

ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 62, No. 8 – September 2014

GENERAL MEETINGS

Randall Museum . 199 Museum Way . San Francisco

7:00 pm Doors Open . 7:30 pm Announcements . 8:00 pm Speaker

SFAA's General Meetings occur on the 3rd Wednesday of each month (except January)

September 17, 2014

ROGER ROMANI

Professor of Physics, Stanford University

BLACK WIDOW PULSARS:

VENGEFUL STAR CORPSES



NASA's Fermi Gamma-ray Space Telescope has revealed a violent high-energy universe full of stellar explosions, black hole jets, and pulsing stars. These cosmic objects are often faint when observed with visible light, but glow bright with gamma rays. Dr. Romani will describe the quest to discover the true nature of the most puzzling of these gamma-ray sources. Several turn out to be a kind of star corpse called a 'black widow' pulsar. When a massive star dies, it leaves a collapsed remnant called a neutron star. When such a star corpse has a companion star, it can be reanimated by material from the companion. Ironically, the revived corpse then begins to vaporize its mate. Dr. Romani will discuss his group's discovery that these black widows may be the heaviest neutron stars known, on the edge of final collapse to black holes.

Roger Romani is professor of physics and member of the Kavli Institute at Stanford University. His research focuses on neutron stars and black holes. He enjoys finding new, strange phenomena in the sky and then building theoretical models to explain them. Past recognition for his work include Sloan Foundation and Cottrell Scholars fellowships and the Rossi Prize of the American Astronomical Society.

President's Message

Hey SFAA!

It's amazing that we're already nearing autumn. The board is hard at work planning events to end the year with some fun. We have a couple public star parties left up on the mountain that should be great. We also have our fall social, and annual StarBQ, scheduled for October 18th. This will be a great time for everyone to come out and enjoy some good food, great company, and an amazing night watching the stars. I am looking forward to being able to talk to everyone there!

With all the fun coming up, I also wanted to mention that we are on the lookout for new board members. We're always trying to plan new fun events, new interesting learning opportunities, and new ways to give back to the public. However, in order to plan and support these great events, we need people who are willing to help schedule and oversee them. There are only a few months left in the year, but there are lots of things that are going on. We are going to lose the auditorium at the Randall early next year for renovations and we need to find a new temporary home. We also would like to support more schools and clubs in the area, but need the extra manpower. If you're have a little extra time and are willing to help out, both the club and the city would greatly appreciate it.

Email me at president@sfaa-astronomy.org if you have any questions or would like to volunteer. Even if you can't join the board, I hope you can make it to our star parties and lectures. You are part of what makes this club amazing. The stars are always watching down on us, but you guys are just as awesome. Make sure you come by and say hi. I love to meet everyone.

Have a great month and keep looking up!

Matt Jones
President
San Francisco Amateur Astronomers
2014

**SAN FRANCISCO
AMATEUR ASTRONOMERS
SFAA UPCOMING EVENTS**

<p>September 17 7:00 pm – 9:00 pm</p>	<p>Astronomy Lecture @ Randall Museum ROGER ROMANI, Professor of Physics, Stanford University BLACK WIDOW PULSARS: VENGEFUL STAR CORPSES</p>
<p>September 20 5:00 pm – 2:00 am</p> <p>Members Only</p>	<p>Mt Tam Members (Only) Night Mt Tam - Rock Springs Parking Lot The SFAA hosts members-only star parties at the Rock Springs parking lot in Mt Tamalpais State Park. The parking lot is above the Pan Toll ranger station, near the Mountain Theater.</p>
<p>September 27 7:00 pm – 11:00 pm</p>	<p>Mt Tam Members Public Star Party Mt Tam - Rock Springs Parking Lot The SFAA joint the Mt Tam Interpretive Society at the annual ‘Summer Astronomy Program’ hosting public viewing events from April through October. SFAA members bring their telescopes, big and small, to Rock Springs parking lot and share viewing with the public after the astronomy lecture has concluded.</p> <p>Members: Please bring your telescope for public outreach and, if possible, a step stool for younger audience members.</p>
<p>October 4 5:30 pm – 10:00 pm</p>	<p>San Francisco City Star Party – Location to be Determined Come join us for our monthly City Star Party. SFAA members provide telescopes for viewing pleasure.</p>
<p>October 18 4:00 pm – 6:30 pm</p> <p>Members Only</p>	<p>Member Social – Star BQ @ Bootjack Parking Lot – Mt Tam Join us for our Fall Social StarBQ up at the Bootjack Campground. This is open to members only and is free of charge. Come talk with your fellow Amateur Astronomers before viewing at the private star party on the mountain.</p>

SAN FRANCISCO AMATEUR ASTRONOMERS

UPCOMING LECTURES

October 15, 2014

KAREL SCHRIJVER, PH.D., Senior Fellow, Lockheed Martin STAR Labs, Palo Alto

STORMS FROM THE SUN



The weather patterns of the Sun are powerful, ever changing, and mesmerizingly beautiful. They drive explosions of literally astronomical proportions that can escape the Sun's gravity to affect all of the planets from nearby Mercury to distant Uranus, including Earth. Space storms involve a force that we generally ignore in our daily lives: magnetism. This force can heat gases to millions of degrees, can speed up atoms to be as dangerous as radioactivity, and can force electromagnetic storms into the the electrical power grid. But although the terminology

may be unfamiliar, space weather follows the laws of physics: storm paths can be forecast and storms lead to predictable consequences around Earth. We are rapidly increasing our understanding of how solar storms become space weather, but the Sun is a big object and the space between it and Earth is vast. We combine the sparse observational coverage of all that space with computer models to help us view the activity of the Sun-Earth system. Thus, we increasingly grasp how three apparently distinct types of space weather originate from explosive lightning storms on the star next door that affect satellites, radio signals, and high-voltage power lines.

Karel Schrijver is a senior fellow at the Lockheed Martin STAR Labs in Palo Alto, California. He received his doctorate in 1986 at the University of Utrecht on the topic of solar and stellar magnetic activity. His current research focuses on the magnetic activity of the Sun, the coupling of the Sun's magnetic field into the heliosphere, the manifestations of magnetic activity of other Sun-like stars, and the impact of solar variability on society.

In addition to scientific research, he is actively involved in developing and operating space instrumentation: he was the science lead and later the Principal Investigator for the Transition Region and Coronal Explorer (TRACE) and for the Atmospheric Imaging Assembly (AIA) of the Solar Dynamics Observatory (SDO), and co-investigator on the Helioseismic and Magnetic Imager (HMI) on SDO and on the Interface Region Imaging Spectrograph (IRIS) Small Explorer project.



FRIENDS OF
MT TAM

2014 ASTRONOMY PROGRAMS
Mt. Tamalpais State Park
Explore the Wonders of the Universe
Free and open to all (no signup).

1.

<p>September 27 7:30 p.m.</p>	<p>Dr. Lynn Cominsky , Sonoma SU universe.sonoma.edu/~lynn "NuSTAR's Sharper View of the Universe" Launched in June 2012, NuSTAR is bringing the high-energy Universe into focus. Exploding stars, hidden black holes and other exotic objects are all being studied in an entirely new light.</p>
<p>October 25 7:00 p.m.</p>	<p>Andrew Fraknoi, Foothill College foothill.edu/ast " The Top Tourist Sights of the Solar System" Where will Bill Gates' Great-Granddaughter go on her honeymoon? Using spectacular space photos we will explore the most intriguing future "tourist destinations" among the planets and moons in our cosmic neighborhood Co-produced with Wonderfest-part of Bay Area Science Festival</p>

September 2014 - THE EVENING SKY

September Sky Map: <http://skymaps.com/skymaps/tesmn1409.pdf>
September Sky Calendar: <http://skymaps.com/articles/n1409.html>

BAY AREA ASTRONOMY EVENTS

Kenneth Lum

<http://tech.groups.yahoo.com/group/bayastro/?v=1&t=directory&ch=web&pub=groups&sec=dir&slk=94>

BAY AREA REGULARLY SCHEDULED EVENTS

<p>EVERY FRIDAY NIGHT 7:00 PM – 10:00 PM excluding major holidays</p> <p>The Telescope Makers' Workshop</p> <p>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</p>	<p>THE TELESCOPE MAKERS' WORKSHOP is held every Friday night from 7pm - 10pm, excluding major holidays (e.g. Christmas Day and New Year's Day) that fall on Fridays. The Workshop is always closed on Memorial Day Weekend. Attendance every Friday night is not mandatory, and members work at their own pace. The Workshop meets at Chabot Space & Science Center, 10000 Skyline Blvd., Oakland.</p> <p>Chabot's TMW is one of only a handful of regularly scheduled telescope making workshops in the U.S., and probably the world; it meets every Friday evening throughout the year, except Memorial Day weekend. It has been in operation since December of 1930, founded by Franklin B. Wright, and is currently run by Eastbay Astronomical Society member Rich Ozer, with help from other EAS members, Dave Barosso, Barry Leska, and others. The price of admission is FREE. All you have to do is show up, buy a mirror blank and a "tool" (typically around \$100 - \$200 depending on the size of the mirror) and start "pushin' glass!" We supply you with instruction, the various grits you'll need to first grind, and then polish and figure your mirror, and all the testing equipment needed. With a small bit of luck, you could wind up with a telescope that costs 1/3 or 1/4 the cost of a store-bought telescope, that is yet optically superior! It does take time - depending on how much time you put in on it, and other factors, it could take a few months or several months. But, it's a fun project, great for kids, and at the end you get a great telescope!</p> <p>For more information call or email Richard Ozer at rozer@pacbell.net or phone (510) 406-1914.</p>
<p>EVERY FRIDAY & SATURDAY EVENING, weather permitting 7:30 PM – 10:30 PM</p> <p>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland CA 94619-2450 (510) 336-7300</p>	<p>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES For more information: http://www.chabot.space.org/</p> <p>Free Telescope Viewing Regular hours are every Friday & Saturday evening, weather permitting: 7:30pm -10:30pm Come for spectacular night sky viewing the best kept secret in the Bay Area and see the magnificence of our telescopes in action!</p> <p>Daytime Telescope Viewing On Saturday and Sunday afternoons come view the sun, moon, or Venus through Chabot's telescopes. Free with General Admission. (weather permitting)</p> <p>12pm - 5pm: Observatories Open</p>

<p>Sunset – 5:11 PM (TWICE MONTHLY)</p> <p>Inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</p> <p>SAN MATEO COUNTY ASTRONOMICAL SOCIETY STAR PARTY</p>	<p>STAR PARTIES AT CRESTVIEW PARK, SAN CARLOS</p> <p>Come out and bring the kids for a mind expanding look at the universe</p> <p>The City of San Carlos Parks and Recreation Department and the San Mateo County Astronomical Society has open Star Parties twice a month. These events are held in Crestview Park, San Carlos California. Note that inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</p> <p>For more information call Bob Black, (650)592-2166, or send an email to SMCAS@live.com or call Ed Pieret at (650)862-9602.</p> <p>Reasons to Attend</p> <p>If you have kids interested in space or planets bring them here for a real life view of planets, nebula, star clusters and galaxies.</p> <p>If you are thinking of buying a telescope or want help using a telescope you own, come here to talk with experienced users. If you think you might have an interest in astronomy come and talk to experienced amateur astronomers.</p> <p>Cautions</p> <p>Dress warmly and wear a hat.</p> <p>Visitors should park on the street and walk into the park so your headlights don't affect the observer's dark adaptation.</p> <p>Only park in the parking lot if you are arriving before dark and plan to stay until the end of the event. You shouldn't need lights but if you feel you do, only bring a small flashlight with the lens covered using red cellophane or red balloon.</p> <p>Please respect the telescopes and ask permission from the owner if you wish to touch.</p> <p>Parents, please watch your children.</p> <p>The park is residential, and adjacent to homes and backyards, please keep noise to a minimum.</p> <p>Schedule Time</p> <p>Astronomers arrive to set up at around sunset. Observing starts at about one hour after sunset and continues for two to three hours.</p>
<p>EVERY CLEAR SATURDAY MORNING OBSERVATORY 10:00 AM – 12:00 PM</p> <p>FOOTHILL COMMUNITY COLLEGE 12345 Moody Road Los Altos Hills</p> <p>Cost: Free</p>	<p>Solar observing with a Hydrogen alpha solar telescope every clear Saturday morning. This allows spectacular views of solar prominences and unusual surface features on the Sun not otherwise visible with regular white light telescopes.</p> <p>Admission is free.</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd. exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$ 3.00.</p>
<p>EVERY CLEAR FRIDAY EVENING 9:00 PM – 11:00 PM</p> <p>FOOTHILL COMMUNITY COLLEGE OBSERVATORY 12345 Moody Road Los Altos Hills</p> <p>Cost: Free</p>	<p>Foothill Observatory is open for public viewing every clear Friday evening from 9:00 p.m. until 11:00 p.m. Visitors can view the wonders of the universe through the observatory's computer-controlled 16-inch Schmidt-Cassegrain telescope. Views of objects in our solar system may include craters and mountains on the moon, the moons and cloud-bands of Jupiter, the rings of Saturn, etc. Deep space objects including star clusters, nebulae, and distant galaxies also provide dramatic demonstrations of the vastness of the cosmos. The choice of targets for Any evening's viewing depends on the season and what objects are currently in the sky.</p> <p>The public viewing programs at Foothill are free of charge and are open to guests of all ages. Please note that the observatory is closed when the weather is cloudy. Also note that visitor parking permits are available from the machines in the parking lots for \$3.00.</p> <p>Come to Foothill Observatory and join us in the exploration of our Universe!</p>

Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$3.00.

BAY AREA EVENTS – SEPTEMBER 2014

<http://groups.yahoo.com/neo/groups/bayastro/conversations/topics/49>

Thursday, September 18
4:00 PM

LOCKHEED MARTIN STAR
LABS
Bldg. 202 Auditorium
Lockheed Martin
3251 Hanover Street
Palo Alto, California

DR. GREGORY C. BEROZA, GEOPHYSICS DEPT., STANFORD UNIVERSITY
Predicting Strong Earthquake Shaking Using Ocean Waves

Tuesday, September 23
12:00 PM

SETI INSTITUTE
Colloquium Series
189 Bernardo Ave
Mountain View

ARE YOU LIVING IN A SIMULATION?
SILAS BEANE, UNIVERSITY OF WASHINGTON

Philosophers have long considered the possibility that we live in an artificial or simulated reality. Dr. Beane will give a short overview of some of the simulation arguments/scenarios that he personally finds most compelling.

Dr. Beane will then attempt to frame the simulation argument in the context of science. In particular, he will discuss recent work which suggests various observational tests of the hypothesis that we are currently living in a simulated universe. These include studies of the cosmic microwave background, high-energy cosmic rays, and high-precision terrestrial experiments.

Tuesday, August 26
12:00 PM

SAN JOSE STATE UNIVERSITY
MAIN LIBRARY
One Washington Square
Room 225
San Jose, CA 95112

Cost: Free

DR. FERDINAND RIVERA
SUCCESSFUL LEARNING OF MATHEMATICS

Dr. Ferdinand Rivera's research focuses on understanding the emergence of structures among children and adults in mathematical activities that involve patterns. His findings are synthesized in his most recent book, Teaching and Learning Patterns in School Mathematics: Psychological and Pedagogical Perspectives. Rivera is a full professor in the Department of Mathematics and Statistics, College of Science, and Chair of the Department of Elementary Education, College of Education.

See <http://tech.groups.yahoo.com/group/bayastro/?v=1&t=directory&ch=web&pub=groups&sec=dir&slk=94>
for additional events added since time of newsletter publication.



OCTOBER 18, 2014

NASA'S AMES RESEARCH CENTER 75TH ANNIVERSARY OPEN HOUSE -

Entry times between 9 a.m and 3 p.m. by ticketed reservation; event ends at 5 p.m.

Image Credit: NASA

UPDATE (Sept. 5):

We are overwhelmed by the response and enthusiasm for this event -- quite literally! 120,000 tickets were reserved in less than three days! Unfortunately, this reaches our current planning capacity for the size of event we were considering. We apologize

that there are no additional tickets available at this time. However, we are assessing the possibility of expanding the event. If you would like to know if we release additional tickets, please subscribe to our general community events email list. We will announce any further general admission ticket releases there first. To subscribe, submit your email address here: <https://lists.nasa.gov/mailman/listinfo/arc-community-outreach>

Additionally, a very very small number of "backstage passes" for tours will be released each Thursday at noon from now until the Open House on Oct. 18. Those passes will also be honored for general admission entry to the open house any time 9 a.m. to 3 p.m. For additional updates about the open house, please watch this webpage, <http://www.nasa.gov/ames/openhouse2014/>

You've sat on our lawn, maybe even hung out on our flightline. Now, for the first time since 1997, we're opening our house. For our 75th anniversary, we're inviting all of the Bay Area and Silicon Valley to come inside the gates and get to know NASA's center in Silicon Valley. Take a two-mile walking tour through the center and visit with Ames engineers and scientists in booths set up in front of their facilities. After the walking tour, join us on our plaza to learn about our missions. Food, drinks and NASA gift shop merchandise will be on sale. This is a family-friendly event, and children's educational activities will be offered. *See Frequently Asked Questions below* Event hashtag is #Ames75

How To Register For General Admission:

To reserve your free general admission ticket:

1. Visit <https://nasaamesopenhouse.eventbrite.com/>
2. Select your arrival time from the drop-down menu
3. Submit the requested information
4. Print your ticket(s) and bring them with you on Saturday, Oct. 18, 2014

General admission tickets allow you to enter NASA's Ames Research Center for our 75th anniversary Open House event, with access to exhibits, a two-mile walking tour and concession areas. We anticipate VERY large crowds. To reduce wait times as much as possible, we staggered entry times. Please register for the time you plan to arrive. Entry to the event is restricted to your printed ticket time window. We recommend you plan additional time for transportation to the center. No parking is available onsite. Please plan accordingly.

Planning and Transportation:

CURRENTLY, NO PARKING WILL BE AVAILABLE ONSITE, but we're developing a portfolio of options to get to the event. We are planning shuttle buses from two local public transit stations and bicycle parking at the main gate at Moffett Blvd. and the Ellis St. gate.

This event is expected to be many times larger than our other recent public events. By distributing automobile traffic over external locations (e.g., public transit stations) rather than our limited on-site roads and lots, we hope to provide a less frustrating traffic experience and a safer pedestrian-only environment across our entire center.

Please understand that this is a walking event, we estimate visitors will be walking a minimum of five miles across our center in order to see the full unique content we're offering for the Open House. See the [Transportation](#) section of Frequently Asked Questions. If you'd like to visit and learn more about Ames in a more compact area, we invite you to visit our free public visitor center, open regularly:

<http://www.nasa.gov/ames/visit>

Special Opportunity -- "Backstage Passes":

In addition we will be releasing a *limited number* of "backstage passes" to tour behind the scenes and see inside certain research facilities. See the [Backstage Pass](#) section of Frequently Asked Questions. Watch this web page, [Ames' home page](#) and Ames' [social media](#) for updates and more information! For email updates about public events at Ames, [join our community mailing list](#).



An aerial photo of NASA's Ames Research Center.

Frequently Asked Questions (FAQs)

PLEASE NOTE: We will be updating this page with frequently asked questions and their answers regularly until our 2014 Open House event. Look for updates mid-day each Tuesday before the event on Oct. 18. We will note the date each question is added or updated in brackets.

TICKETS:

How do I get register to attend the event? [added Sept. 2]

To reserve your free *general admission* ticket,

1. Visit <https://nasaamesopenhouse.eventbrite.com/>
2. Select your arrival time from the drop-down menu
3. Submit the requested information
4. Print your ticket(s) and bring them with you on Saturday, Oct. 18, 2014

General admission tickets allow you to enter NASA's Ames Research Center for our 75th anniversary Open House event, with access to exhibits, a two-mile walking tour and concession areas. We anticipate VERY large crowds. To reduce wait times as much as possible, we staggered entry times. Please register for the time you plan to arrive. Entry to the event is *restricted to your printed ticket time window*. We recommend you plan additional time for transportation to the center. No parking is available onsite. Please plan accordingly.

Backstage pass: This separately reserved ticket allows specific timed opportunities for attendees to participate in a tour of one of the unique facilities or labs at Ames.

What is a "backstage pass" and how do I get one? [added Sept. 2]

Backstage passes allow a limited number of Open House attendees to tour "behind the scenes" and see inside certain research facilities, guided by Ames scientists and engineers. Though most research groups at the center will have explanatory booths set up along the walking tour in front of their buildings, most labs inside the buildings are very small, so capacities are extremely limited and these passes will be the only opportunity to see the interior facilities.

Each Thursday at noon PDT from now until the Open House event, specific sets of backstage passes will be released on this Eventbrite site: <http://amesbackstage.eventbrite.com>

We have restricted capacities for each tour, so the number of backstage passes available are extremely limited, and will be first-come, first-served online according to the schedule below. In order to spread these opportunities among as many attendees as possible, we ask that you select and register for only one pair of tickets for one backstage pass opportunity throughout the day.

The following is the planned release schedule for backstage passes:

Sept. 04: [Fluid Mechanics Laboratory](#) (partially ADA accessible) and [FutureFlight Central](#) (ADA accessible)

Sept. 11: [Unitary Plan Wind Tunnel](#) and [Vertical Motion Simulator](#) (partially ADA accessible)

Sept. 18: [SPHERES lab](#) (ADA accessible) and [20G centrifuge](#) (partially ADA accessible)

Sept. 25: [SpaceShop \(advanced manufacturing\)](#) (ADA accessible)

Oct. 02: [Ames Exploration Encounter](#) (ADA accessible) and [hyperwall-2](#) (ADA accessible)

Oct. 09: TBD

Oct. 16: [National Full-scale Aerodynamics Complex](#) (not ADA accessible)

Please note that not all backstage pass tours are fully accessible, some may be partially accessible. For questions or concerns regarding ADA access, please contact Dana Bolles at dana.bolles@nasa.gov. There may be additional requirements (no high-heels, closed-toe shoes) that will be communicated to you in the ticketing information of your selected backstage pass tour.

TRANSPORTATION:

How do I get to the event? Where do I park? *[added Sept. 2]*

NO PARKING IS PLANNED TO BE AVAILABLE ONSITE. We're developing a portfolio of options to get to the event, but due to the number of pedestrians anticipated, we will not allow motor vehicles on campus.

This event is expected to be many times larger than our other recent public events (e.g. space shuttle flyover, Mars Curiosity landing, LCROSS impact, Yuri's Nights and LADEE science night and launch). By distributing automobile traffic over external locations (e.g., public transit stations) rather than our limited on-site roads and lots, we hope to provide a less frustrating traffic experience and a safer pedestrian-only environment across our entire center.

We are planning shuttle buses from two local public transit stations (1) VTA Lightrail [BayShore/NASA Station](#) and (2) VTA/CalTrain [Mountain View Transit Station](#)

But, again, no parking will be allowed on site. Please note that we have an ADA POC to address specific accessibility needs. If ADA accommodations are needed, please contact Dana Bolles at dana.bolles@nasa.gov.

We are planning to accommodate bicycle parking at the main gate at Moffett Blvd and the Ellis Street gate.

Visit [our Open House website](#) a couple weeks before the event to learn the final details about all the transportation options. We'll also send this information to your registration email address when the information is finalized.

Please understand that this is a "walking event," we estimate visitors will be walking a minimum of five miles across our center in order to see the full unique content we're offering for the Open House,. If you'd like to visit and learn more about Ames in a more compact area, we invite you to visit our free public visitor center, open regularly: <http://www.nasa.gov/ames/visit>

ALLOWED AND PROHIBITED ITEMS AND ACTIVITIES:

What can I bring? *[added Sept. 2]*

- Printed tickets for everyone in your party.
- Cameras and phones! Feel free to take a selfie with everything in sight, unless specifically told not to.
- Comfortable shoes. This is a pedestrian event.
- Sunscreen and/or hats. This is primarily an outdoor event.
- Small bags, purses, backpacks and diaper bags only.
- Water and snacks, though there will be food and non-alcoholic beverages available for purchase.
- Strollers, wheelchairs.
- Small blankets on which you can rest and picnic.
- Enthusiasm and excitement – and patience. We're expecting BIG crowds for this event!

Your entry into, continued presence on, or exit from, this installation is contingent upon your consent to inspection of person and property. (14 CFR 1204.1003)

What is prohibited? What are the "rules" of the event? *[added Sept. 2]*

- Unauthorized entry upon any NASA real property of this installation is prohibited. (14 CFR 1204.1004)
- Your entry into, continued presence on, or exit from, this installation is contingent upon your consent to inspection of person and property. (14 CFR 1204.1003)
- Unauthorized introduction of weapons or dangerous materials is prohibited
- Unless specifically authorized by NASA, you may not carry, transport, introduce, store, or use firearms or other dangerous weapons, explosives or other incendiary devices or other dangerous instruments or material likely to produce substantial injury or damage to persons or property. (14 CFR 1204.1003)
- Possession of firearms or dangerous weapons is strictly prohibited.

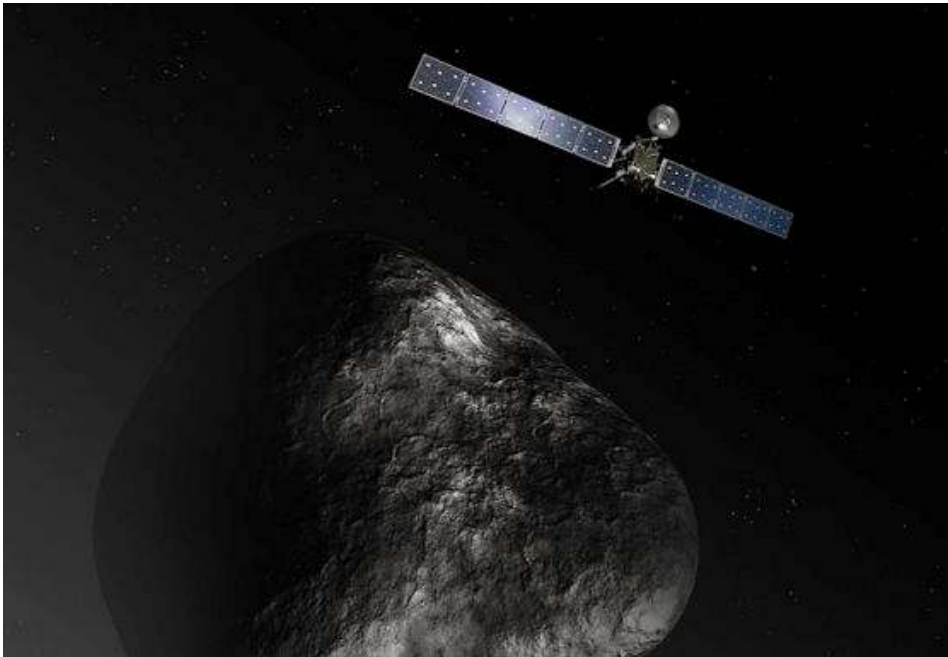
- No alcohol permitted.
- Please follow California regulations regarding tobacco smoking at this event.
- Awnings, tents, and all other items that require staking are prohibited from the event.
- Animals, other than certified service animals, are prohibited from the event.
- Visitor motor vehicles are prohibited from the event.
- Bicycles, Segways, skateboards, etc. (must be secured at the gates)
- Glass containers, ice chests

PLEASE NOTE: This is a federal site. All substances restricted by federal law are restricted at this event.

NASA SCIENCE NEWS

ROSETTA COMET IS DARKER THAN CHARCOAL

Sept. 5, 2014: A NASA instrument aboard the European Space Agency's (ESA's) Rosetta orbiter has successfully made its first delivery of science data from comet 67P/Churyumov-Gerasimenko. The instrument, named Alice, began mapping the comet's surface last month, recording the first far-ultraviolet light spectra of the comet's surface. From the data, the Alice team discovered the comet is unusually dark -- darker than charcoal-black -- when viewed in ultraviolet wavelengths. Alice also detected both hydrogen and oxygen in the comet's coma, or atmosphere.



*Artist's impression of the Rosetta orbiter at comet 67P/Churyumov-Gerasimenko. The image is not to scale.
Image Credit: ESA/ATG Medialab*

Rosetta scientists also discovered the comet's surface so far shows no large water-ice patches. The team expected to see ice patches on the comet's surface because it is too far away for the sun's warmth to turn its water into vapor. "We're a bit surprised at just how unreflective the comet's surface is and how little evidence of exposed water-ice it shows," said Alan Stern, Alice principal investigator at the Southwest Research Institute in Boulder, Colorado.

Alice is probing the origin, composition and workings of comet 67P/Churyumov-Gerasimenko, to gather sensitive, high-resolution insights that cannot be obtained by either ground-based or Earth-orbiting observation. It has more than 1,000 times the data-gathering capability of instruments flown a generation ago, yet it weighs less than nine pounds (four kilograms) and draws just four watts of power. The instrument is one of two full instruments on board Rosetta that are funded by NASA. The agency also provided portions of two other instrument suites.

Other U.S. contributions aboard the spacecraft are the Microwave Instrument for Rosetta Orbiter (MIRO), the Ion and Electron Sensor (IES), part of the Rosetta Plasma Consortium Suite, and the Double Focusing Mass Spectrometer (DFMS) electronics package for the Rosetta Orbiter Spectrometer for Ion Neutral Analysis (ROSINA). They are part of a suite of 11 total science instruments aboard Rosetta. MIRO is designed to provide data on how gas and dust leave the surface of the nucleus to form the coma and tail that gives comets their intrinsic beauty. IES is part of a suite of five instruments to analyze the plasma environment of the comet, particularly the coma.

To obtain the orbital velocity necessary to reach its comet target, the Rosetta spacecraft took advantage of four gravity assists (three from Earth, one from Mars) and an almost three-year period of deep space hibernation, waking up in January 2014 in time to prepare for its rendezvous with 67P/Churyumov-Gerasimenko.

Rosetta also carries a lander, Philae, which will drop to the comet's surface in November 2014.

The comet observations will help scientists learn more about the origin and evolution of our solar system and the role comets may have played in providing Earth with water, and perhaps even life.

Credits:

Production editor: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#)

More information:

Rosetta is an ESA mission with contributions from its member states and NASA. Rosetta's Philae lander is provided by a consortium led by the German Aerospace Center in Cologne; Max Planck Institute for Solar System Research in Göttingen; French National Space Agency in Paris; and the Italian Space Agency in Rome.

NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, manages the U.S. contribution to the Rosetta mission for the agency's Science Mission Directorate in Washington. JPL also built the MIRO instrument and hosts its principal investigator, Samuel Gulkis. The Southwest Research Institute, located in San Antonio and Boulder, developed Rosetta's IES and Alice instruments and hosts their principal investigators, James Burch (IES) and Alan Stern (Alice).

For more information on the U.S. instruments aboard Rosetta, visit: <http://rosetta.jpl.nasa.gov>

More information about Rosetta is available at: <http://www.esa.int/rosetta>

JELLYFISH FLAMES ON THE ISS

Sept. 10, 2014: Fire is inanimate, yet anyone staring into a flame could be excused for thinking otherwise: Fire dances and swirls. It reproduces, consumes matter, and produces waste. It adapts to its environment. It needs oxygen to survive. In short, fire is uncannily lifelike. Nowhere is this more true than onboard a spaceship.



A new ScienceCast video looks at the lifelike behaviour and underlying physics of jellyfish flames on the ISS. [Play it](#) Unlike flames on Earth, which have a tear-drop shape caused by buoyant air rising in a gravitational field, flames in space curl themselves into tiny balls. Untethered by gravity, they flit around as if they have minds of their own. More than one astronaut conducting experiments for researchers on Earth below has been struck by the way flameballs roam their test chambers in a lifelike search for oxygen and fuel. Biologists confirm that fire is not alive. Nevertheless, on August 21st, astronaut Reid Wiseman on the ISS witnessed some of the best mimicry yet.

"It was a jellyfish of fire," he tweeted to Earth along with a video. Wiseman was running an experiment called FLEX-2, short for Flame Extinguishment Experiment 2. The goal of the research is to learn how fires burn in microgravity and, moreover, how to put them out. It's a basic safety issue: If fire ever breaks out onboard a spacecraft, astronauts need to be able to control it. Understanding the physics of flameballs is crucial to zero-G firefighting.

"Combustion in microgravity is both strange and wonderful," says Forman Williams, the PI of FLEX-2 from UC San Diego. "The 'jellyfish' phenomenon Wiseman witnessed is a great example." He points out some of the key elements of the video: "Near the beginning we see two needles dispensing a droplet mixture of heptane and iso-octane between two igniters. The fuel is ignited ... then the lights go out so we can see what happens next."



Click to visit the FLEX-2 home page. [Web link](#)

"The flame forms a blue spherical shell 15 to 20 mm in diameter around the fuel. Inside that spherical flame we see some bright yellow hot spots. Those are made of soot." Heptane produces a lot of soot as it burns, he explains. Consisting mainly of carbon with a sprinkling of hydrogen, soot burns hot, around 2000 degrees K, and glows brightly as a result.

"Several globules of burning soot can be seen inside the sphere," he continues. "At one point, a blob of soot punctures the flame-sphere and exits. The soot that exits fades away as it burns out."

There is also an S-shaped object inside the sphere. "That is another soot structure," he says. The 'jellyfish phase' is closely linked to the production of soot. Combustion products from the spherical flame drift back down onto the fuel droplet. Because sooty material deposited on the droplet is not perfectly homogeneous, "we can get a disruptive burning event," says Forman. In other words, soot on the surface of the fuel droplet catches fire, resulting in a lopsided explosion.

Remarkably, none of this is new to Forman, who has been researching combustion physics since the beginning of the Space Age. "We first saw these disruptive burning events in labs and microgravity drop towers more than 40 years ago," he says. "The space station is great because the orbiting lab allows us to study them in great detail."

"Tom Avedisian at Cornell is leading this particular study," Forman says. "We're learning about droplet burning rates, the soot production process, and how soot agglomerates inside the flame."

At the end of Wiseman's video, the soot ignites in a final explosion. *That's* how the fire put itself out. "It was a warp-drive finish," says Wiseman.

For more amazing tweets from the ISS, follow Wiseman [@astro_reid](#).

Credits: Author: [Dr. Tony Phillips](#) | Production editor: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#)

More information: [Flame Extinguishment Experiment](#) -- FLEX home page

[More information about FLEX](#) -- from the Glenn Research Center
