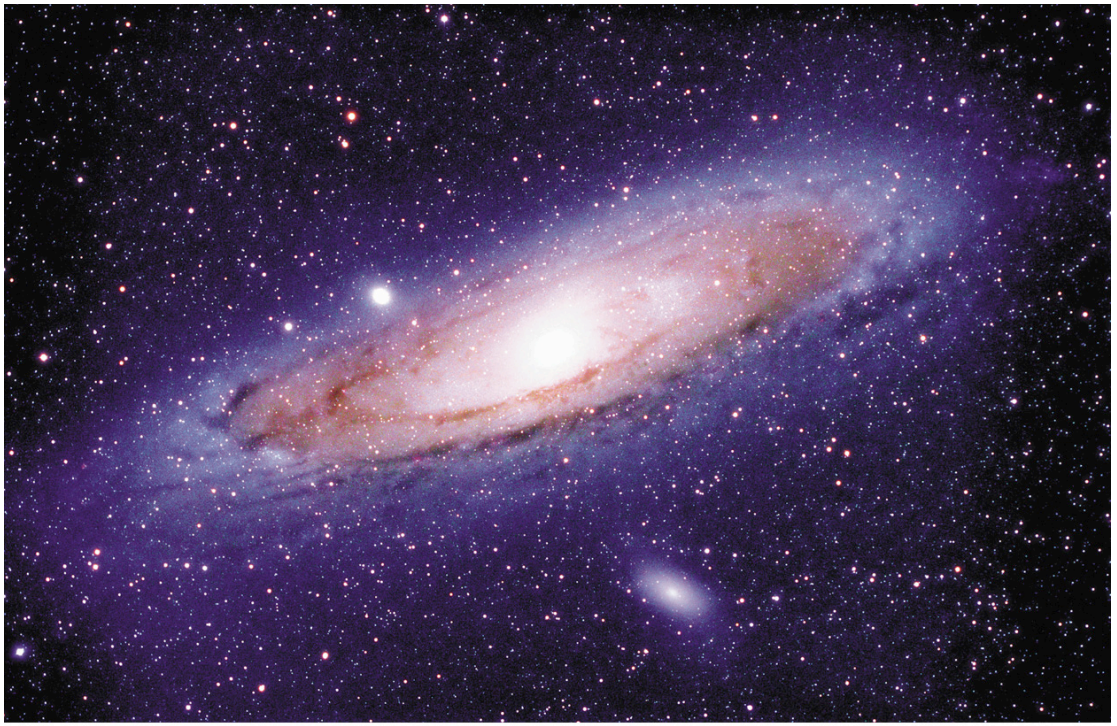
# Nebula

An interstellar cloud
of gas and/or dust

Typically larger than the solar system - may contain many stars

# Galaxy

A great island of stars in space, all held together by gravity and orbiting a common center



100s of billions of stars

# Universe

The sum total of all matter and energy; that is, everything within and between all galaxies

100s of billions of galaxies...
in the observable portion of the universe

Space is big. You just won't believe how vastly, hugely, mind- bogglingly big it is. I mean, you may think it's a long way down the road to the chemist's, but that's just peanuts to space.

Douglas Adams

Next two classes: guest lectures by Professor Derek Richardson