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Next Docent Meeting
December 19

The next docent meeting will be held on Monday, December 19. The meeting will convene at 6:00 in the main conference room and will feature dinner and a speaker. Docents should visit the docent forum calendar to schedule their hours for January. Docents who do not have web access may contact Nick Petrosino See the URL for the docent calendar at lower left.

Kitt Peak Docent Program

950 N Cherry Ave
Tucson, AZ 85719

Docent Forum: http://groups.yahoo.com/group/docentforum/
Docent Calendar: http://groups.yahoo.com/group/docentforum/
Volunteering at Kitt Peak:http://www.noao.edu/outreach/kpoutreach.html

www.noao.edu

KITT PEAK DOCENT

«First Name» «Last Name»
«Mailing Address»
«City» «State» «Zip Code»

Kitt Peak Docent Program

DOCENT NEWS

Number 98
December 2005

KITT PEAK DOCENT

Points of Interest:

- The docent meeting is scheduled for Monday, December 19, featuring dinner and a speaker.
- December 6: Asteroid 1994 XL1 near-Earth flyby at 0.037 AU
- December 7: Gerard Kuiper's 100th birthday
- December 11: 1st "Mars" anniversary of Mars Rover Opportunity landing
- December 12: Moon occults Mars
- December 12: Mercury greatest western elongation of 21°
- December 13: Geminids meteor shower peak
- December 21: Winter Solstice, 18:35 UT
- December 22: Ursids meteor shower peak.

For additional information about these points of interest, visit http://www2.jpl.nasa.gov/calendar/.

Public Outreach wishes all the docents a very Merry Christmas and a happy holiday season.

INTREPID SOLAR SPACECRAFT CELEBRATES 10TH ANNIVERSARY

The Solar and Heliospheric Observatory (SOHO) spacecraft celebrates its 10th anniversary Dec. 2. The SOHO mission, a collaboration between NASA and the European Space Agency (ESA), has allowed scientists to make significant advances in understanding the closest star, our sun. This includes understanding the violent solar activity that causes stormy space weather, which can disrupt satellites, radio communication and power systems on Earth.

"It's impossible to overstate the importance of SOHO to the worldwide solar science community," said Dr. Joe Gurman, U.S. project scientist for SOHO at NASA's Goddard Space Flight Center, Greenbelt, Md. "In the last ten years, SOHO has revolutionized our ideas about the solar interior and atmosphere and the acceleration of the solar wind."

Some of SOHO's major scientific accomplishments include:

- Allowing space weather forecasters to play a lead role in the early warning system for space weather and give up to three days notice of Earth-directed disturbances.
- Supplying the most detailed and precise measurements beneath the surface of the sun.
- Providing the first images of a star's turbulent outer shell (the convection zone) and of the structure of sunspots beneath the solar surface.
- Making the sun transparent by creating images of the sun's far side, including stormy regions there that will turn with the sun and threaten the Earth.
- Discovering a mechanism that releases more than enough energy to heat the sun's atmosphere (corona) to 100 times its surface temperature.
- Discovering that a series of eruptions of ionized gas (coronal mass ejections) from the sun blasts a "highway" through space where solar energetic particles flow. These particles disrupt satellites and are hazardous to astronauts outside the protection of Earth's magnetic field.
- Monitoring the sun's energy output (the "total solar irradiance" or "solar constant") as well as variations in the sun's extreme ultraviolet radiation, both of which are important to understand the impact of solar variability on Earth's climate.
- Identifying the source regions and acceleration mechanisms of the solar wind, a thin stream of ionized gas that constantly flows from the sun and buffets Earth's magnetosphere.

SOHO data are freely available over the Internet, and people all over the world have used images from the observatory to discover more than 1,000 comets.

"I tip my hat to SOHO's engineering and operations teams, whose skills and dedication have overcome multiple technical challenges over the last decade, such as the loss of control of the spacecraft in 1998, the loss of the gyros when we recovered the spacecraft a few months later, and a sticky high gain antenna in 2003," said Dr. Bernhard Fleck, ESA Project Scientist for SOHO.

The observatory was originally designed for a two-year mission, but its scientific insights have proven so valuable that NASA has consistently granted it extensions, the latest of which allows the spacecraft to cover a complete 11-year solar cycle.

For more information about SOHO on the Web, visit: http://www.nasa.gov/vision/universe/solarsystem/soho2005.html

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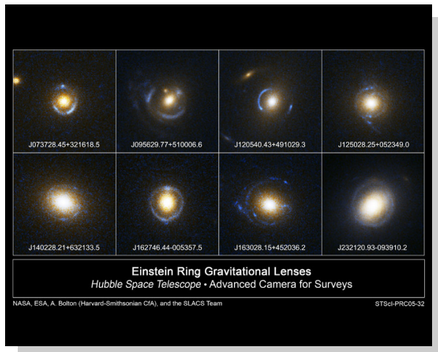
EINSTEIN'S RINGS IN SPACE

A ring often serves as the visible symbol of the unseen - be it mystical, Lord of the Rings-style power or the devotion between two people. In space, a ring of light is more than a symbol. It is a guidepost to unseen matter and a beacon from galaxies in the distant universe.

Albert Einstein predicted that such rings would be found nearly 70 years ago. In a 1936 paper, he described how the gravitational field from a massive object can warp space and thereby deflect light. In special cases, the light from a distant object can be so distorted that it creates a complete ring known as an "Einstein ring." The distortion maps the distribution of matter creating the warp and brightens the light source to make otherwise too-faint galaxies visible.

"An Einstein ring is one of the most dramatic demonstrations of the general theory of relativity in the cosmos," said Adam Bolton of the Harvard-Smithsonian Center for Astrophysics (CfA). "It provides an unique opportunity to study the most massive galaxies in the universe."



The optical illusion created by warped space is called gravitational lensing. It is nature's equivalent of having a giant magnifying lens in space that bends and amplifies the light of more distant objects. In gravitational lensing, light from a distant galaxy can be deflected by an intervening galaxy to create an arc or multiple separate images. When both galaxies are exactly lined up, the light forms a bull's-eye pattern, called an Einstein ring, around the foreground galaxy.

Astronomers now have combined two powerful astronomical assets, the Sloan Digital Sky Survey (SDSS) and NASA's Hubble Space Telescope, to identify 19 new gravitational lens galaxies, adding significantly to the approximately 100 gravitational lenses previously known. By studying the arcs and rings produced by these lens candidates, the astronomers can precisely measure the mass of the foreground galaxies. Among these 19, they also have found eight new Einstein rings. Only three such rings had previously been seen in visible light.

These newly discovered lenses come from an ongoing project called the Sloan Lens ACS Survey (SLACS). A team of astronomers, led by Adam Bolton of CfA and Leon Koopmans of the Kapteyn Astronomical Institute in the Netherlands, selected its candidate lenses from among several hundred thousand optical spectra of elliptical galaxies in the Sloan Digital Sky Survey. They then used the sharp eyes of Hubble's Advanced Camera for Surveys (ACS) to make the confirmation.

"The massive scale of the SDSS, together with the imaging quality of HST, has opened up this unprecedented opportunity for the discovery of new gravitational lenses," Bolton explained. "We've succeeded in identifying the one out of every 1,000 galaxies that show these signs of gravitational lensing of another galaxy."

Besides producing odd shapes, gravitational lensing gives astronomers the most direct probe of the distribution of dark matter in elliptical galaxies.

Dark matter is an invisible and exotic form of matter that has not yet been directly observed. Astronomers infer its existence by measuring its gravitational influence. Dark matter is pervasive within galaxies and makes up most of the total mass of the universe. By studying the dark matter in galaxies, astronomers hope to gain insight into galaxy formation, which must have started around lumpy concentrations of dark matter in the early universe.

"Being able to study these and other gravitational lenses as far back in time as several billions years allows us to directly see whether the distribution of dark and visible mass changes with cosmic time," said Koopmans. "With this information, we can test the commonly held idea that galaxies form from collision and mergers of smaller galaxies,"

The SLACS Survey that Bolton began at the Massachusetts Institute of Technology (MIT) is continuing, and so far the team has used Hubble to study almost 50 of their candidate lens galaxies. The eventual total is expected to be over 100, with many more new lenses among them. The initial findings of the survey will appear in the February 2006 issue of The Astrophysical Journal and in two other papers that have been submitted to that journal.

Further information can be found at the SLACS website: http://www.slacs.org

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December 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 Jerry, Bill	2 Ken, Jim S.	3 Jerry, Jim O.
4 Anna, Larry L.	5 Eugene, Jim M.	6 Bill, Barbara	7 Sheila, Punch Empire HS 16	8 Jerry, Joyce	9 Bill, Don Redeemer-Lutheran 24	10 Ken, Jim O.
11 Jerry, Larry L.	12 Jim M., Barbara	13 Bill, Larry E.	14 Sheila, Punch	15 Jerry, Richard G.	16 Eugene, Don, Doug	17 Jerry, Jim O.
18 Anna, Ken	19 Bill, Jim M. Docent Meeting	20 Joyce	21 Sheila, Punch	22 Jerry	23 Don, Doug	24 Need Docent
25 Christmas Day	26 Anna	27 Bill, Joyce	28 Sheila, Punch	29 Eugene, Richard G.	30 Don, Doug	31 Need Docent

NEW SCHEDULE FOR DOCENT TRAINING

In previous years the docent training classes occurred in June and October. This year a conflict arose when the department tried to book conference rooms for the training and discovered that TAC had scheduled most of them at the same time that the training was scheduled to begin.

Pushing back the training into late October to avoid the conference-room conflict meant that the classes would have to be scheduled around the holidays and that meant the likelihood of trainees or staff missing the classes and the entire session running longer than necessary.

The solution was to push training into January. The new schedule also means that there will be a larger gap between training sessions, allowing winter and summer classes. In 2006 the winter session begins on January 23 and concludes on March 15. The summer session will begin on June 26 and conclude on August 16, just about the time that school goes back into session. This gap of three and a half months allows more time for recruiting and planning than did the previous schedule of June and October classes. It also means that seasonal docents may find it easier to attend the classes. Ads announcing the upcoming training will be running

As with the last class, the mentor program will be in effect again and a bit more formalized now that the initial attempt has been made. Documents for the mentors and trainees will be available in a folder titled Mentor Program on the file page of the docent forum and information outlining the program will be added to the training manual. Anyone interested in participating in this program should contact the program coordinator.