Huachuca Astronomy Club
Sierra Vista
Arizona

Nightfall

A Publication of the Huachuca Astronomy Club

January 2017

President's Notes

Welcome 2017: We've got big plans for you!

We need to start by getting ready to meet two comets, right out of the gate, and image them as they fly by. Comet 45P/Honda-Mrkos-Pajdusakova, is a short-period comet (about 5.25 years) discovered by Minoru Honda on December 3, 1948. Not believed to be a very big comet, with a nucleus estimated to be 0.5-1.6 kilometers in diameter, it will be closely approaching Earth this time around. The comet will reach perihelion (closest approach to the Sun) on December 29, 2016, at 0.53 Astronomical Units (AU) from the Sun. Moreover, the comet passes just 0.08 AU (7.4 million miles) from Earth on February 11, 2017, at 14:44 UT.

At its closest, this comet will be zipping past us, crossing nine degrees of sky from one night to the next. This should be excellent for sequential imaging or video projects. The first reports are already starting to come in for 45P. These November sightings give the estimated brightness at about magnitude 17, but that will be changing fast. By January 1, it will be topping magnitude 7 as it passes the Sun. It will then retain its relative brightness as it nears us in February, before starting to fade as it heads back out. Last time around (in 2011), 45P showed long ion, and dust tails. It turned out to be quite photogenic. As always, it's a comet, so it may fizzle, or it may put on a greater than anticipated show. So, don't look just once, make it a nightly routine until you cannot find it anymore.

The other comet to watch for, coming around early in 2017, is 41P/Tuttle-Giacobini-Kresak. Comet 41P is also a short period comet. It has an orbit of about 5.5 years. The comet was first discovered by Horace Tuttle on May 3, 1858. Later, the comet was also discovered (independently) by Michel Giacobini in 1907 and Ľubor Kresák in 1951. Comet 41P should be magnitude 10 at the start of March and peak the last week of April, when it should be brighter than magnitude 6. In past approaches, 41P has had outbursts, and will this time, if we're lucky. If it does, this may well make 41P a very bright binocular comet, or perhaps even a naked eye comet. There aren't many good images of 41P out there, so you have added incentive to give it a try.

Comets are usually categorized into two groups: the long-period comets (including single-apparition comets) and short-period comets. The long-period comets have orbits of more than 200 years, and have no common orbital inclination. All the long-period comets are believed to originate from the Oort cloud. They can be big slushy ice balls on their first time to the inner Solar System that put on great shows as the sling around the Sun. The great comet of 2007, Comet McNaught, put on an amazing show (in the southern hemisphere, of course), was one of these long-period comets. These first-time callers can also go right into the Sun, or get so close they get torn apart by differential tidal forces and or vaporize … and, well, that's it for them -- no show for us. The recent "nearly great" Comet ISON, formally known as C/2012 S1, was one of these.

The short-period comets have orbital periods of less than 200 years. The special class of short-period comets with orbital periods less than 20 years and low inclination are called Jupiter-Family comets. These short-period comets are believed to originate from the Kuiper belt. However, because their orbits cross Jupiter's, the comets will have gravitational interactions over time. Their orbits have come to be controlled by Jupiter and thus the Jupiter-Family classification. There are currently over 400 Jupiter-Family comets known, most of which are extremely faint due to the exhaustion of their volatiles through multiple trips to the inner Solar System and meet and greets with Jupiter. Jupiter-Family comet orbits will gradually change from these interactions, and eventually the object will either be thrown out of the Solar System or collide with a planet or the Sun. By the way, I'm not sure if the now famous and defunct Comet Shoemaker-Levy 9 that wacked into Jupiter in 1994 was a Jupiter-Family comet. Nevertheless, both 41p and 45P are short-period comets in the Jupiter-Family class and they're coming our way.

Happy comet viewing and New Year!

Welcome our new members

Alan McElroy of Sierra Vista joined the club in December; he observes with an 8" reflector that he built himself. David Tannebaum and Therese Foster joined as a family in January. Welcome, we are glad you joined!

Our January Speaker

The January 13 meeting will be held in the Student Union Building at Cochise College beginning at 7 p.m.

Dr. Nalin Samarasinha received his PhD from University of Maryland where his studies focussed on cometary science.

A portion of his PhD work involved studying the rotational state of comet 1P/Halley -- first "tumbling" comet or asteroid. Over the last three decades, he has investigated the dynamical and physical processes occurring in the comae and nuclei of many comets and he has over 50 peer-reviewed publications. Currently, he is leading a global campaign to monitor comae of three comets which will come close to Earth in 2017 and 2018 where amateur astronomers can make significant contributions. Asteroid 12871 is named for him in recognition of his contributions to cometary science.

Abstract:

Three Jupiter-family comets – 41P/Tuttle-Giacobini-Kresak, 45P/Honda-Mrkos-Pajdusakova, and 46P/Wirtanen – experience close approaches to Earth ranging from 0.08-0.14 AU during the interval of 2017-2018. Three such close approaches in two years is a rare occurrence.

Similar to the Global Comet ISON Coma Morphology Campaign coordinated by us in 2013, we have organized the global 4*P Coma Morphology Campaign (http://www.psi.edu/41P45P46P) seeking the participation of both professional and amateur astronomers. The primary goal of this effort is to produce science facilitated by a multi-longitudinal observing campaign. After an introduction to comets, I will talk about what results we may be able to extract from this global coma morphology campaign.

2017 Dues

The treasurer, Ted Forte, will be collecting dues for 2017 at the January 13 meeting. Several memberships expired in December. Your membership is important to us, and we hope you will renew. Dues are $35 family, $25 individual and $10 student (with valid student ID). Active duty military pays $25 family and $20 individual. Make checks payable to “HAC”. You can pay your dues in person by cash or check. If you will miss the January meeting and owe dues, please send your check to PO Box 922 Sierra Vista, AZ 85636 or log onto www.hacastronomy.org, pull down the “membership” menu and click “renew” where you can pay with your PayPal account or credit card. If you joined the club in 2016, your dues will be requested the month following your join anniversary and will be prorated to extend your membership to December 2017.

For all of you that paid your 2017 dues already, thank you, we appreciate your continued participation and support!

Be Safe out there

We don’t think of astronomy as being a particularly dangerous activity, but it is not without some perils. Hazards like tripod legs, cables, equipment cases, and uneven ground all become of extra concern at night. Astronomers quickly learn to be comfortable in the dark, but we sometimes forget how disorienting it can be to our guests. Remember that when doing outreach, extra care must be taken to avoid accidents. Always stay aware of your surroundings and do your best to warn of obstacles and safeguard those around you. Make sure your ladder is in good repair and on a solid footing and keep a good hold on it when your guests are climbing. At Patterson, we need to be especially aware of those pesky power pedestals that wait to ambush shinbones and kneecaps. Remind parents to monitor their kids at all times and don’t hesitate to speak up if you see a potential for injury or damage. Safety is everyone’s responsibility.

Daytime events are particularly fraught with danger. Observing the sun is the most inherently dangerous activity we do. The potential for eye damage cannot be overstated. When sharing a scope pointed at the sun, the safety of your guests is YOUR responsibility! Be certain that your filtering technique is effective and that your equipment is in good repair. Check for cracks, tears, and pinholes in your filter before every use. When in doubt, opt out.

Being safe isn’t difficult, but it does require vigilance. Stay aware, and always think safety. If you have concerns or suggestions concerning safety considerations, please make them known to the board or the event coordinator. Nothing is more important to us than the safety of our members and guests!

Our Yahoo Group: “HACLIST”

Joining HACLIST is the best way to stay informed on HAC events and meetings, and is also a great place to discuss astronomy, telescopes and astrophotography. You can post your astro photos and observing reports, list your astro-equipment for sale and ask questions. The group is also a very powerful tool for club administration. It is the most effective way for the HAC board to reach the membership with announcements, schedule changes, event cancellations and notices. It only works though if you sign up. Ask Ted Forte to send you an invitation to join the group or just send an email to: haclist-subscribe@yahoogroups.com. After you join you can select to receive individual emails, a daily digest or no email.

December Star Party Corner

By Keith Mullen, HAC Member Star Party Coordinator

The Holiday season is over and we hope you all had a wonderful Christmas and are planning a great new year. Now it's time to get back to what we love to do, sit out back freezing looking through an eyepiece or guiding a camera to some distant astronomical wonder. The next scheduled Member Star Party will be held at Keith & Teresa Mullen's Repogazer Observatory (RGO) on Saturday Jan. 28th.

What we have planned is an informal “welcome to Lumicon” joining our astronomical community. There will be a Pot-Luck beginning at 5:30 pm with a Filter Demonstration on at least 2 scopes after sunset. I've brought dozens of Lumicon filters back from the lab in Sacramento. Many of these filters even I haven't ever had a chance to check out, so that means allot of you probably haven't either. So, if you see a demo of a certain filter and like what you see, we can make provisions to get you one at a once in a lifetime price.

We're hoping for another HAC wives turnout like we had at Craig & LeAnn's last month, so Ladies, cook up a dish or desert and drag the old man out here for an evening of celebration and discovery, there's never a dull night at RGO and please remember that weather isn't a factor, we can have a great evening even if it clouds up. Guys, bring out your scopes and check out some of your favorite Messier, NGC or other sites with a never before tried filter. Try to be here for the Pot-Luck by 5:30 pm so we can get out by twilight and get in a couple hours before it get to cold. BTW, we added a new Celestron CGE-PRO mount under the 14" Edge and are hoping to get it operating via Wi-Fi using a smart phone, something I’ve never seen but plan on using a lot.

Directions to RGO will be placed on the HAC-LIST later next week or you can call Keith at 520-266-4230.

Hope to see many of you here.

The article below is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!

Space Place Article December 2016

Big Science in Small Packages

By Marcus Woo

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS ("minks") is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares – eruptions on the sun that produce dramatic bursts of energy and radiation.

Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes, researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

The $1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017. MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

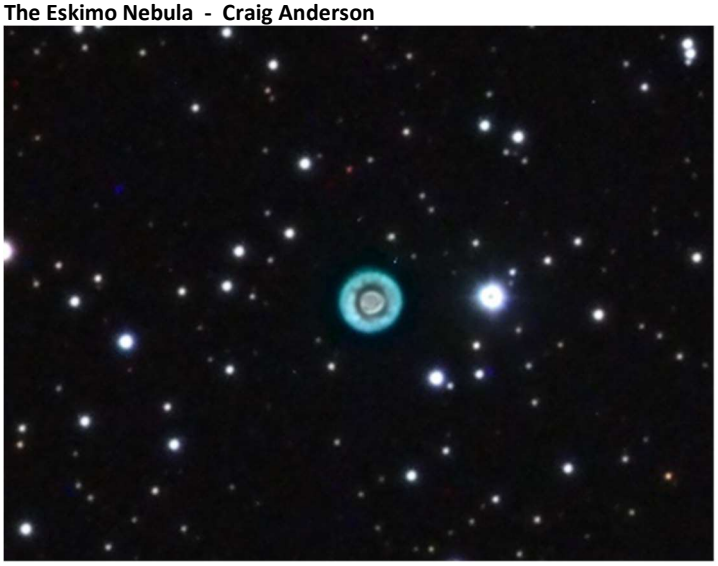
If you’d like to teach kids about where the sun’s energy comes from, please visit the NASA Space Place: http://spaceplace.nasa.gov/sun-heat/

Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE — short for CubeSat investigating Atmospheric Density Response to Extreme driving - built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA

Pictures from HAC Members

NGC 7293 Helix Nebula - By Max Mirot

The Eskimo Nebula - Craig Anderson



Barnard 150 – Glen Sanner

The Moon – By David Roemer

The Cave Nebula – Rick Burke

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HAC Jan/Feb Calendar of Events

SU	MO	TU	WE	TH	FR	SA
1 January 	**2** Venus/Moon 1.9°	**3** Mars/Moon 0.1° Quadrantid meteors	**4** Quadrantid Meteors	**5** **2:47 PM** Patterson Public Night 6PM	**6**	**7**
8	**9** Aldebaran/Moon 0.4°	**10**	**11**	**12** **6:34 AM** Eastern Elong. Venus	**13** Hac Meeting Student Union Nalin Samarasinha PSI	**14** Regulus/Moon 0.8°
15	**16**	**17** Vesta Opposition	**18** Jupiter/Moon 3°	**19** **5:23 PM** Cub Scouts Patterson 6PM Western Elong. Mercury	**20**	**21**
22	**23**	**24** Saturn/Moon 4°	**25** Mercury/Moon 4°	**26** Coronado School Stem Night 5:30PM	**27** **7:07 PM**	**28** Member Star party. Repogazr Obs Keith Mullen
29	**30**	**31** Venus/Moon 4° Mars/Moon 2°	**Feb 1**	**2** Patterson Public Night 6:30PM	**3** **11:19PM**	**4**
5	**6** Jupiter Sationary	**7**	**8**	**9**	**10** **7:33** Hac Meeting Library Commons	**11**
12	**13**	**14**	**15** Jupiter/Moon 3° apart	**16** Lowell School at Warren Ballfield 6:30PM	**17** Venus at greatest brillancy	**18** **2:33PM**
19	**20** 	**21**	**22**	**23**	**24**	**25**
26 **9:58AM**	**27**	**28**	**Mar 1**	**2** Patterson Public Night 7PM	**3**	

All event times MST. Join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email to: haclist-subscribe@yahoogroups.com