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Kitt Peak Docent Program

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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



Next Docent Meeting May 16

The next docent meeting will be held on Monday, May 16. 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 June prior to the May meeting. See the URL for the docent calendar at lower left.

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

Kitt Peak Docent Program

DOCENT NEWS

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COELOSTAT COMPUTER WORKING AGAIN

The keyboard and mouse on the coelostat computer ceased to function for a while, which prevented docents from using the docent database and the coelostat control program. A simple restart got both peripherals working again.

Docents may now sign in and enter their tour totals on that computer. The “star” icon on the desktop opens the database. The tour total button does not become active until the docent has signed in. All docents on duty must sign in. Once all docents have signed in, tour totals may be entered by clicking the “Add Tour Totals” button.

To avoid duplicate entries, docents must communicate. The numbers in the database are reported to the NSF and must be accurate, so the docents on duty can decide which of them will make the entry.

It is easiest, once the database is open, to just minimize it rather than close it after entries have been made. That way one click puts it back on the screen. The button for the

program will be at the bottom of the screen where the Start menu is located.

When docents are finished entering tours, they can take a peek at the Sun on the web cam. The quick capture window is always open to display the Sun’s image. By using the jog buttons on the control software, docents can reposition the image occasionally to keep it centered on the screen.

The window for the control software, called WinScope, is next to the quick capture window. The WinScope window is shrunken and should remain so because everything needed to position the Sun’s image is accessible without enlarging the window.

If docents have any doubts about how to position the Sun, they should ask for help from the staff, especially NOP staff. The coelostat may also be controlled from the gift shop and from downtown. But docents should not hesitate to help keep the Sun on the screen when staff are busy behind the counter or otherwise unavailable.

THE SOLAR ARRAY MAKING PROGRESS

Coronado Instruments is ready to begin installing the mount and two of the telescopes in the Razdow dome. Installation begins the weekend of April 30 and May 1.

The array, ultimately featuring three Coronado telescopes in an automated dome, comes to Kitt Peak courtesy of Coronado Instruments and Meade Instruments Corporation. The first of the telescopes will be 60-mm refractors sporting H-alpha and Calcium K filters. The Calcium K telescope will image the Sun and those images will be available on a web site, the URL for which is to be announced later. The other telescope will be dedicated to either imaging or visual

use.

The final array will employ two refractors with H-alpha filters, one for imaging and the other for viewing, and a third refractor to image Calcium K. Coronado plans to upgrade the array to 90-mm telescopes in the future.

Meade is developing the dome automation software. The company has been involved recently in a new-product roll out with their RCX400 line of telescopes, which has delayed the installation of software. By May 1, though, a good portion of the hardware should be in place.

Points of Interest:

- The docent meeting will be held Monday, May 16, featuring dinner and a presentation by Roger Repp
- May 1 to 8: Texas Star Party, near Fort Davis
- May 4 to 8: Desert Sunset Star Party, near Three Points, AZ
- May 5: Space Day
- May 5: Deep Impact trajectory correction maneuver #3
- May 5: Eta Aquarids Meteor Shower peak
- May 14: Griffith Observatory’s 70th birthday
- May 19: Moon occults Jupiter
- May 22: Asteroid 2005 ED318 near-Earth flyby at 0.016 AU
- May 31: Moon occults Mars

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

SDSS USES 200,000 QUASARS TO CONFIRM EINSTEIN'S PREDICTION OF COSMIC MAGNIFICATION

Applying cutting edge computer science to a wealth of new astronomical data, researchers from the Sloan Digital Sky Survey (SDSS) reported today the first robust detection of cosmic magnification on large scales, a prediction of Einstein's General Theory of Relativity applied to the distribution of galaxies, dark matter, and distant quasars.

These findings, accepted for publication in The Astrophysical Journal, detail the subtle distortions that light undergoes as it travels from distant quasars through the web of dark matter and galaxies before reaching observers here on Earth.

The SDSS discovery ends a two decade-old disagreement between earlier magnification measurements and other cosmological tests of the relationship between galaxies, dark matter and the overall geometry of the universe.

"The distortion of the shapes of background galaxies due to gravitational lensing was first observed over a decade ago, but no one had been able to reliably detect the magnification part of the lensing signal", explained lead researcher Ryan Scranton of the University of Pittsburgh.

As light makes its 10 billion year journey from a distant quasar, it is deflected and focused by the gravitational pull of dark matter and galaxies, an effect known as gravitational lensing. The SDSS researchers definitively measured the slight brightening, or "magnification" of quasars and connect the effect to the density of galaxies and dark matter along the path of the quasar light. The SDSS team has detected this magnification in the brightness of 200,000 quasars.

While gravitational lensing is a fundamental prediction of Einstein's General Relativity, the SDSS collaboration's discovery adds a new dimension.

"Observing the magnification effect is an important confirmation of a basic prediction of Einstein's theory," explained SDSS collaborator Bob Nichol at the University of Portsmouth (UK). "It also gives us a crucial consistency check on the standard model developed to explain the interplay of galaxies, galaxy clusters and dark matter."

Astronomers have been trying to measure this aspect of gravitational lensing for two decades. However, the magnification signal is a very small effect -- as small as a few percent increases in the light coming from each quasar. Detecting such a small change required a very large sample of quasars with precise measurements of their brightness.

"While many groups have reported detections of cosmic magnification in the past, their data sets were not large enough or precise enough to allow a definitive measurement, and the results were difficult to reconcile with standard cosmology," added Brice Menard, a researcher at the Institute for Advanced Study in Princeton, NJ.

The breakthrough came earlier this year using a precisely calibrated sample of 13 million galaxies and 200,000 quasars from the SDSS catalog. The fully digital data available from the SDSS solved many of the technical problems that plagued

earlier attempts to measure the magnification. However, the key to the new measurement was the development of a new way to find quasars in the SDSS data.

"We took cutting edge ideas from the world of computer science and statistics and applied them to our data," explained Gordon Richards of Princeton University.

Richards explained that by using new statistical techniques, SDSS scientists were able to extract a sample of quasars 10 times larger than conventional methods, allowing for the extraordinary precision required to find the magnification signal. "Our clear detection of the lensing signal couldn't have been done without these techniques," Richards concluded.

Recent observations of the large-scale distribution of galaxies, the Cosmic Microwave Background and distant supernovae have led astronomers to develop a 'standard model' of cosmology. In this model, visible galaxies represent only a small fraction of all the mass of the universe, the remainder being made of dark matter.

But to reconcile previous measurements of the cosmic magnification signal with this model required making implausible assumptions about how galaxies are distributed relative to the dominant dark matter. This led some to conclude that the basic cosmological picture was incorrect or at least inconsistent. However, the more precise SDSS results indicate that previous data sets were likely not up to the challenge of the measurement.

"With the quality data from the SDSS and our much better method of selecting quasars, we have put this problem to rest," Scranton said. "Our measurement is in agreement with the rest of what the universe is telling us and the nagging disagreement is resolved."

"Now that we've demonstrated that we can make a reliable measurement of cosmic magnification, the next step will be to use it as a tool to study the interaction between galaxies, dark matter, and light in much greater detail," said Andrew Connolly of the University of Pittsburgh.

ABOUT THE SLOAN DIGITAL SKY SURVEY (www.sdss.org)

The Astrophysical Research Consortium (ARC) operates Apache Point Observatory, site of the SDSS telescopes.

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 <i>Anna</i>	2 <i>Jim M.</i>	3 <i>Richard D.</i>	4 <i>Barbara, Gene, Bob Sch. Grp. 75</i>	5 <i>Joyce</i>	6 <i>Doug ALFAES Sch. 45-50 Mexican</i>	7 <i>Jim O.</i>
8 <i>Ken, Mark</i>	9 <i>Jim M.</i>	10 <i>Larry, Lee</i>	11 <i>Sheila</i>	12 <i>Joyce, Barbara, Gene Sch. Grp. 60</i>	13 <i>Doug, Pat</i>	14 <i>Ken, Jim O.</i>
15 <i>Eugene</i>	16 <i>Jessica, Lee, Laura Tour group-28</i>	17 <i>Richard D., Joyce</i>	18 <i>Sheila</i>	19 <i>Barbara, Gene</i>	20 <i>Doug, Pat</i>	21 <i>Jim O.</i>
22 <i>Mark, Anna</i>	23 <i>Ken</i>	24 <i>Larry, Lee</i>	25 <i>Sheila, Punch</i>	26 <i>Bob</i>	27 <i>Doug</i>	28 <i>Jim O., Eugene</i>
29 <i>John</i>	30 <i>Jessica, Jim M.</i>	31 <i>Larry</i>				

DOCENT STAR PARTY

The last newsletter contained an article about a docent star party in May. Two dates were given as possible for the event: May 14 and May 28. May 14 is no longer an option because of other staff commitments. That leaves the 28th if anyone is interested.

The response so far has not been promising. Only one docent expressed interest. The purpose of the star party was simply to offer docents a chance to gather on Kitt Peak and do a little astronomy of their own along with a bit of socializing. Participants need not have a telescope to attend. Those who have them are more than willing to share.

By moving the star party to the picnic area, docents also have the option of bringing food. The picnic area, just past mile post ten, has a covered ramada and plenty of tables. Docents and their families or friends could choose to bring indi-

vidual meals or to arrange a potluck.

The original plan was to host two star parties a year - one in the spring and one in the fall. Previous attempts have fallen short of expectations because of wind. It was hoped that by moving the event to the picnic area this year that problem could be solved, at least partially. But if the docents are not interested in the star parties, though, there is little point in planning any more of them. The docents may choose and either choice is acceptable to the department.

The matter may be discussed at the next docent meeting on May 16. Those who have already decided either way are welcome to contact the program coordinator by email, phone, or in person to express their views.