

Welcome to Stars, Galaxies & the Universe



Grading for Stars, Galaxies & Universe

One-hour exams (3 exams, dates on syllabus)	300
Final exam (16 December 2010)	150
Homework (10 of 12 ICON assignments)	100
Reading Quizzes (Mondays in class – 10 of 12)	100
Total	650



Lecture #1:

Introduction, Tour of the Universe, The Night Sky

- Introduction to syllabus, course policies
- Tour of the universe in pictures
- Orientating yourself with the night sky

Other things you need to know:

- Course etiquette: see syllabus – please take seriously!
- Course website:
http://astro.physics.uiowa.edu/~clang/sgu_fall10
-reading assignments, lecture notes, exam dates,
study guides, course policies, etc.

Goals of this course

- an introduction to astronomy for non-scientists
- an understanding of the night sky and observing
- an understanding of the physical processes driving *stars, galaxies and the universe*
- an appreciation for the role of astronomical discoveries in today's world – media, internet

http://astro.physics.uiowa.edu/~clang/sgu_fall10



Course Website

Please use the webpage!

- detailed syllabus
- exam information
- class assignments
- lecture notes
- *no course material on ICON – only grades*

Other things you need to know:

- Course etiquette: see syllabus – please take seriously!
- Course website:
http://astro.physics.uiowa.edu/~clang/sgu_fall10
- reading assignments, lecture notes, exam dates, study guides
- Grades posted on U Iowa ICON website (29:50) – no other course materials
- **Labs do not meet this week!** Lab materials provided in class.
Lab+Lecture are 4 s.h. together: 75% of grade from lecture and 25% from lab (must pass both to get full credit for course)



Course Guidelines

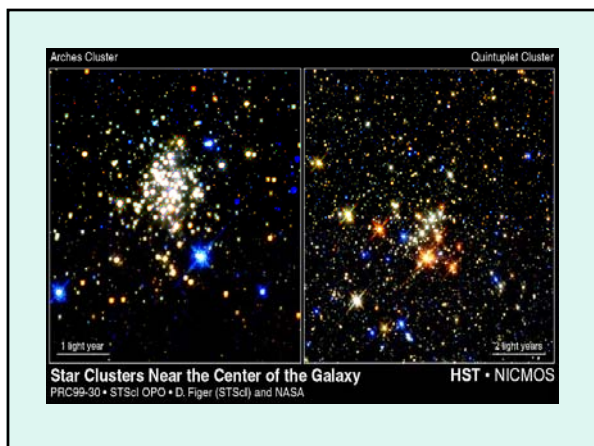
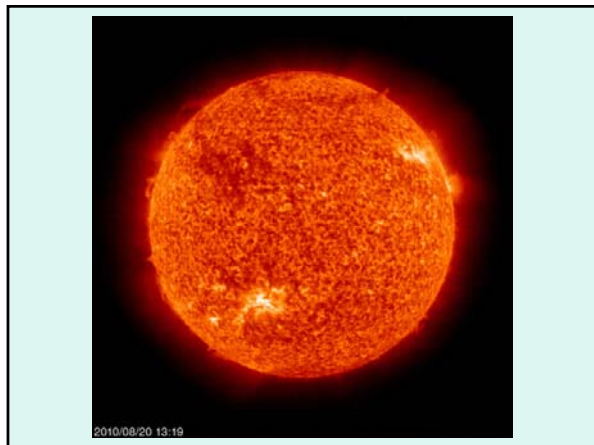
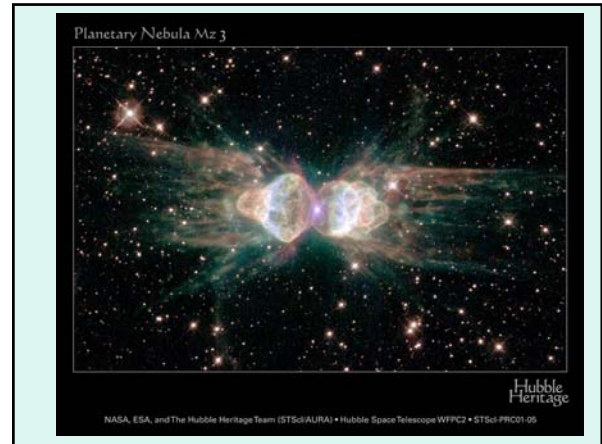
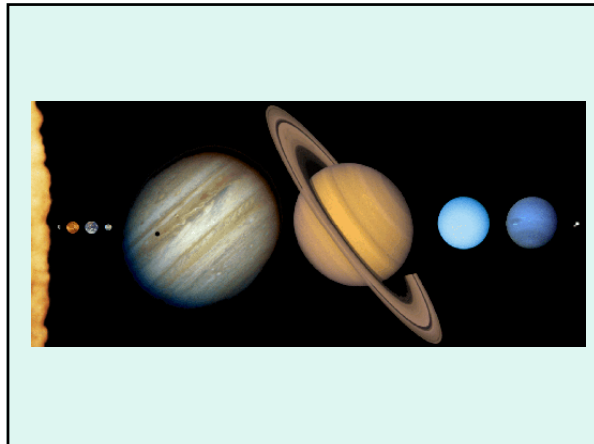
- for add/drop issues, please go to VAN 203 at other end of building
- lots of space available in lab section on Wednesdays (2:30-4:20 pm)
- *please* come to lecture! textbook will be no substitute
- *please* do not talk during lecture, no cellphone ringing
- *please* ask questions during class – there are no silly questions!
- *please* come to office hours or see me if you need help
- *please* limit your emails; send email from university address only to the course email sgu-fall10@astro.physics.uiowa.edu



Turning Point Clickers

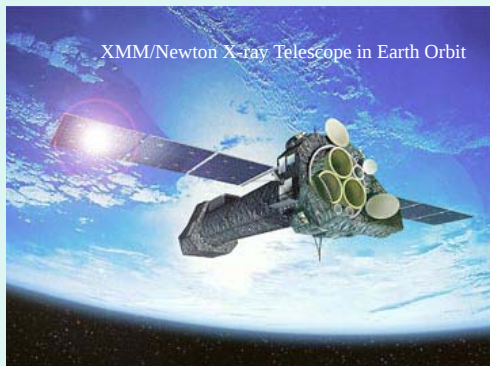
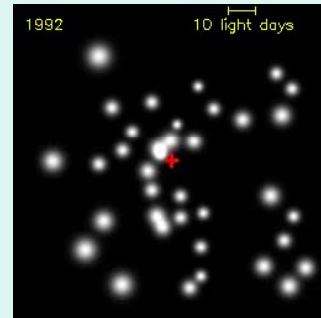
- Buy at bookstore (new or used)
- Register online and bring to class daily
- http://its.uiowa.edu/support/srs/student_faqs.shtml







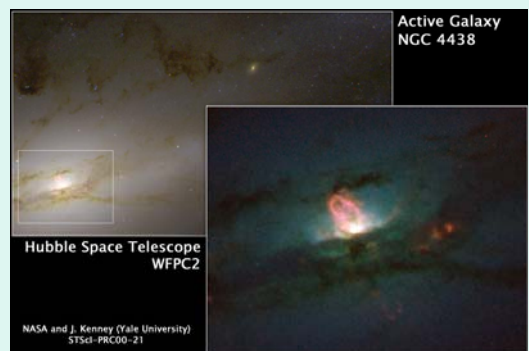
Motion of stars in our Galactic Center
due to the 4 million solar mass black hole!

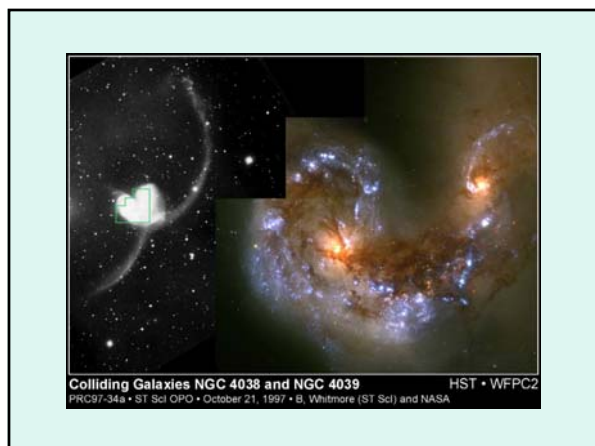
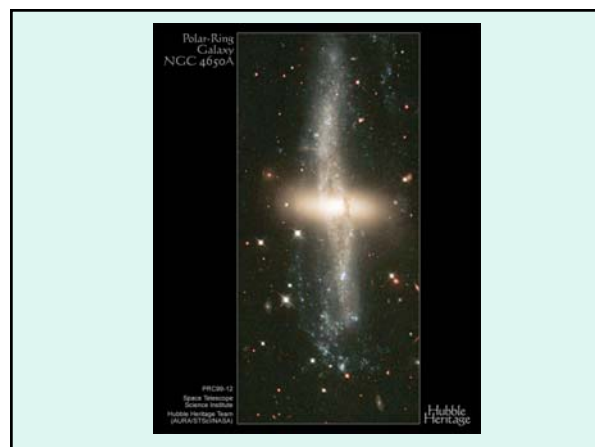
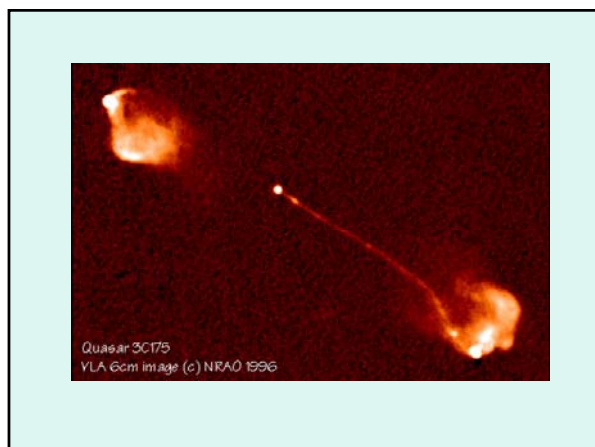
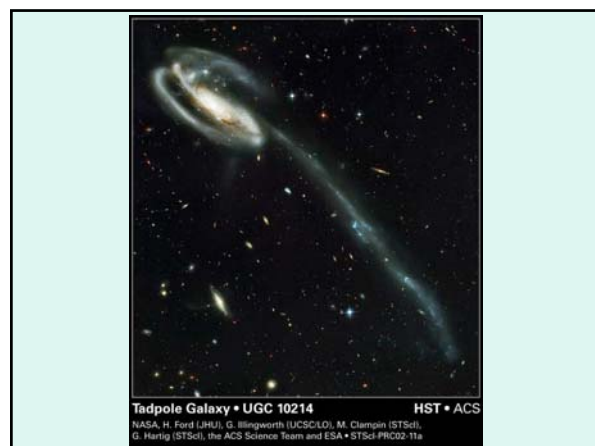
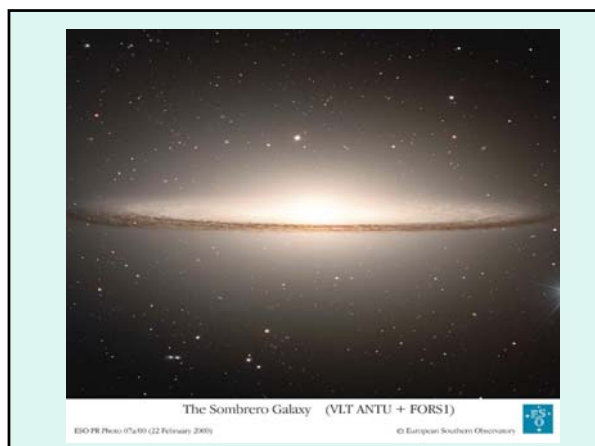


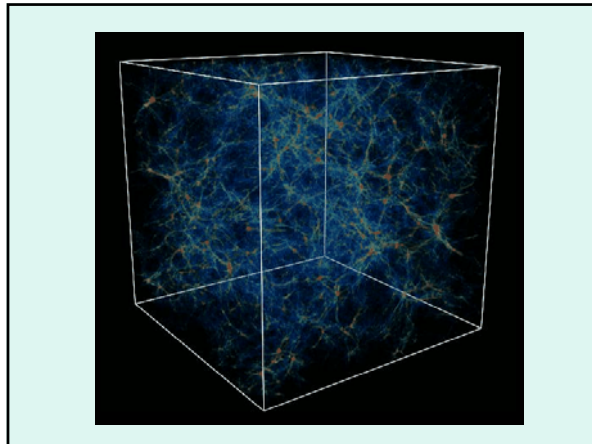
Owens Valley Radio Telescope near Bishop, CA



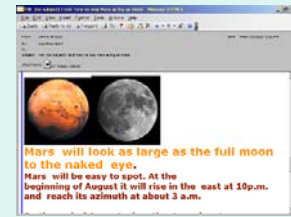
Black holes in the centers of nearby galaxies



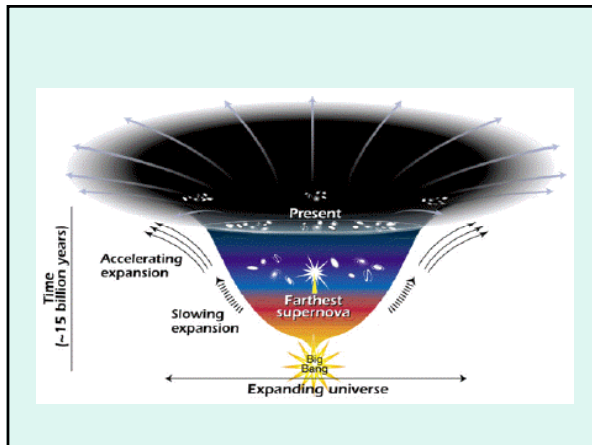




Mars Internet Hoax



Be on the lookout! It's an e-mail chain letter claiming that Mars is about to come closer than ever in history and will look as big and bright as the full Moon with the naked eye.



Reality of Mars vs. Moon Size



Clicker Frequency Setting



1. Hit "Channel" button
2. Hit 44

Light should be flashing Red/Green while setting

3. Press "Channel Button"

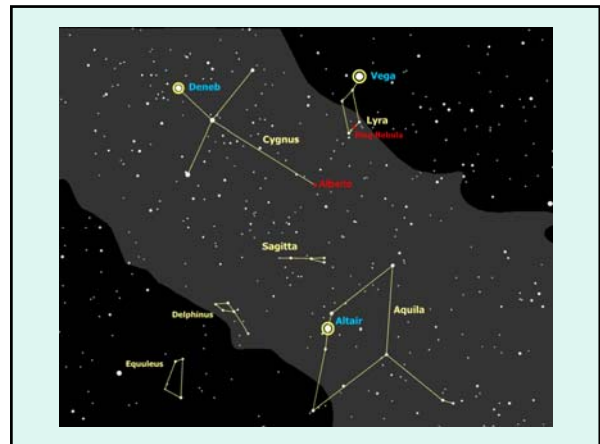
4. Light should settle on green if the setting worked

Opposition is when Mars is exactly opposite in the sky from the Sun

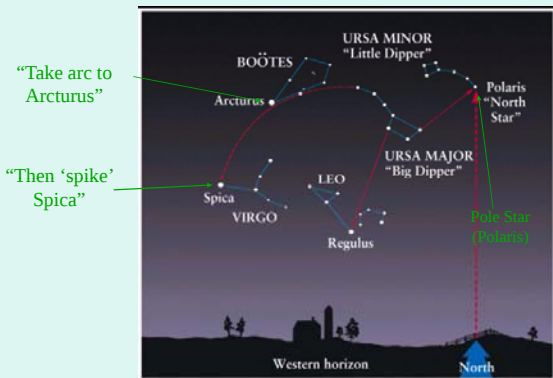


- Mars oppositions happen about every 26 months
- Next opposition is March 2012 (one in Jan 2010)
- Opposition of 2003 was closest in 60,000 years

Constellations: patterns of stars in the night sky



Finding stars Polaris, Arcturus, Spica using Big Dipper



The Evening Sky (Aug/Sept 2010)

Planets in the West (setting):

Venus: low in the west-southwest during twilight. It sets by dark.

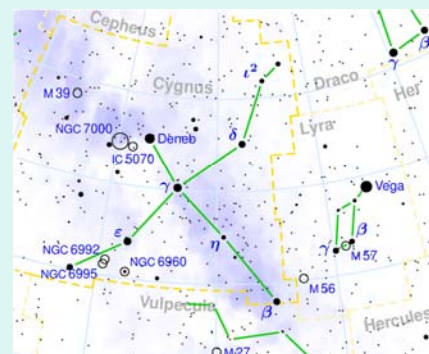
Mars is a little to Venus's upper right.

Saturn has moved far off to Venus's right or lower right.

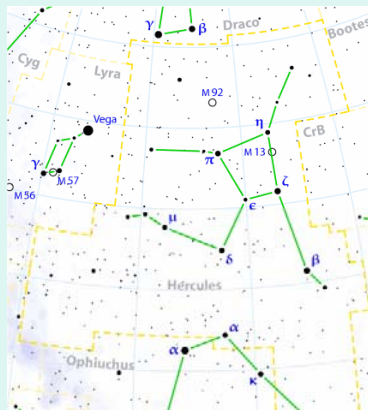
Planets in the East (rising):

Jupiter rises in late twilight and is well up in the east-southeast before midnight. The brightest star like point in the morning sky.

Cygnus



Hercules



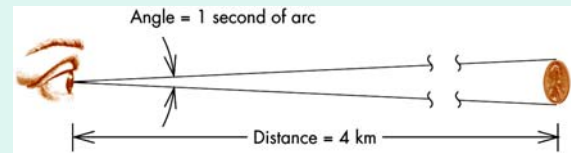
Angular sizes

Because distances are so great in astronomy, we measure apparent sizes in fractions of a degree

1 degree = 60 arcminutes = 60'

1 arcminute = 60 arcseconds = 60''

1 degree = 3600''



Delphinus

A detailed star chart of the constellation Delphinus. The chart shows the constellation's boundaries in a dashed yellow line. Major stars are labeled with Greek letters: α (Deneb Delphi), β (Sualfa), γ (Sualfa), δ (Sualfa), ϵ (Sualfa). Deep sky objects are labeled: NGC 7006, NGC 6891, NGC 6934. Neighboring constellations are labeled: Vulpecula, Sagitta, Aquila, Equ, and Atair.

The moon subtends an angle of $\frac{1}{2}$ degree or the moon has an angular size of $\frac{1}{2}$ degree

A diagram illustrating the angular size of the Moon. It shows the Moon in the sky, with a vertical line and a horizontal line indicating the angle subtended. The angle is labeled as $\frac{1}{2}$ degree. A complete circle is labeled as 'Complete circle = 360°'. The diagram is labeled 'a'.

A photograph of the night sky showing the constellations Sagittarius and Scorpius. The Milky Way is visible in the background. The constellations are outlined in yellow. The labels 'Sagittarius' and 'Scorpius' are written in yellow.

A diagram illustrating the angular size of a star cluster. It shows a person looking at a star cluster in the sky. The angle subtended by the cluster is labeled as 6°. The diagram is labeled 'c'.

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Night sky Rule of Thumb:

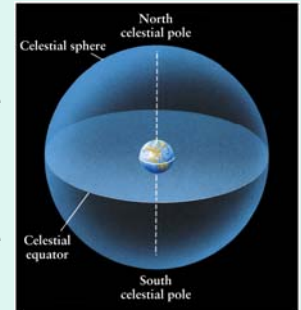
one finger width = 2 deg.
one hand width = 10 deg.



Celestial Sphere: Extension of the Earth's Coordinates

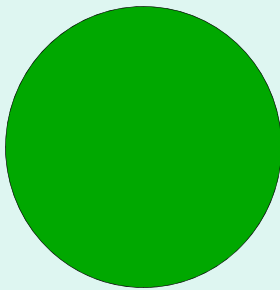
• FIXED positions:

1. North celestial pole (known as "Polaris" right now – start that is close; "pole star")
2. South celestial pole
3. Celestial equator



Try this: What is the angular size of this sphere in degrees as you see it?

(What does the angular size depend on??)



Coordinates in the sky: Horizon System

Zenith: point directly overhead at any time

Horizon: the lowest point you can see (the ground)

