

Celestial Observer

Amateur Observers' Society of NY, Inc
A 501(c)3 organization



MAY 2012



270 Concord Avenue
West Hempstead, NY 11552-1202
www.aosny.org (F) 360-248-3129

Next Club Meeting May 6, 1:15pm
Hofstra University Berliner Hall, rm 117

Long Island Marathon Day see details at <http://www.run-li.com/2011/index.php?id=110>

Meeting Location- now relocated to Hofstra University thanks to the efforts of MAUS director, **Dr Don Lubowich** and the Physics/Astronomy Dept. Bldg 61, Berliner Hall (Chemistry/Physics) rm 117. 79-91 California Ave, Hempstead, NY 11550 Parking areas on California Ave or Huntington Place, both across the street.
www.hofstra.edu/pdf/Printable_campus_map.pdf

Awards Given in March and April-Photos by Doug Klemm and Rich Huber



1st Photo-Mike Kozma, Sue & Gary Citro, Mike McCormick, Mike Barnett, Barry Gloger, Nick Carrai, Elliot Goldsmith, Dennis Wilde and Doug Klemm 2nd-Bill Bogardus congratulates Rich Tyson for his Astronomical League Binocular Double Star Award 3rd-Rich congratulates Mike Barnett and Bob Masterson. **Below-**Linda Prince explains the Venus Transit. Bill Congratulates Pat Longergan, Joe Simon and Murray Cohen.

President's Report – Bill Bogardus

At our last two meetings we held nominations for officers for the coming year. Elections will be held at the May meeting and I hope that you will be there to vote. (If you cannot attend but would like to vote, there are absentee ballot instructions for mail, e-mail or phone on page 8) One thing that is inevitable is that changes will happen eventually and that applies to me as well. Three years ago, I agreed to take over as president because I felt that the "heart and soul" of our club, Sue, needed a break. At the time, I told her that I was just filling in for a while, which is how I felt about it. While traveling up and down the island to be at club events and meetings has been a joy and pleasure, it has taken its toll in "wear and tear" so to speak. It is time. PS don't worry, I'm not going away.

There are many people to thank for all that has happened in those three years, and I honestly feel that we are a successful, strong organization because of the dedication of the many hands that make light work. When it's time to show up for events, there are dozens of members whom I had come to expect to see there consistently. Likewise, when it's time to meet to arrange and plan for those events there is a core of board members and chairpersons who give so much of their time and attention. At every level, there is someone who gives of themselves in whatever way or amount that they feel they can. All have given some; some have given it their all. If I would start to name names, there would be no end because at every threshold, there is someone just after that.

So to all of you, thank you for a great three years.

Now, to look forward to the future, there are all of those events that I've been talking to you about. I hope that at least some of you will plan to travel to the Cherry Springs Star Party with me. The weather is often "iffy" but the spring and early summer time is great for "galaxy alley" and the state park there is a dedicated dark sky location and is a great place to look for "dim fuzzies". Registration is open.

Do you know where you'll be for the Venus transit? It's your last chance to see one.

Did you check out ALCON 2012 in Chicago? Two of our members have won telescopes there.

Have you found the application for StarFest? Come have a good time.

Are you coming to the Summer Picnic to be held at Custer?

Whatever you do, get out there and behold the beauty of the skies.

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Nominations completed by **Gordon Schaefering** and **Phil Korpus** Pres: Sue Rose, VP: Rich Huber, Rec Secty: Dave Tang, Bob Demko, Corr-Secty: Bill Bradley, Tres: Harvey Miller, Activ Dir: Linda Prince, Member-at-Large (2 positions): Bill Crispino, Mike Durkin, Dan Higgins, Ed Wernersbach, George Saar, Gene Zagorsky, Dennis Wilde, Elliot Goldsmith. Voting instructions on page 8.

April 1, 2012 Meeting Summary

Rich Huber discussed the upcoming events of Astronomy Day and NEAF and requested volunteers. **Linda Prince** discussed the upcoming events at Syosset HS and Jones Beach Nature Center and requested volunteers. **Bill Bogardus** reminded everyone of the dark skies at the upcoming Cherry Springs Star Party, June 14-16. **Sue Rose** reminded everyone that NYS Parks permits expired April 1 and the new ones are available for \$30. The Treasurer's report shows a net loss of \$1.82 for March. The StarFest Committee discussed the opening of registration for the AOS event in Savoy, MA on July 20-22. Rich gave specifics of the ATREX launch event at Wallops Island, VA after many cancellations and showed photos taken at Custer by him and **John Bliex**. **Willy Yee** observed 50+ objects for a Messier Marathon at a farm in New Paltz, NY. **Bob Benjamin** observed 44 objects accompanied by **Dave Tang**, at the Shrine in Manorville on Mar 17th. Bill and **Tom Pennino** took pictures of Venus, Jupiter and the Moon conjunction for the hotline. **Ed Wernersbach** saw the same as did Sue who also reported on a trip by AOS'ers to Suffolk County Community College to observe their new planetarium and was given an invitation for AOS to come use it. **Dennis Wilde** saw Sirius B through the use of diffraction rings at RMSP. Bill used the diffraction rings of Procyon to collimate his 14" SCT. **Mike McCormick** also saw Sirius A+B but with color filters.



Awards were given to **Joe Simon**, **Murray Cohen**, and **Patrick Lonergan**.

Messier Marathon will be held at

Custer on Apr 14th. Sue reviewed the Globe at Night program to map light pollution April 11-20. Linda gave a very comprehensive presentation on the Transit of Venus coming June 5th at 6:03pm. More info is available at

www.transitofvenus.org/education/video-new-media and www.transitofvenus.nl/history.html.

Linda also stressed the importance of using proper solar filters when viewing this transit and the probable AOS viewing sites for this transit to be at Nature Center at Jones Beach or at Sunken Meadow State Park. (Note: Unfortunately, **Gary Citro** was unable to attend but we hope to see his report on the Oyster Bay new LED street lights at a future meeting. After the elections, **Mike Kozma** will be discussing Radio Astronomy at the Arecibo Radio Telescope and the AOS award. There's more than one way to observe, especially when clouds become an issue.)



May and June AOS Activities – Linda Prince

May 6, 1:15 PM	Club Meeting and elections	Rm. 117, Berliner Hall, Chem/Phys Bldg., California Ave., Hofstra U., Hempstead
May 6, 8-10 PM	Stars on Sunday – <i>volunteers needed</i>	Roof of Berliner Hall, Hofstra U., Hempstead
May 11, 12, 18, 19	Observing	RMSP* field #2
May 12, 8:30 AM	City of Stars Tour – must sign up ahead with Linda Prince	Meet at LIRR rest area Penn Station 8:30 am
June 3, 1:15 PM	Club Meeting	Rm. 117, Berliner Hall, Chem/Phys Bldg., California Ave., Hofstra U., Hempstead
June 5, 5 PM	Observing Transit of Venus – controlled public event Public will attend after 6:30 PM	Theodore Roosevelt Nature Center, Jones Beach (cloud alternate – Sunken Meadow St. Park, East end of Field 1 by the bdwalk)
June 9, 8 AM – 1 PM	East Meadow Pride Day – <i>volunteers needed</i>	Speno Park, East Meadow Avenue, East Meadow
June 8, 9, 15, 16	Observing	RMSP* field #2
June 23, 6 PM	MAUS event - Caribbean Night – <i>volunteers needed</i>	Lakeside Theater, Eisenhower Park, East Meadow
June 28, 7:30 PM	Urban Stargazers – <i>volunteers needed (tentative)</i>	Parking lot, Cradle of Aviation Museum, Garden City

*RMSP=Robert Moses State Park

AOS Outreach-We are being asked more and more to provide special observing programs for different groups. Many of these provide an honorarium which is used to support AOS member activities and the observatory upkeep. If you know of such a group, contact **Linda Prince**. Also contact Linda if you can participate in any of our activities.

North Shore HS on Mar 29-Thanks to **Jerry Allen, Bill Crispino, John Coffey, Dave Denison, Linda Prince** and **Anthony & Gene Zagorsky** and their friend **Tyler Radigan**.

Astronomy Day on April 11-Thanks to **Bill Crispino, Mari Garcia, Elliot Goldsmith, Rich Huber, Doug Klemm, Wendy Lipper, Carol Lotardo, Bill & Billy Meaney, Tom Pennino, Linda Prince, Sue Rose, Gordon Schaefering, Lisa & Dave Tang**. We were only able to do a little solar observing due to clouds, but a few visitors saw prominences through Tom's telescope.



Syosset HS Family Astronomy Night-April 20 Thanks to **Linda Prince, Carol Lotardo** and **Vadim Paley**.

Stony Brook University Astronomy Day-April 21 Thanks to **Linda Prince** and **Carol Lotardo**

MAUS- Events for this year as follows: June 23 Caribbean International Festival at Eisenhower Park, 7:30pm, July 14 - Heckscher State Park - LI Philharmonic, July 24 - Echo Park, West Hempstead - Johnny Cash Tribute, July 28th at Ellsworth W. Allen Town Park, on Motor Avenue in Farmingdale, 7pm, Aug. 24 - Jones Beach Boardwalk, Oct. 26 - Clark Garden, Albertson - Spooky Walk. Contact **Linda Prince** if you would like to participate.

Hofstra Stars on Sunday- Don's program has been growing so we are including this in our Outreach agenda. If you wish to assist, 8-10pm after our meeting, please contact **Sue Rose**. A presentation in rm 117 precedes going up to the roof where scopes are set up. 25 people braved the rain and visited on April 1, no fooling. Thanks to **Rich Huber, Linda Prince** and **Sue Rose** who helped.

Young Astronomers Feedback- Just wanted to send an e-mail thanking the members of the AOS for the great Astronomy program. Linda, Susan and the gentlemen were terrific. My son really enjoyed it. Sincerely, Dan Gasperek



New AOS Banner-Thanks to the efforts of **Carol Lotardo, Rich Huber** and **Sue Rose**, we have a new and colorful vinyl banner. That's **Bill Meaney** and Sue.

Hotline Update - If you're not on the hotline, you're missing all kinds of information. Current and past copies of the newsletter are in the files section as are suggestions for observing projects. Contact **Gary Citro**.

AOS Mentoring Program If you would like to participate as either a mentor, or mentee, please contact **Harvey Miller**.

AOS Picnic- Sat, Aug 11 we start to think about warmer weather and the AOS Summer Picnic comes to mind. Location is Custer Institute. Come and check out your observatory. Please bring a side dish. Contact **Sharon Francomano** for what is needed. Must RSVP by Aug 1.

Sue Rose Observatory (SRO)- **Bill Crispino** You may join the training program to become a "qualified user" and ultimately a master observer (SRO staff member) who can open it on your own and use the facility when you want after 1 year membership. If you're interested in using and operating the SRO, contact Bill. **John Bliex** is the Maintenance Director. He and Rich have done some successful astrophotography using the 14" Celestron so that's another reason to consider learning how to use the facility.

Membership: A Membership list is available in the files section of the AOS yahoo group Hotline Welcome New Members

Thomas Haeberle

Victoria Simao

David Sanchez

Stephanie Dineu

Lima Felipe

Mirza Abdul

Jennifer Higgins, wife of our Secretary

Congratulations to **Lisa C. Beightol** and husband who welcomed son Aiden into the world last Oct and to **Amanda Savitsky** who is graduating from college.

Please keep these members in your thoughts and prayers – **Larry Benjamin, Sharon Francomano, Mary Reed, Marie Tortorici** and **Dennis Wilde** are all fighting difficult illnesses and Sharon is having another surgery in a few days.

Condolences to **Jim D'Agostino, Dan Sanvitale** and **Gary Citro** who all lost their fathers recently.

StarFest- The 2012 StarFest Registration is open! This year, we're moving the location to the Shady Pines Campground in Savoy, MA, July 20-22. The cost of registration for AOS members is \$25 (Non-Members, \$30). This includes a pizza dinner at the campground cafeteria on Saturday night. NOTE: Your camping fees are NOT included in the Registration fee. You must contact Shady Pines Campground (413-743-2694) and make reservations. Camping is \$35 per night for 2 people. Kids are extra. Also, if you decide to cancel, you must notify Shady Pines to cancel your camping reservation in addition to notifying the StarFest Registrar. All questions should be directed to: AOSStarFest@aosny.org **Please register without delay!** Members see the accompanying e-mail registration form. Non-member registration form at www.aosny.org Great t-shirts too. During our June meeting, AOSer **Jeff Norwood** of Camera Concepts will be discussing all kinds of filters and have many available for purchase. If anyone has anything they would like to donate for use as a raffle prize, please contact **Sue Rose**.

Transit of Venus

On June 5, 2012, the planet Venus will pass in from of the Sun, depending upon where you are in the world. If you miss it, the wait is over 100 years till the next one. Where to go? How to see it?

Sources of Filters for Viewing the Sun and Venus Transit- American Paper Optics, 3080 Bartlett Corporate Drive, Bartlett, TN 38133, 800-767-8427 or 901-381-1515. Astro-Physics, Inc., 11250 Forest Hills Rd., Rockford, IL 61115, 815-282-1513. Celestron International, 2835 Columbia Street, Torrance, CA 90503, 310-328-9560. Coronado Technology Group, 1674 S. Research Loop, Suite 436, Tucson, AZ 85710-6739, 520-760-1561 or 866-SUNWATCH. DayStar Filters LLC, 149 Northwest OO Highway, Warrensburg, MO 64093, 660-747-2100. Meade Instruments Corp., 16542 Millikan Ave., Irvine, CA 92606, 714-756-2291. Rainbow Symphony, Inc., 6860 Canby Ave., #120, Reseda, CA 91335, 818-708-8400. Telescope and Binocular Center, P.O. Box 1815, Santa Cruz, CA 95061-1815, 408-763-7030. Thousand Oaks Optical, Box 4813, Thousand Oaks, CA 91359, 805-491-3642. From Rich Huber- Seymour Solar Polymer Filter: I just received (yesterday) my full aperture filter from Seymour Solar, which is available through eBay. It is a heavier polymer filter with some thickness, not the thin material of the Baader Solar material. It is mounted nicely in an aluminum cell that slips over my ETX 125 and it has a set screw. Since I already had some pieces of Velcro material around the corrector cell, it fit nice and snug and with the plastic thumb screw it is held securely on the end of the tube. The views through the filter show sunspot detail and the image is a subdued yellow orange, not very bright. I have not yet been able to use it when the atmosphere was steady so I don't know how good the definition is. But what I saw seems plenty good enough for outreach, and it will show the Venus transit well. That one's available from Seymour Solar at www.seymoursolar.com You can also link to them through eBay. Orion Glass Solar Filter: I also have an Orion full aperture glass solar filter that fits my 10 inch Dobsonian. This is a pretty high quality filter where the glass is mounted in an aluminum cell. When you mount it on the telescope, the Chromium or Nickel coating is on the inside of the cell where you can't reach it to scratch the coating. This one also gives a yellow orange view but it is brighter than the Seymour Solar filter. The definition is pretty good and I have been able to clearly see the Penumbra and Umbra in sunspots with it. You can get that filter from Orion at www.telescope.com Baader Solar material mounted in an aluminum frame: I also have an Astrozap filter which is made of an aluminum cell with Baader filter material mounted in it. That frame let's me slip it over the end of my 8 inch Celestron SCT. The image is a bright blue white color like the old Solar Screens. I must say it has the best definition of all the filters I have tried. The sunspot details are very striking. You can get this filter at www.telescopes.com (not Orion).

During our June meeting, AOSer **Jeff Norwood** of Camera Concepts will be discussing all kinds of filters and have many available for purchase.

AOS Viewing Options We've thought long and hard about this. We want to share this with the public, but we don't want to miss it ourselves. The critical stage for calculating the Earth/Sun distance is at the very beginning. The remaining time is watching the disk slowly make its way across the face of the Sun until sunset, 2 hours later. Therefore, the plan is to hold a private observing session at the Theodore Roosevelt Nature Center at Jones Beach from 6 to 6:30 pm. Any members of the public wishing to see the event will be given reservations at 6:30, 7 or 7:30 pm. In addition, there will be a talk inside and an internet feed showing the progress all over the world. We will have solar projection devices set up outside as well. What happens if it's cloudy? We should be able to determine at a day in advance if we need to move the location to Sunken Meadow Park, east end of field 1 by the boardwalk. You WILL need a StarGazing Permit. If we need to go north, the **Mid-Hudson Astronomical Association**, VP (and AOS member) **Willie Yee**, has invited us to join them and SUNY New Paltz, 5:00 pm - 9:00 pm. <http://midhudsonastro.org/event/2012/transit-of-venus>

Universe in the Classroom Transit of Venus issue-The phrase "once in a lifetime" denotes a rare event. A transit of Venus is actually a "twice-in-your lifetime" event, because they occur twice during an eight-year span, with each pair separated by more than a century. The current transit pair (2004 & 2012) concludes this year. Miss it, and you'll have to wait 105 years to see another. A transit of Venus is historically important as scientists attempted to use them to measure the size of the solar system. Expeditions mounted to observe the passage of Venus across the solar disc, however, were limited by the technology of the day. Modern technology makes a transit of Venus accessible to everyone. In this edition of the Universe in the Classroom, learn about the history of Venus transits, and find out how you can bring this experience into the classroom. <http://m1e.net/c?12616928-q2RQXdqLPdCJ.%406839067-02bArnrSrBsDI> Local Venus Transit times- Scroll down a little and plug in your full address (good for anywhere in the world that gets to see at least part of this transit) at the top of the map, then click on LOCATE <http://transitofvenus.nl/wp/where-when/local-transit-times/>

Observing Reports-Compiled by John Bliex If you have an observation to share, let us know!

****Just a reminder when posting observing reports please include your viewing location and Telescope info***

3/16 B. Bogardus posted several images to the AOS hotline taken while attending the Winter star party in the FI Keys. The images were wide field photos of M24, NGC6603, C-80, M6, 8 & 20, Orion Nebula M42/43, and the Moon and Venus.

3/14 R. Tyson Obs. @ Freeport, NY Using a 10" Newtonian telescope and excellent viewing conditions Rich observed Planet Mars. Visible were the planets N.P. cap and surface features Mare Boreum, Utopia, and Mare Cimmerium. The brightest features were clouds on the proceeding side of Mars. Obs. made @ 254, 348, 503X

3/17 R. Huber posted images of M-13 and M-35 taken with a 80mm lens/ DSLR and also posted an image by J. Bliex of M-97 taken W/ 150mm Newt. all to the AOS hotline

3/17 B. Crispino Obs. @ AOS SRO, Southold, NY. With a good turnout, Bill hosted 125-150 people who this week paid a visit to the club observatory. From 8:00 – 11:30pm. the group viewed planets Venus, Jupiter, Mars and Saturn using the club 14" Sct @ 90X

3/19 C.Lotardo Obs. @ Merrick,NY. Carol had an observation of Planet Saturn and posted the image to the AOS hotline. Photo taken W/ 90mm MakCass afocal projection.

3/19 R.Tyson Obs. @ Freeport, NY. With good seeing conditions. Rich again observed clouds on Mars proceeding side . The clouds were as bright as the planets N.P. cap. Under close examination two clouds were observed located over Olympus Mons. W/ 10" Newtonian

3/20 L.Gerstman held an open sidewalk observing session from a local shopping center in Uniondale, NY. Larry observed Planet Venus, Jupiter, Mars and shared views with shoppers and passersby. Obs. W/ 90mm MakCass @ 72, 125, 167X

3/23 W.Yee Obs. @ Gardiner, NY. Under pt cloudy observing conditions with fair transparency. Willie using a 13" Newtonian telescope @ 55X still logged an impressive total of 43 messier objects during a mini- Messier marathon. The objects observed this night included M - 1, 13, 31, 32, 35, 37, 38, 40, 42, 43, 44, 45, 53, 58, 59, 60, 63, 65, 66, 67, 78, 81, 82, 84, 86, 87, 88, 89, 90, 91, 94, 95, 96, 97, 101, 102, 103, 104, 105, 106, 108, 109, 110. Also logged was the possible observation of the newly reported supernova SN2012 AW located in M-95 Leo.

3/26 There were several club members who filed daylight Venus observing reports, by using the position of the Moon to aid in locating the planet . T.Pennino posted an observation at 3:00pm., G. Zagorsky at 4:00pm., L. Prince at 6:51pm., B.Bogardus also posted a photo of the Moon and venus to the AOS hotline.

3/26 R.Tyson Obs.@ Freeport,NY. Rich had an observation of newly discovered supernova SN2012 AW located in M95 in Leo. Using a 10" Newtonian @ 171 X he also estimated its brightness at a 12.8

3/27 After several postponements, there was a successful launch of the NASA ATREX experiment early on the morning of the 27th. Several AOS members viewed the launches and filed observing reports. T. Pennino who was obs from Commack, NY. Viewed the launches and emission clouds which extended west to east from Libra to Capricornus. A. Lione obs. from Shelton Ct. viewed two trails shortly after 5:00am. L. Gerstman obs. from Long Beach,NY. had a binocular observation of the 2 test rocket and 5 Atrex rocket trails. R. Huber and J. Bliex obs from Custer inst. Southold, NY. viewed the launches and emission test clouds that extended from Corvus to Scorpius.

3/29 R. Huber Obs.@ AOS SRO Southold, NY. Rich hosted a group of local H.S. students who visited and attended a Custer lecture. The group also observed M-41, 42, Venus and the Moon from 6:15- 9:30pm, using the club 14" Sct.

4/2-4 There were many AOS members who filed observing reports of viewing the splendid early evening conjunction of Venus and M-45. Several posted binocular reports and also posted images to the AOS hotline. Those filing reports were W. Lipper, V. Paley, S.Rose, Ed Wernersbach , Liz Smith, L.Prince, G.Citro, R. Tyson, L.Gerstman, R.Lindenfeld, C. Rullmann and R. Huber.

4/3 B.Crispino posted an unaided lunar observation by obs. Mare Crisium, Mare Fecunditatis, Mare Serenitatis, Mare Tranquillitatis, and the Woman and Rabbit on the moon.

4/5 B.Crispino Obs.@ AOS SRO , Southold,NY. Bill had a night of planetary observations. He viewed Planets Mars and Saturn using the club 14" Sct @ 180X and also posted a sketch of Mars to the AOS hotline.

4/8 J.Allen observed the sun and limb prominences in ha

4/13 T.Pennino Obs. @ RMSP, NY. Sky conditions were clear, windy, and fair transparency .Tom was also joined by AOS members D.Wilde, and T.Lynch. who shared views of deep sky objects M-49 ,53,61,64,65,66,95,96,104,105,Ngc 3628.

4/13 J.Arcara Obs.@ Shoreham,NY. With clear and windy observing conditions, Joe observed Planets Venus,Jupiter,Mars and Saturn w/8"Sct @ 81+114X

4/13 J.Bliex Obs@Patchogue,NY. With clear,breezy conditions and average seeing, John viewed M-3,5,13,63,64,92, 94 w/8"Sct @ 74X

4/18 B.Bogardus Obs@ Ft.Davis Texas. Bill filed several obs. reports while attending this year's Texas Star party. Using his 60mm refracting telescope over several nights, he obs. M-4,7,8,22,24,30, Omega Centauri C-80, and Centaurus A C-77. He was also offered views from several of the large yard telescopes of D/S targets Abell 43 and Caldwell 69

Observing Events-Contact Pres Bill Bogardus if you are interested in joining expeditions to NM for the annular eclipse in May, Cherry Springs Star Party or the Transit of Venus in June, or ALCON 2012 in July.

HEAVENLY EVENTS TO WATCH FOR IN MAY, 2012 Prepared by **Robert Chapin**

"Venus has lit her silver lamp
Low in the purple west"
- Ella Higginson

Since late autumn, 2011, VENUS has stood out in the evening west with her strong, steady luminance. As May begins the -4.7 magnitude planet will still be well up in the west at dusk, appearing as a fat crescent in our telescopes, but she'll drop quickly sunward. By month's end Venus will have dropped into the pink glow of the set Sun. She's heading for the morning sky for the rest of the

year - but before that we'll have a brief look (weather permitting) as Venus passes directly in front of the Sun's disk on the late afternoon of June 5. At 6:03 PM the round dark silhouette of Venus begins to nudge its way onto the top edge of the Sun - and at 6:21 the full spot will be seen. Sunset will bring the transit to a close for Long Islanders around 8:24 PM. All are cautioned that we must NEVER LOOK DIRECTLY at the Sun - especially through binoculars or telescopes - without special equipment and viewing techniques! Such equipment and techniques will be used at Robert Moses State Park's Field 2, and other locations. The next transit of Venus after this one will be 105½ years from now. More on this next month.

At month's end Venus will be found with binoculars or telescope minutes after sunset, just above MERCURY. Still in Leo and to the left of the star Regulus, MARS has resumed its long prograde (eastward among the stars) sweep which will keep it aloft in the western sky well past the end of 2012. As May begins Mars is due south about an hour after sunset, and sets around 3:30 AM. JUPITER is in conjunction with the Sun on May 13 and can't be seen anytime this month. Retrograding above Spica in Virgo, 0.4 magnitude SATURN is due south around 11 PM at midmonth and sets not long after daybreak.

- 4 The bright waxing gibbous Moon triangulates with Mars and the star Spica this evening.
- 5 Full Flower Moon tonight is at perigee, just 222 thousand miles away from Earth. Extreme tides may result in the event of stormy weather. Bright moonlight would spoil any display of the Eta Aquarid meteors.
- 15 Around 3:37 AM this morning the 5.2 magnitude star κ (Kappa) Piscium will reappear from behind the dark upper-right limb of the waning crescent Moon.
- 18 Friday evening: The beginning of a weekend under the stars, free of moonlight. The familiar northern and equatorial stars of spring and early summer appear. Look low in the south for some austral wonders for a change. Due south of Spica is ι (Iota) Centauri (with Menkent, θ [Theta] Centauri to its left) around 10:30 PM. Due south of ι Cen, very close to the ocean horizon, are the galaxy Centaurus A and the brightest globular cluster, ω (Omega) Centauri. The stars of Lupus the Wolf are best at 12:30 AM, after midnight; and due south at 1:30, all of the magnificent Scorpius can be explored. At 4 AM Corona Australis, the Southern Crown, is due south beneath the Teapot of Sagittarius. (On the weekend of June 16/17, enjoy them again 2 hours earlier, beginning at nightfall.)
- 20 New Moon. A fairly long annular solar eclipse will follow a path nearly 150 miles wide across southern China, Japan and the north Pacific. The path hits our west coast near Crescent City, CA and continues past Reno and Albuquerque (both expecting 4½ minutes of annularity,) ending at sunset near Lubbock, TX. This is a copy of the eclipse of May 10, 1994 which was seen around Buffalo and Rochester, New York.
- 22 Look for the very thin waxing crescent Moon near Venus, low in the west-northwest after sunset.
- 27 Mercury is in superior conjunction with the Sun.
- 28 Mars is above the First Quarter Moon this evening.
- 29 Around 8:48 PM this evening the 4.8 magnitude star δ 87 Leonis can be seen winking out along the dark lower-left limb of the Moon.

Annular Eclipse May 20 From **Glenn Schneider** Any AOS members headed this way for the Annular eclipse in May to northern Arizona? I know the AOS was discussing other plans as well. We may not "cross paths", but if the weather is "iffy" who knows where we may actually find ourselves. I'll be keeping our logistics plan updated on this page: http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ASE2012_PLANS/ASE2012_PLANS.html

National parks eclipse parties at http://newton.uor.edu/facultyfolder/tyler_nordgren/eclipse/Eclipse.html If you want to volunteer for (and go to) a public star party at the Grand Canyon or Glen Canyon: We can always use bodies for May. Some specifics: All of the GCNP lodges are FULLY BOOKED already for the entire weekend. So, it's a motel in Tusayan, or Mather Campground or Trailer Village. Campsites as well as Trailer Village are available through the Park for Mather or Xanterra for Trailer Village. We have two star parties scheduled, Saturday night with Grand Canyon Association members joining in as guests, and Sunday night after the eclipse. So far I have about 16 astronomers and 20+ telescopes committed to the eclipse. Some H-Alpha, some white light. Also, some great activities going on concurrently at Glen Canyon. I've sent about 6 or 8 astronomers over to Joan Mayer, the Ranger in charge over there. Please ask anyone interested to contact me at gcsp@tucsonastronomy.org. Jim Also, here's an amazing eclipse site! <http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2012May20Agoogle.html>

Elections-Voting will take place at the May 6 meeting. Officers take their positions on July 1, 2012.

Nominees running unopposed

President: Sue Rose

Vice President: Rich Huber

Treasurer: Harvey Miller

Corresponding Secretary: Bill Bradley

Activities Director: Linda Prince

Nominees requiring voting

Recording Secretary: Robert Demko or Dave Tang (vote for 1)

Vote for **2** at-large board positions. Those elected will serve a 2 year term. Names in alphabetical order:

Bill Crispino

Elliot Goldsmith

George Saar

Dennis Wilde

Mike Durkin

Dan Higgins

Ed Wernersbach

Gene Zagorsky

Please note: if Dave Tang is elected to the position of Recording Secretary, the at-large nominee receiving the third most votes will assume Dave's current at-large position for the next year.

Voting will take place during the AOS May monthly meeting. All AOS members are legally entitled to vote.

In the event of a tie -only AOS members in attendance may vote in a tie-breaking election.

Absentee ballots must be received by 10pm on Sat, May 5- **via e-mail** to lordgordons@verizon.net, **by phone** to 914-803-0114 (leave a message with your name and call back number. State clearly the position and the nominee you are voting for. For the at-large positions say: "At-large members: (name1), (name2).") **or by regular mail** to **Gordon Schaefering**, 52 Yonkers Terrace - 4G, Yonkers, NY 10704. Please vote for listed nominees only; write-in names will not be accepted. All absentee ballots will be kept in the strictest confidence. I will submit only absentee vote totals when the votes are tabulated during the May meeting.

Hofstra Events- If you're looking for something to do before or after our meeting, check out www.hofstra.edu/festivals. The 29th annual Dutch Festival is outdoors on the south campus, not far from our meeting, from 11-6, \$6. Bring your wooden shoes.

AOS Member Astrophotos & Drawings-The Astronomical League is looking for member astrophotos to be published in the Reflector. AOSers do some of the best work available. Consider submitting your photo gems to goarfamilly@hotmail.com. Identify yourself as an Amateur Observers' Society, 9308, member.

AOSer Jeff Norwood of Camera Concepts & Telescope Solutions-Our new website has a gallery for customers to post their work. I would invite all of you to feel free to post your images there. We would be proud to display the kind of imaging that can be done here in light polluted Long island! Please send your photos along with pertinent information to our webmaster, Lou Mercado, at planetreef@verizon.net. He will see to it that they are posted properly along with photo credits.



Bill Crispino's drawing of Mars through the C14 at the AOS Observatory in Southold, 4/5/12 at 11pm. 22mm Televue eyepiece at ~180 power. Seeing and transparency 3 of 5. Diameter 12.1 arc

sec, mag -0.6, just past meridian.

The Pleiades and Venus



Carol Lotardo through 10x50 binoculars **Liz Smith** with a Nikon.



Left-M42 and M43 in a wide field shot from the Winter Star Party, FL by **Bill Bogardus**.



Right- M101, taken through the TMB 105 APO Refractor and the Rebel XTi at ISO 800, 2 exposures at 7 mins and 1 at 5 mins. Galaxy Ngc 5474, mag 11.3 at lower right by **John Bliex** from Patchogue.

Canon new digital single lens reflex astrocamera to capture crisp images of planets and stars. EOS 60Da suggested retail \$1,500. It has an 18 megapixel sensor compared to the previous version 8.2.

Year of the Solar System 2011-12 - Planetary exploration is shifting into high gear with an unprecedented tripling of flybys, orbital insertions and launches to destinations around the solar system. To commemorate the increase, NASA has declared the year ahead "The Year of the Solar System." History will remember the period Oct. 2010 through Aug. 2012 as a golden age of planetary exploration. http://science.nasa.gov/science-news/science-at-nasa/2010/07oct_yss/ The Curiosity Rover was launched in Nov for a rendezvous with Mars next August. **AOS** will be participating in activities at the East Meadow Library. The library received a grant to present a traveling exhibit called Discover Earth. We will participate in the astronomy activities, Dec 1-Feb 1.

AOS Awarded its First Grant The Huntington Arts Council has awarded a grant, to teach astronomy through the computer manipulation of astrophotographs, to AOS and the Bowling Green Elementary School in East Meadow. **Rich Huber** and **Sue Rose** will be teaching the classes.



East Meadow Library does it again. They received a grant to be Climate Day Ambassadors. Congratulations!

Visitors to the AOS Observatory-Kevin Manning (far left) brought a group of students from the Bayshore HS to view the Moon, Venus, Orion Nebula and M41 before the clouds moved in. **Rich Huber, Steve Bellevia** and **Dave vanPopering** assisted.

FOR SALE!!! - Members have equipment lying around gathering dust that could use a new home. We will gladly list items for sale in the monthly newsletter. Send any info on items for sale to AOSEditor@aosny.org **Bob Masterson** bmasters44@gmail.com is selling a Sky Shed Pod. It's the basic pod with no "bays".

George Saar- 1990's Vintage - Tasco 17TR (TOWA) 80mm made in Japan, F900 Refractor with finder scope, (with GEM Mount, ep's and .96 x 1.25in diagonal to use standard eyepieces - and 65mm ED APO Burgess Backpacker. Very good shape with focuser and optics excellent condition. Mount can be used as Alt ax or Equatorial position. The Tasco is selling for \$180 for an AOS Club Member and the Burgess 65MM ED for \$150 - just the OTA. They are both still shown on Astromart for a higher price. gjsmason@optonline.net

Gary Woska I became a club member a few years ago after I purchased my first telescope. I live in South Queens not far from JFK Airport. As you might expect light pollution is a major problem. It is a rare night to see more than a few bright stars and nearly impossible to identify a constellation. As much as I enjoy the science of astronomy, stargazing is only possible if I travel away from home. I therefore, would like to sell my telescope and eye piece collection. My telescope is an Orion StarMax 127 Mak-Cass with major upgrades including a custom balance system I designed myself. Most of my eyepieces are TeleVue Radians and Panoptics. All are in pristine condition and still in their original packaging. I'm sure someone would enjoy this very nice telescope and eyepiece collection. I'm hoping that you might be able to help me contact possible buyers perhaps thru AOSNY. Please contact me at Gary Woska 516-931-5322 ext 142 at work, 718-835-9406 at home, 718-551-8895 cell. grwoska@were.com



20" f/5 Tectron dob Alexander Mallon is the original owner. *An amazing scope, excellent optics from Nova Optics -Many members of Rockland Club (NEAF) and AOS club know my scope as a SUPER PERFORMER! ONLY joy found in using this scope!! Red giants in Globes are always easy to see as RED! -- Enckes division in Saturn's rings always easy. * 3.1" EOptics secondary to allow for full illumination. (vs. stock 2.6 secondary) * Brand new coating on primary from Nova. * Tectron clamp blocks, 2 - 1/4" Tectron focuser (very nice, smooth and solid). * Famous and Classic "nesting upper cage in mirror box" design. EXTRAS: Telrad w/dew shield, dew zapper on secondary and dew zapper for finder scope, 80mm finder w/erect image prism, rip-stop Nylon shroud, rear cooling fan, wheels and ramp for use with your van, solid wood shipping box from Nova-recent aluminizing job. I prefer pick-up, but I will be willing to drive/meet within reason. \$3700 firm **Alexander Mallon** 845-688-9751 cell 845-802-6111 astroskywatcher@yahoo.com **Bob Benjamin** says **GREAT DEAL!!** and **GREAT SCOPE!!**

New York State Park StarGazing Permits New Rules- The effective dates are changed. Jan 1-Dec 31, \$30. Purchase permits only from Labor Day till April 30 except this year. Permits are available for sale at EVERY location where Star Gazing is permitted (8-6pm every day), the main office in Belmont Lake State Park (9-4pm weekdays), or by mail at NYS Parks Dept, Attention Permit Office, PO Box 247, Babylon, NY 11702. Send a check for \$30 with a copy of your vehicle registration. Call 516-785-1600 for any questions. If you feel the exp. change with no compensation and selling restrictions are unfair, please write to Mr. George Gorman at address above. For day use only - Golden Park Program – NY citizens 62 and older with proper ID to enter free on non-holiday weekdays.

Moon Watch <http://astro.ukho.gov.uk/moonwatch/index.html>

What we want you to do

- Go out each evening following the day of the new moon.
- Find a westerly facing spot with a clear view of the horizon.
- Wait for the Sun to set, then look for the crescent moon in that part of the sky.
- **Don't** look directly at the Sun, using your naked eye, binoculars or a telescope.
- Can you see the crescent moon? Are you sure? Is it a cloud or a vapor trail?
- Make a note of where you were, the date and time of your observation, the weather conditions and whether you saw the Moon or not.
- Come to this website and [report](#) your observation.
- Try and observe the crescent moon each night until you see it, reporting each observation attempt.

[Sign up](#) for an e-mail reminder of the next new moon and come back next month and try the same thing again.

WEB SITES and News

SunGun <http://www.sunguntelescope.com/MAIN.html> Viewing without a telescope.

Where is Curiosity? http://www.nasa.gov/mission_pages/msl/news/WhereIsCuriosity.html

Cradle of Aviation www.youtube.com/watch?v=sCucMJWZ5aU&feature=youtu_gdata_player

Kepler Mission Gets 4 More Years *through Sept 30, 2016* to find planets encircling other stars like the Sun.

www.skyandtelescope.com/community/skyblog/newsblog/Kepler-Gets-More-Four-More-Years-146276455.html

Christopher Go's shots of Mars from the Philippines with a C14 www.christone.net/astro/mars/index.html

and Saturn Transit of Titan http://www.spaceweather.com/swpod2009/13mar09/go1_strip.gif

Mars Dust Devil www.space.com/15056-mars-dust-devil-twister-3d-video.html

At the End of the Earth, Seeking Clues to the Universe www.nytimes.com/2012/04/08/world/americas/high-in-chilean-desert-a-huge-astronomy-project.html?_r=1&hp

Scale of the Universe <http://htwins.net/scale2/scale2.swf?bordercolor=white>

Earth Timeline http://www.bbc.co.uk/science/earth/earth_timeline

Resident Muted Dazzling Streetlight <http://www.thesun.co.uk/sol/homepage/news/4219859/Residents-muted-dazzling-streetlight-in-Weymouth-Dorset-with-lampshade.html>

CNN on Light Pollution http://lightyears.blogs.cnn.com/2012/04/05/who-turned-off-the-stars-light-pollution/?hpt=hp_t3

Water Ice on Mercury? <http://spaceflightnow.com/news/n1203/25messenger>

Oldest known planets from the early days of the Universe

<http://www.skymania.com/wp/2012/03/oldest-known-planets-in-universe-found.html/5621/>

Printable Sky Maps for NYC area http://www.windows2universe.org/the_universe/ny_map.html

Kahn Academy online astronomy classes <http://www.khanacademy.org/#cosmology-and-astronomy>

Moon Watch <http://astro.ukho.gov.uk/moonwatch/index.html>

Maunder Minimum could be responsible for making superior wood used by Stradivarius <http://web.utk.edu/~grissino/downloads/burckle%20grissino%202003.pdf>

Astronomy Village www.mnn.com/earth-matters/space/stories/astronomy-village-keeps-residents-in-the-dark

Lack of Dark Matter Near Sun <http://www.eso.org/public/news/eso1217/>

The Solar System <http://solarsystem.nasa.gov/index.cfm>

Astro Quiz <http://www.space.com/quizzes/>

Sky and Telescope provides Free astronomy e-mails- a Newsletter, Weekly Bulletin, Astro Alert and notification of special online promotions. www.skyandtelescope.com/s?action=login&f=y

Star Parties, Conventions, Observing Sessions, etc for 2012

May 20 Annular Solar Eclipse <http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2012May20Agoogle.html>
 May 30-June 3 World Science Festival, NYC <http://worldsciencefestival.com/>
 June 5 Venus Transit <http://eclipse.gsfc.nasa.gov/transit/venus0412.html>
 June 14-17 Cherry Springs Star Party, Cherry Springs Park, PA www.astrohbq.org/CSSP/Information.html
 June 20-23 Green Bank Star Quest, WV <http://www.greenbankstarquest.org/>
 June 23 Custer Annual Meeting www.custerobservatory.org
 July 4-7 ALCON, Chicago, IL www.astroleague.org <http://alcon2012.astroleague.org/alcon-2012-2/registration/>
 Jul 18 – 22 Mason Dixon Star Party, Shreveport Airport / Footlight Ranch, York Cnty, PA www.masondixonstarparty.org/
 Jul 20 -21 The Conjunction 2012, Northfield, MA <http://www.philharrington.net/astroconjunction/>
 July 20-22 AOS StarFest, Shady Pines Campground, Savoy, MA www.aosny.org
 Aug 10 – 12 Maine State Star Party Edmunds, ME <http://www.downeastaa.com>
 Aug 10 – 19 Rockland Summer Star Party Savoy, MA <http://www.rocklandastronomy.com/SSP/index.html>
 Aug 16 – 19 Stellafane 2012 Springfield, VT <http://www.stellafane.com>
 Aug 17 – 19 Hidden Hollow 2012 Mansfield, OH <http://www.wro.org/hiddenhollowinfo.html>
 Aug 17 – 21 Almost Heaven Star Party Spruce Knob, WV <http://www.ahsp.org>
 Sep 14 – 16 Black Forest Star Party Cherry Springs State Park, PA <http://www.bfsp.org/starparty/index.cfm>
 Oct 6 AOS Astronomy Day at Cradle of Aviation
 Oct 7 – 14 Peach State Star Gaze Deerlick Astronomy Village, Sharon, GA www.atlantaastronomy.org/PSSG/
 Oct 11 – 14 KAS Astrofest 2012 Vestal, NY <http://www.kopernik.org>
 Oct 12 – 22 Mid Atlantic Star Party Robbins, NC <http://www.masp.us/>
 Oct. 19 -21: Custer's 34th Annual Astronomy Jamboree www.custerobservatory.org
 Nov 12 – 18 Chiefland Fall Star Party Chiefland Astro Village, FL <http://chieflandstarpartygroup.com/fall.html>
 Nov 13 Total Solar Eclipse <http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2012Nov13Tgoogle.html>

Custer Institute and Observatory www.custerobservatory.org SAT EVENING STARGAZING 7pm-12., includes stargazing after. CusterDonna@yahoo.com or call 631-765-2626. Sat, May 5: Moon Appreciation Night, Mon, June 4: Partial lunar eclipse, midnight-dawn, Tues, June 5: Transit of Venus, 6pm. Suggested Donation: \$5 Members; \$10 Non-Members; \$5 Full-time Students. All observing events are weather permitting.
AAA lecture Series May 4: Alex Wolszczan, Penn State, —The Astronomical Future of Man. May 6, David J. Thompson, NASA, “Exploring the Extreme Universe with the Fermi Gamma-ray Space Telescope.” www.aaa.org/lectures1112

Columbia University Friday Nights Free Lectures at a Public Level Followed by Guided Star-Gazing with Telescopes. Pupin Hall on the Columbia University Campus. No Reservations needed, lectures are 30min, Star-Gazing lasts for 2 hrs. Lectures are Wheelchair Accessible; Star-Gazing on the Roof is Not. <http://outreach.astro.columbia.edu/calendar/> May 11 -- 8 pm, Cameron Hummels, The Immortal Quantum: Following Energy throughout the Universe

NYSkies Seminars The 1st and 3rd Fri of each month. 6:30-9PM McBurney Hall, 125 W 14th St, 6/7 Ave, NYC www.nyskies.org/seminar.htm

Larry Gerstman - May 29 -7 PM, East Meadow Library-The Transit of Venus.

<http://sites.google.com/site/larrygerstman/>

Dr. Kevin Manning, retired BNL astrophysicist, astronomy programs www.lookuptothestars.com/upcoming-events.html

Astronomical League Online Astronomy Lecture Series- in collaboration with Keck Observatory Astronomy Lecture Series at Kahilu Theatre - Brian Siana (UC Riverside) How Stars Destroyed Most of the Atoms in the Universe, May 10, 7:00pm (1:00am EDT). It will be available live on the League website and for several days after at www.astroleague.org.

Space Place Newsletter: for Formal and Informal Educators includes many useful and free resources on the Space Place website that can be helpful for kids and grown-ups interested in learning about science, technology and space. Downloaded from <http://spaceplace.nasa.gov/educator-newsletter/en>. We hope you find the newsletter and our website <http://spaceplace.nasa.gov> helpful.
 Laura K. Lincoln and Space Place Team

MESSENGER BRIEFING: ORBITING the METAL-RICH PLANET

By Denton Ebel, Curator (Meteorites) Curator-in-Charge Dept. of Earth and Planetary Sciences, AMNH

"Source: Amateur Astronomer's Association of NY news journal, Eyepiece." Dec 2011

MESSENGER stands for Mercury Surface, Space Environment, Geochemistry, and Ranging. This instrument-rich spacecraft, launched in August 2004, is designed to answer a broad range of science questions. Eyepiece readers may have attended the public lecture given by Principal Investigator Sean Solomon of the Carnegie Institution of Washington in July 2010 at the American Museum of Natural History. After three flybys, a major rocket burn inserted the MESSENGER spacecraft into Mercury orbit six months ago.

What have we learned? Seven papers in *Science* (vol. 333, 30-Sept-2011) reveal Mercury's surface composition, map flood volcanism in the Northern Plains, suggest possible recent volcanic activity, constrain the shape and variability of Mercury's magnetic field, and describe interactions between the magnetosphere and plasma in Mercury's exosphere.

"This is the first major scientific meeting at which MESSENGER orbital observations are being presented to the scientific community," says MESSENGER Principal Investigator Sean Solomon of the Carnegie Institution of Washington. "As the first spacecraft to orbit our solar system's innermost planet, MESSENGER continues to reveal new surprises every week. It is timely to sum up what we've learned so far and to seek feedback from our international colleagues across planetary science on our interpretations to date."

The composition of Mercury is very different from that of the Moon and other terrestrial planets. Its iron core makes up about 65 % of Mercury's total mass. Earth's core, by comparison, is just 32 % of its mass. Understanding how such a planet accumulated from the dust, ice, and gas in the early solar nebula is a key science goal of the MESSENGER mission. To a cosmochemist, the finding of an Earthlike ratio of potassium to thorium, very unlike the low ratio in the K-depleted Moon, signifies lack of substantial fractionation of volatile elements. Mercury's surface also has a high sulfur/silicon ratio, higher than the Earth's. Both of these findings rule out formation hypotheses requiring the boiling off of Mercury's mantle by an early, hot sun, or high-temperature condensation of Mercury from the same kind of material that formed the Earth.

MESSENGER's compositional analysis also raises difficulties for another hypothesis: that a major impact occurred after differentiation of the core, and stripped off much of the planet's original mantle. Reaccreted impact debris should have lost volatile elements to space. Unless almost all of the stripped mantle material failed to re-accrete, Mercury's high volatile content is difficult to explain by the impact hypothesis.

Your author, and Conel Alexander of the Department of Terrestrial Magnetism at the Carnegie Institution of Washington, recently proposed in *Planetary and Space Science* that Mercury's formation zone was enriched in carbon-rich inter-planetary dust that caused sulfur to condense into solid, less volatile minerals at very high temperatures. This hypothesis predicts MESSENGER's findings of high sulfur content, but does not entirely explain the stark condition of Mercury's huge iron core.

New research results are expected to come from recent increases in solar flare activity excited x-ray emission by heavier elements, allowing further confirmation of Mercury's high sulfur/silicon ratio by the MESSENGER x-ray fluorescence spectrometer (XRS), and better constraints on surface concentrations of titanium. Accumulating XRS data begin to suggest compositional differences between various rock units. Spectroscopists are working to tease out the mineralogy of Mercury's surface, but its low iron and titanium contents relative to the Moon or Mars render infrared spectra nearly featureless. Measurements of Mercury's elongate scarps are providing new constraints on how much the planet has shrunk over time. The geophysics group has worked out the parameters that describe Mercury's shape, using gravity data (ranging). These constrain models of Mercury's interior structure, which is sure to be unique given its large core and sulfur-rich composition. With time, the complex exosphere - magnetosphere - solar wind interactions begin to reveal themselves as solar maximum is approached.

MESSENGER has provided the first up-close look at Mercury since the Mariner flybys of the 1970's, and the first sustained investigation from orbit. Humans have been trying to figure out how planets form for hundreds of years, and these new findings bring the last so-called 'terrestrial planet' into the realm where comparative planetology can be applied with strong observational constraints.



NASA Helps Europe Study a Comet—Up Close and Personal

By Dr. Tony Phillips

Europe's Rosetta spacecraft is on its way to intercept comet 67P/Churyumov-Gerasimenko. Comets have been intercepted before, but this mission is different. Rosetta aims to make history by landing a probe on the comet's surface while the mother ship orbits overhead.

"Rosetta is the European equivalent of a NASA flagship mission," explains Claudia Alexander, project scientist for the U.S. Rosetta Project at NASA's Jet Propulsion Laboratory. "It will conduct the most comprehensive study of a comet ever performed."

Rosetta's payload contains 21 instruments (11 on the orbiter, 10 on the lander) designed to study almost every aspect of the comet's chemistry, structure, and dynamics. Three of the sensors were contributed by the U.S.: Alice (an ultraviolet spectrometer), IES (an ion and electron sensor), and MIRO (a microwave sounder).

The main event of the mission will likely be the landing. The 100-kg lander, which looks a bit like a cross between NASA's old Viking Mars landers and a modern microsatellite, will spend two weeks fastened to the comet's icy surface. The European-built probe will collect samples for analysis by onboard microscopes and take stunning panoramic images from ground level.

"First the lander will study the surface from close range to establish a baseline before the comet becomes active," explains Alexander. "Then the orbiter will investigate the flow of gas and dust around the comet's active, venting nucleus."

Rosetta's sensors will perform the experiments that reveal how the chemicals present interact with one another and with the solar wind. Alice and MIRO detect uncharged atoms and molecules, while IES detects the ions and electrons as the solar wind buffets the nucleus.

One problem that often vexes astronomers when they try to study comets is visibility. It's hard to see through the dusty veil of gas billowing away from the heated nucleus. The microwaves MIRO detects can penetrate the dust, so MIRO can see and measure its target molecules even when other instruments can't.

MIRO is one of several experiments focused on the comet's structural properties. It will determine the comet's dielectric constant, emissivity, and thermal conductivity to determine whether it is made of a powdery loose material, has a detectable layer of loose material, or is hard as rock.

"We want to find out whether comets have retained material from when the solar system formed," says Alexander. "If the ancient materials are still there, we can get an idea of what conditions were like at the dawn of the solar system."

Rosetta enters orbit in 2014. Stay tuned for updates!

Check out "Comet Quest," the new, free iPhone/iPad game that has you operating the Rosetta spacecraft yourself. Get the link at spaceplace.nasa.gov/comet-quest.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Rosetta's lander Philae will eject from the spacecraft, touch down on the comet's nucleus, and immediately fire a harpoon into the surface to anchor itself so it won't drift off in the weak gravity.

