

Contact List

Kitt Peak Visitor Center—318-8726
Nick Petrosino, Supervisor
npetrosino@noao.edu
318-8732

NOAO Public Outreach
Rich Fedele, Manager
rfedele@noao.edu
318-8163
Robert Wilson,
Program Coordinator
rwilson@noao.edu
318-8440

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



Next Docent Meeting Monday, December 17

The next docent meeting will be held on Monday, December 17. 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. Docents who do not have web access may contact Nick Petrosino. See the URL for the docent calendar at lower left.

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

DOCENT NEWS



DOCENT HELP REQUESTED FOR SCHOOL PROGRAM

Connie Walker of Educational Outreach needs assistance to conduct a multifaceted program at Ventana Vista Elementary School located on Kolb Road north of Sunrise Drive. The event is Saturday, December 1st. Set up begins at 4:00 p.m and the event should last until 9:00. Basil's pizza will be ordered for everyone who assists.

The portion of the program conducted by NOAO is called "Science of Light." The activities come from a program called Hands-On Optics, which EO conducts annually at the Southern Arizona Regional Science and Engineering Fair. The activities are simple and designed to demonstrate the properties of light by using lasers and mirrors.

For example kids try to align mirrors to reflect a laser beam onto a target. But the mirrors have to be aligned before the laser is turned on. Kids also get to construct simple telescopes as an introduction to optics.

Other activities demonstrate "The Essence

of Luminescence." Simple everyday items are employed to produce some surprising effects. In a darkened room, the crushing of a Life Saver breath mint produces sparks in a reaction called triboluminescence, much to the delight of the students. Demonstrations of fluorescence, phosphorescence, and chemiluminescence are also on the program, using such common substances as laundry detergent and tools such as hand-held UV lights. Basic explanations accompany the demonstrations.

These activities are on the same level as the demonstrations in the visitor center, so they should not pose a problem for any docent. Anyone willing to assist with this program should respond directly to Connie Walker at cwalker@noao.edu or 318-8535. As always the time spent on the program counts toward the eighteen-hour monthly requirement. A flyer for the program is available on the forum files page.

Points of Interest:

- The docent meeting is scheduled for Monday, December 17 and will feature dinner and a presentation.
- December 6: Web seminar—Are We Alone?
- December 7: 35th anniversary (1972) Apollo 17 launch—last manner mission to the Moon
- December 8: Asteroid 2007 VD 184 near-earth flyby at 0.020 AU
- December 13: Geminids Meteor Shower peak
- December 14: Moon occults Neptune
- December 19: Mars closest approach to earth at 0.589 AU
- December 22: Winter Solstice, 06:08 UT
- December 24: Moon occults Mars
- December 24: Mars at opposition

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

DOCENT TRAINING BEGINS NEXT MONTH

Public Outreach is about to run the television commercial for the Kitt Peak Docent Program, which begins on January 23rd. Between the television commercial and the print ads, the department expects to garner numerous applications from well qualified individuals, as has happened in the past.

Docents may feel free to mention the training to visitors who might express an interest and should also be prepared to field questions about the program. The following points, then, may prove helpful to know.

Training begins on Wednesday, January 23rd and will continue every Wednesday for sixteen weeks. The majority of training sessions will occur on Kitt Peak. Transportation is provided, departing from CFO at 8:30 and

returning by about 4:30. Trainees have the option of bringing a lunch or buying lunch in the cafeteria for \$8.00. Information and an application are available on the web site, which has been reworked by Mark Newhouse and looks much better and is easier to navigate than the old web page. The volunteer link is obvious. Internet access is a must for prospective docents.

One change is being implemented for 2008 with respect to trainees: there will be a \$25.00 materials fee payable the first day of class to cover the cost of the docent manual and other supplies. The fee applies, though, only once an applicant is accepted, so do not confuse it with an application fee. Anyone may submit an application free of charge.

MARS EXPRESS: FIRST GLOBAL MAP OF MARTIAN IONOSPHERE

With ESA's Mars Express, scientists continue to gain new insight into the mysterious Martian environment. Some of the most exciting results are being sent back by the MARSIS (Mars Advanced Radar for Subsurface and Ionospheric Sounding) experiment. MARSIS transmits low frequency radio waves towards the planet's surface and records the echoes of the different layers.

Although Mars is sometimes described as the most Earth-like of all the planets, there are many differences between the two worlds which scientists are trying to understand. One of the less familiar aspects of both planets is that they possess an ionosphere - a layer of ionised (electrically charged) particles - in their upper atmospheres.

Earth's ionosphere has been studied intensively and is invaluable as a reflector of radio waves, but, until recently, little was known about the Martian ionosphere.

Previous measurements indicated that Mars' ionosphere generally lies about 110 to 130 km above the planet. In this region, high-energy solar radiation and particles in the solar wind split the atoms and molecules in the upper atmosphere, releasing free electrons. One of the most surprising results from Mars Express has been the discovery of an ionosphere above the planet's hemisphere which is in the dark.

Although the main task of MARSIS is to probe beneath the planet's surface in search of unseen geological materials and structures, the radar is also a valuable tool for learning about the ionosphere. This is because the radio waves from MARSIS are reflected and modified as they pass through the ionised layer.

Now, after some two years of operation, an international team of scientists has been able to analyse more than 750,000 echoes from MARSIS in order to make the first direct measurement of the global distribution of electrons in the Martian ionosphere - or the total electron content (TEC).

The distribution of the TEC has been determined by using a novel 'transmission-mode' technique to sound the ionosphere, instead of the more common 'reflection mode'. In the transmission mode, the radar transmits a pulse that travels through the ionosphere twice, once on the way down to the surface and again on the way back.

The received echoes are weakened, delayed and dispersed, depending on the electron density in the ionosphere directly below the spacecraft. In the process of correcting the radar signal, the team has been able to estimate the TEC and its global distribution with an unprecedented spatial resolution of about 5 km.

"We have been able to analyse the MARSIS data to obtain the first large-scale coverage of the ionosphere above the planet's night side," said Ali Safaenili of NASA's Jet Propulsion Laboratory, lead author on a scientific paper presenting the new results. "The ionosphere on the night side of Mars has never been mapped before."

The mapping of the geographical variations in the night side TEC data reveals an intricate web of regions with high electron density. One of the most interesting discoveries has been the close correlation between the number of electrons in the night-side ionosphere and the direction of the local Martian magnetic field.

"We confirmed that the regions of high electron density are associated with strongly magnetised areas, especially south of the equator, near places where the magnetic field lines are perpendicular to the surface," said Wlodek Kofman of the Laboratoire de Planetologie de Grenoble, CNRS a co-author on the paper. "On Earth, this situation is only found at the two magnetic poles," he added.

The draping of the solar wind around the planet presumably allows the ionosphere to form above the night-side. The interaction with the solar wind energises the atmosphere and produces a population of free electrons.

In the coming years, as the low point of the spacecraft's orbit drifts further into the night side, MARSIS is expected to provide an even more precise map of the ionosphere and the regions where the solar wind connects to the Martian magnetic field.

Mars Express has been orbiting the red planet since December 2003. It carries seven scientific experiments, including MARSIS. The primary purpose of MARSIS is to investigate the subsurface of Mars up to a depth of 5 km in order to detect buried materials, such as water ice or liquid. It is the first instrument ever designed to actually look below the surface of Mars.

MARSIS was developed jointly by the Italian Space Agency and NASA, under the scientific supervision of the University of Rome 'La Sapienza', in partnership with the Jet Propulsion Laboratory and the University of Iowa, USA.

Contacts

Jeffrey Plaut
MARSIS co-Principal Investigator
Jet Propulsion Laboratory, USA
E-mail: Plaut@jpl.nasa.gov

Ali Safaenili
MARSIS Co-Investigator
Jet Propulsion Laboratory, USA
Email: Ali.Safaenili@jpl.nasa.gov

December 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 <i>Jim, Ken</i>
2 <i>Larry L., Jack</i>	3 <i>Everett, Paul</i>	4 <i>Jerry, Joe</i>	5 <i>Sheila, Mike</i>	6 <i>Jerry, John</i>	7 <i>Gerald, Vance (C)</i>	8 <i>Jim, Eugene</i>
9 <i>Jerry, Mike</i>	10 <i>Everett, Paul</i>	11 <i>Joyce, Gerald, Frank (T)</i>	12 <i>Sheila, Paul</i>	13 <i>Jerry, John</i>	14 <i>Gerald, Vance (C), Joe, Apollo Sch 75</i>	15 <i>Jim, Eugene, Mike</i>
16 <i>Jerry, Ken</i>	17 <i>Aubrey</i> <i>Docent Meeting</i>	18 <i>Joyce, Mike</i>	19 <i>Sheila, Paul</i>	20 <i>Jerry, Ken</i>	21 <i>Gerald, Vance (C), Joe</i>	22 <i>Larry L.</i>
23 <i>Gerald, Mike</i>	24 <i>Need Docent</i>	25 <i>Christmas Day</i> <i>Closed</i>	26 <i>Sheila, Paul</i>	27 <i>Joyce, Joe</i>	28 <i>Gerald, Vance (C)</i>	29 <i>Jerry</i>
30 <i>Jerry, Gerald</i>	31 <i>Paul</i>					

MID DECEMBER IS THE TIME FOR PROGRAMS

Much is happening this month and it is all happening on the second and third weeks. A look at the programs page of the web site would allow docents to keep visitors informed about events upcoming on Kitt Peak.

The Geminids Meteor Shower is the subject of Midnight Meteor Madness on Friday, December 14th. The program begins at 10:00 p.m., a pleasant change from the usual midnight start time, and concludes at 1:00 a.m. Complimentary hot refreshments and snacks will be served. Guests will park in the picnic area.

Junior Astronomers is scheduled next on the afternoon of the Saturday the 15th. This program has been reduced in price with the hope of attracting more participants. Kids are now \$8.00, members are \$5.00, and adults are free. The event lasts from 3:30 to 5:30 p.m.

Later that same night, beginning at 10:00, is Magnificent

Mars, which will make its closest approach to Earth four days later on the 19th. Like all the planet programs, Mars will feature a presentation by a planetary scientist prior to the observing. Here too complimentary refreshments will be served.

Two days after Mars's closest approach is the members program on Friday the 21st. The 2.1-meter NOP is much anticipated by members and staff alike. The program begins at 9:00 and lasts until midnight. Parking is in the picnic area. Feel free to hand visitors a membership brochure or direct them to the web site. Remind them that the department hosts special members-only events each quarter. Previous events have included sunset at the McMath-Pierce and a tour of WIYN.

Persons interested in any of these programs may call the visitor center to make reservation. Some of the programs have attendance limits, so the sooner guests call the better their chances of enjoying a special night on Kitt Peak.