

Wednesday, January 15, 2014

Wheeler on Travel (<http://www.kavlifoundation.org/>)

Videos on Friday:

Fingerprints of the stars. A lesson in how to study the stars and learn about the Universe. Look for how astronomers use spectra to study stars and their implications. <http://phdcomics.com/tv/#020>

The Elegant Universe Part 1 minutes 26.3 to 38.4: the Quantum Café, the bizarre world of quantum mechanics. Look for how the forces of nature, other than gravity, work and the strange, probabilistic nature of the microscopic world. <http://www.pbs.org/wgbh/nova/physics/elegant-universe.html#elegant-universe-einstein>

- Syllabus/Schedule
- Webpage: <http://www.as.utexas.edu/astronomy/education/spring14/wheeler/309n.html> (also blackboard)
- Book: Cosmic Catastrophes (second edition)
- Five exams
- Grading: plus/minus grading will be used for the final grade; for example: 79.5 – 83.3 B-, 83.4 – 86.6 B, 86.7 – 89.4 B+. (do not drop lowest exam -- but extra credit!)
- Grades are not curved: 90 - 100 A, 80 - 90 B, etc.
- Review Sessions before exams - Thursday, 5 - 6 PM
- Lectures will be posted after class on the web site (see old class web sites if you want to peek ahead).

# Extra Credit

*On exams* (2 points):

*Sky Watch Project* - details on web site, in handout. Log of observations: up to 5 points on each exam. Due at each hourly exam.

Keep an eye on Betelgeuse in Orion, also locate Sirius A, the Crab Nebula, Cassiopeiae A, Cygnus X-1, Sagittarius A, others. **1) Record enough information so that we can tell you actually went out at night and tried to see something. 2) Give a brief summary of why they are important to the class.** Some of these can be seen with the naked eye, some not. Some can be seen now, some later in the term. Some in the morning, some in the evening. **Beware clouds!**

Book - electronic copy available through University library  
[http://catalog.lib.utexas.edu/search/X?SEARCH=Cosmic  
+Catstrophes](http://catalog.lib.utexas.edu/search/X?SEARCH=Cosmic+Catstrophes)

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# Reading: Chapters 1 thru 5 for background plus Chapter 6 - Supernovae

## Chapters 1 & 2 - AST 301

- Particles, forces, neutrinos
- Charge repulsion
- Pressure -
  - Thermal
  - Quantum
- Nuclear Reactions

## Chapters 3, 4, & 5

- Binary Star Evolution
- Accretion Disks
- White Dwarfs

Will refer to as needed

Schedule - start with Chapters 6

Leave room for Chapters 13 and 14 and extra stuff

One minute exams

Peer interaction

Discussion

## The Universe is a strange place!

It began in a Big Bang, the creation of space and time as we know them.

It has been expanding for 13.8 billion years.

It is full of dark matter, unlike protons, neutrons, electrons, our stuff, that nevertheless gravitates.

It currently seems to be accelerating in the grip of some anti-gravitating “dark energy.”

On the microscopic scale, which can determine events on the cosmological scale, nature follows the laws of quantum theory, probability not certainty, quantum jumps, wave-like properties of particles.

Study the stars - see where that leads...

# Background Check

What is a main sequence star?

What is a red giant star?

What is a white dwarf?

Write a few sentences, talk with your neighbors.