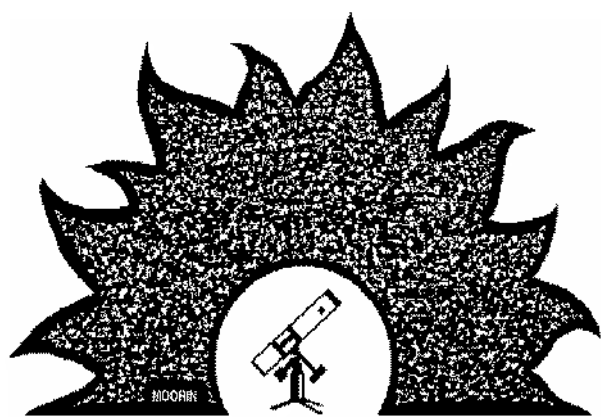




PAStimes

Phoenix Astronomical Society
www.pasaz.org

May 2014
Volume 65 Issue 9

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

May 7 PAS Meeting - Different Day / Same Room

For the May 7 PAS Meeting, we are seeking a Guest Speaker. We had Dennis Young lined up to do a presentation, but he had a family emergency take him away from doing our meeting. So, we are seeking Guest Speaker(s). We are opening up this meeting to Astronomy Documentaries, Show & Tell, Presentations by PAS Members, or if we are lucky, another Guest Speaker. The Location of the room will be the same as it has been over the whole Spring school year in LS-109. The time will

stay the same. Meet at 7pm for set up, socializing, snacking, and then we will open the meeting at 7:30pm. Please note, we are not doing this meeting on Thursday May 1, which would normally be the date of this meeting. For Dennis, we moved his meeting date to a Wednesday, so he could make it. We can't move it back, because as of writing this article, it is already Wednesday Apr 30, with no time to move things around.

So, sign up with Terri to offer any of the options above. When you do, if there is

a Title to be had, and a length of presentation, please send that info along with your request to be part of the May 7 presentations. Thank you so very much for your patience in these changes. We hope to see you at our meeting. Bring a snack to share. Bring a friend!

Before the May 7 PAS Meeting, many PAS members are RSVP'd to attend dinner at 4:30 at Village Inn. RSVP is required. See details in article below. §

PAS Meeting of Apr 3

Terri, Event Coordinator

The PAS Meeting opened with President Bruce. We had a few brief announcements and a short discussion about upcoming events. It was decided that on Apr 21 we would hold a public star party at Black Mountain Campus. We discussed the upcoming Apr 15 Total Lunar Eclipse.

Then we turned the meeting over to Eric Steinberg, PAS Member, who did a very informative, follow up to a previous presentation he had done for PAS. His talk turned to the Equinox, then to Transparency, and Seeing. The markers on the whiteboard were running dry so I supplied the set of markers donated to PAS by Earl DeLong, so Eric could finish his presentation. Then he talked about Skippy Sky and Twilight. Very good presentation. Eric is always a great guest speaker.

Then the evening turned over to Alex Vrenios, PAS Member, who did a presentation as well. Alex was presenting a grade school level "Intro to Astronomy" with the intent of getting feedback from the group about the choice of words, the meanings, the info included, etc... to try to keep it all age appropriate. It was a very good presentation, well thought out and planned and Alex got a lot of great feedback. The talk started with the Planets and moved to Galaxies and Hubble and Cosmology, and the scale of the Universe.

I wish to thank Alex and Eric for presentations that were very informative and fun to listen to. Both of these fine PAS Members have been doing several presentations throughout this year and 2013 for the club. Thank you both, so very much!§



Eric Steinberg: "Sky, Time & Weather"



Alex Vrenios: "Intro to Astronomy"

Dinner Before the May 7 PAS Meeting

By Terri

We are having dinner at Village Inn at 4:30 before the PAS meeting. RSVP is required so Terri can put in the reservation for

that many seats. RSVP on the website calendar for dinner before the meeting, or by email by Monday May 5th. Village Inn

wants to know a couple days ahead of time, how many will be attending. See you there! §

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May 1 - Aug 31 Upcoming PAS Events

By Terri, Event Coordinator

May 2: School (Private) Event from 6pm - 8pm. RSVP your attendance.

May 6: School (Private) Events from 8am-3pm. RSVP your attendance. Day time event, Solar viewing. Location: Surprise.

May 7: PAS Meeting 7pm to 10pm PVCC Main Campus in Patayan Room - East KSC-1000B - KSC Building. Bring a snack to share. Water provided by President Bruce. Great Guest Speaker lined up. Bring a friend! Everyone welcome!

May 10: Astronomy Day in Carefree. Public Event at Mike's home. Potluck at 5pm, viewing at 7pm. RSVP required with Mike at Primefactory@q.com.

May 11: Bookmans FREE Telescope Workshop. Everyone Welcome. Meet in the front window of Bookmans at 19h Ave & Northern Ave in Phoenix from 3:30 to 5:30. Bring your telescope, accessories, something to write on and questions. RSVP is required with Terri at Events@pasaz.org. When you RSVP, include the make & model of your telescope.

May 14: CTCA (private). RSVP is with Joe. PAS Star Tour Members Only.

May 15: Meeting of the Minds (Business Meeting. It's a Party. Bring a snack to share. Sign up to do presentations for after the Meeting Agenda has been concluded. Great chance to so Show & Tell of anything astronomy related.

May 22: Free Telescope Workshop and public Star Party at PVCC main Campus - 32nd Street & Union Hills- 7pm to 10pm. RSVP is required with Terri Events@pasaz.org. When you RSVP - leave number in your party and make & model of the scope you are seeking help with. This is also a good class to attend to get ideas on what type of scope you should purchase. RSVP for the Workshop, the Star Party or both.

May 24: Solar Day at Bookmans - 19th

Ave and Northern in Phoenix from 2pm to 4pm, right outside the store. Come safely view the Sun through our Solar Filtered Telescopes.

May 24: At Bookmans Sidewalk Astronomy Event from 7:30 to 9:30pm. Public event, everyone welcome. Come see Jupiter, Saturn, maybe Mars.

May 28: Back up date for CTCA of May 14.

May 29: Public Star Party at Black Mountain Campus of PVCC from 7pm to 10pm. RSVP is with Terri at Events@pasaz.org. If you call in your RSVP, leave your name & number in your party and your email address so I can confirm your RSVP.

May 30: Private event at DBG 7pm to 9pm. RSVP is closed.

May 31: Private event at DBG 7:30 -9:30pm. RSVP is closed.

June

June 8: Bookmans FREE Telescope Workshop. Everyone Welcome. Meet in the front window of Bookmans at 19h Ave & Northern Ave in Phoenix from 3:30 to 5:30. Bring your telescope, accessories, something to write on and questions. RSVP is required with Terri at Events@pasaz.org. When you RSVP, include the make & model of your telescope.

June 11: CTCA Private event. RSVP is with Joe & PAStimes Star Tour Members only.

June 14: Lecture #1 of Mike's Summer Lecture Series. See the article about this set of 5 Lectures, in this issue. RSVP required with Mike. Topic: "Electromagnetic Universe"

June 19: Solar Day with Kids at Bookmans 19th Ave & Northern, free and open to the public from 1pm to 3pm. See the Sun

through our Safely Solar Filtered Telescopes.

June 22: Solar Day - View the Sun through our Safely Filtered Telescopes. See PAS online Calendar for more details.

June 28: Messier Object Dark Sky Star Party for PAS Members only. Location is Carefree with potluck at 6pm and viewing at 8pm. RSVP with Terri for this event.

July

July 3: Public Fireworks party at Mike's home in Carefree. Potluck is at 6:30pm. Sunset is 7:42, Dark is 8:45, with a Star Party after all the 4th of July excitement is done. RSVP is with Mike at Primefactory@q.com. Everyone welcome!

July 12: Lecture #2 of Mike's Summer Lecture Series. See the article about this set of 5 Lectures, in this issue. RSVP required with Mike. Topic: "Earth Shattering Evolution"

July 13: Bookmans FREE Telescope Workshop. Everyone Welcome. Meet in the front window of Bookmans at 19h Ave & Northern Ave in Phoenix from 3:30 to 5:30. Bring your telescope, accessories, something to write on and questions. RSVP is required with Terri at Events@pasaz.org. When you RSVP, include the make & model of your telescope.

July 26: Lecture #3 of Mike's Summer Lecture Series. See the article about this set of 5 Lectures, in this issue. RSVP required with Mike. Topic: "Planetary and Stellar Jets" with a Star Party after the lecture.

August

Aug 9: Lecture #4 of Mike's Summer Lecture Series. See the article about this set of 5 Lectures, in this issue. RSVP required with Mike. Topic: "Galactic Jets and Cosmic Evolution"

(Continued on page 3)

May 1 - Aug 31 Upcoming PAS Events

(Continued from page 2)

Aug 10: Bookmans FREE Telescope Workshop. Everyone Welcome. Meet in the front window of Bookmans at 19h Ave & Northern Ave in Phoenix from 3:30 to 5:30. Bring your telescope, accessories, some-

thing to write on and questions. RSVP is required with Terri at Events@pasaz.org. When you RSVP, include the make & model of your telescope.

Aug 23: Lecture #5 of Mike's Summer

Lecture Series. See the article about this set of 5 Lectures, in this issue. RSVP required with Mike. Topic: "Upcoming Astronomical Disasters" with a Star Party after the lecture. §

Mike's Summer Lecture Series 2014

Written by Mike, edited for the newsletter by Terri

All 5 of these lectures happen on Saturday afternoons at Mike's home in Carefree. The potluck is at 5:30. The lecture begins at 7pm. Two of these lectures have Star Parties planned for after the lecture. Lectures without Star Parties after, will have a movie. Bring a movie to share. Everyone is welcome! Sign up in PerfectPotluck.com with the Main Dish & Drink you plan to bring and share. RSVP is required with Mike at Primefactory@q.com. When you RSVP, please tell Mike the number in your party so he can be sure to have a chair set up for your comfort.

Lecture #1: June 14: "The Electromagnetic Universe" While $E = mc^2$ shows that matter is energy, I will show the form & electromagnetic functions needed to make matter in the universe. The strong & weak forces have been unified with electromagnetism but gravity is complex shadows of the energy universe. Real matter & antimatter are circulating rings of energy while virtual matter & antimatter are made when energy is out of phase during destructive interference. While my models of elementary matter demonstrate the physical properties of quantum electrodynamics & quantum chromodynamics, I basically built them from neutrinos so quarks are ultimately made of leptons.

Lecture #2: July 12: "Earth Shattering Evolution" The gas giant planets began inside a Herbig/Haro jet that was focused from a supernova shell that swept into our massive dusty knot that was imbedded in a molecular interstellar gas cloud. Jupiter set the planetary distance relationships so the inner planetary disk of dust and condensed rocky debris quickly form rings that then rain material down on rapidly growing solid planets and moons. The impact history of the solid planets & some of the large moons are similar to the large impacts that grew the Earth into the largest solid object in our solar system. Every major & most minor geologic ages began with a significant asteroid strike. Phoenix's Precambrian mountains & geology are the ejecta blanket debris of the largest ancient impact to occur in the solar system.

Lecture #3: July 26 with Star Party: "Planetary and Stellar Jets" In cometary dust tails 10 micron and larger dust basically follow the comet's orbit and each is capable of focusing a tiny plasma jet from the passing solar wind that are miniature versions of the comet's powerful gas tail. Strong north & a south string polarities conduct large voltages, currents, and ions. Cometary magnetotails light up the entrained gas like a florescent tube making the

gas tail easier to see. Asteroids, moons, & planets can have strong magnetic fields that give clues to how stars stellar core's can burn hydrogen away from the core. Understanding how planetary & stellar jets are made allows jets to be read like they are books. There are special circumstances that allow relativistic stellar jets to erupt from condensed stars.

Lecture #4: Aug 9: "Galactic Jets and Cosmic Evolution" builds on concepts presented in the previous lecture. Open cluster stars and globular cluster stars have different origins and histories. In my version spiral and dwarf galaxies are made from giant elliptical galaxies. Giant elliptical galaxies are made by Cygnus A* (3C405). Galactic jets tell a long and detailed story of galactic birth and death across an older universe than you might think.

Lecture #5: Aug 23 with Star Party: "Upcoming Astronomical Disasters" The universe is a dangerous place but we can see what's coming. The next supernova shell is coming soon. At least two halo stars will pass close to our solar system. Continuing small collisions make asteroid's orbits unpredictable. Radiation exposure & magnetic reversals of the Sun and Earth. Eta Carinae could blow apart part of our galaxy as a hypernova tomorrow! §

Bookmans Telescope Workshop Mar 16

By Terri, Event Coordinator

In attendance from PAS for this event, and very, very much appreciated as we had more attendance than 3 of us could handle easily: Rick Cunningham, Don Boyd, Howard Moneta, William & Terri Finch, Kevin Witts, & Rodney Fong.

From the public, we had these folk with their awesome telescopes: Pam Kielbowicz with her 8" Dob. Rick helped Pam since he has the same telescope. He did all sorts of adjustments to her scope. Bobby & Deanna attended with their Carson RP300. Arjun brought 3 friends and his Nextar 6SE, and

then we had Pam Sullivan with her RX-9 and Pamela Jackson & Mack Daniels with their 8" Meade. Everyone was busy helping and learning. The group with Arjun and Mack's group joined Howard and Don as we discussed astrophotography. Many thanks to Howard for his input. Kevin was awesome with Pam and talking about star charts and planispheres.

Wow, we were overloaded with attendance, but it was awesome to have them all here and the help. We also had 2 gentlemen, one with 3 kids and the other with a gal,

who swung by, interested in the telescopes, and they said they would return at a later time.

Pam Sullivan writes: Your members have been so kind and helpful. I feel more confident after just two meetings. I'm sure I will be attending more sessions to improve my skills.....I hope to see the moon tonight. Thank you again for your patience. (A few days later, Pam writes) I am happy to report that I was able to see the moon! what a delight! Thanks again§

Sidewalk Astronomy Event at Bookmans Mar 8

By Terri & other attendees

Attending this event from PAS was: Sam Insana (8" dob) & Frank Insana, William (10" dob) & Terri Finch (Handouts and Q&A), Don Boyd (8"), Rick Cunningham (8"), Rodney Fong (6"), Howard Moneta (8") & his Mom, Daniela. My contact for this event was Katy Spratt, who is the Event Coordinator for Bookmans events.

Sam writes: Saturday night, March 8th, PAS celebrated John Dobson, the inventor of the Dobsonian telescope and the leader of sidewalk astronomy. He passed away this year at age 95. Terri, William, Don, Howard, Rick, and Sam attended with telescopes. Some set up on the sidewalk at the entrance of Bookman's, and some of us set up in the parking lot, east of the building. Bernard of PAS also showed up. And a future member, Pam Kielbowicz, attended as well. I estimate around 100 people viewed through my 8 inch Newtonian scope. I showed them Jupiter and the Moon. There were people from around age 5 to age 85. Most had never looked through a telescope before, and everyone was awe-struck. They thanked us for being there. Although there were bright lights, it didn't matter since the Moon and Jupiter are so bright. 2 security guards from the Walgreens came out to see what was happening. They thoroughly enjoyed the event and posed for photographs of each other looking through the telescopes.

One interesting note was that a large dark crater on the Moon at the middle of the terminator showed strange streaks like a giant sloth had raked its claws over the surface of the crater. It was actually caused by the location of the sun casting shadows on the crater floor while shining through jagged peaks on the crater wall. I had never seen anything like this before. Three of us

hadn't had dinner so we split a pizza we bought at the strip mall. Frank showed up early in the evening. He was on his way back to his job at the Grand Canyon. He enjoyed looking through the scopes talking to us and the visitors and looking through Bookman's. Terri handed out literature to those visitors who wanted to learn about PAS. It was a fun evening.

Terri writes: It was a very windy afternoon/evening. The gusts were tremendous. Luckily, I had brought my paper weights. I believe it was a very successful event. Lots of families enjoyed the views through the telescopes. We had Rodney, Don and William on the sidewalk in front of Bookmans. I was behind William with the PAS Table of handouts, a donation box - which took in one donation, Q & A for the attending kids, info about our club, about AZSciFestival, and other various handouts such as bookmarks, NASA Space Place, and more. I had a sign in sheet to collect emails of people interested in knowing when the upcoming FREE public events were happening, and we filled 2 pages, I believe.

I was asking questions and one little girl had an interesting reply. I asked her what she knew about the Moon, as she had just seen it through William's scope. She replied with "Aliens live there." I looked at her sister and asked "Do you agree with that answer?" Sister, taking my lead, shook her head no. So I asked what she knew about the Moon and she said that it has holes on it. I explained what Craters were and gave them both a prize.

Howard, Sam and Rick set up across the way, in a dark corner, non parking lot, of Walgreens. Those of us on the sidewalk sent people to Sam's group of scopes, and

Sam's group sent them to our group of scopes. It was a very smooth process.

I would guess that I handed out, one per family, a minimum of 100 "Who are we" pages with the March star chart on the back. Aside from the high winds and the lighting of the parking lot and lights above us for the sidewalk, it was a very successful event.

At the set up time, Katy had visited for a while, then took off to do something, then visited again before leaving for the evening. Bernard Gronstal, a PAS Member who hasn't been seen that much at PAS events, stopped by, viewed through the scopes, chatted with me for a while and then left. I would like to do another event like this, with brighter objects to see, as we couldn't see much less than Jupiter, in the lighting of the area, and/ or possibly something Solar related. Discussing future events with Katy.

Many, many thanks to my Telescope Team who really showed and shared the Sidewalk Astronomy Event with the public!

Pam writes: It was so nice meeting you and William and others I had not had the pleasure of meeting before at Mike's. It was also very nice to see again those I had met before. Everyone was very kind and full of good suggestions and information for a beginner like me. I will be attending more events in the future. I have so much to learn. Thanks.

Rodney writes: The sidewalk event at Bookmans came off well even though the area was lit up. We concentrated on bright objects such as the moon and Jupiter. Some scopes were able to see Orion Nebula, some clusters and others. We had good public turn out, easily in the hundreds. Many "Wow" reactions, especially from children. It was a fun night.§

There's More Than One P.A.S.

By Terri, Event Coordinator

For those of you who may not know, there is a PAS - Phoenix Astronomical Society in New Zealand. I recently got an email from a wonderful lady there, and thought this would be a good thing to include in our newsletter, as we learn from experience.

Robyn writes: Hi, I'm a Year 4 teacher at Opaki school and was wondering if anyone from the Wairarapa Branch would be

interested in bringing a telescope to school one night and showing the students some features of the summer sky. We will be studying astronomy during term 4 and it would be great if we could get a look at the night sky. If this wasn't possible, would we be able to arrange a night to come to the Stonehenge Aotearoa and have a session there looking at the night sky? Thanks, Robyn Farmer

Terri writes to Robyn: Robyn, I just figured out why what you wrote below doesn't make sense to me. You are in New Zealand. I am in Arizona, USA. I'm sorry we can't bring a telescope to your event. You are way too far away. You would need to contact the PAS in New Zealand to get their assistance. Please have a super day. Terri

(Continued on page 10)

Cholla Middle School Star Party Mar 12

By Terri & Various attendees

Attending this event from PAS was William & Terri Finch, Kevin Witts, Mike Marron and Rodney Fong (as volunteer). Our contact at this event, Paul Vachon, was not present due to his Dad passing away, so in his place, we were in contact with Mark Williams. Mark took very good care of us.

We arrived and started the evening with Sardella's Pizza. Yummy! We had plenty to eat and bottled water. Then we set up and fought the clouds. We showed Sirius, Jupiter and the Moon. That was it for the evening, with clouds getting in our way all night long. Between the clouds, I did Q & A with the attending kids. They seemed to like it. I wish to thank Kevin for bringing his Solar System. He had a few kids help him set it up, and then he left it on the ground for the evening and he and I, at various times during the night, went over to the Solar System to point out the planets, their position, etc. It was very helpful to have that visual Solar System there. Many thanks also to Rodney who did handouts, ran to the Cafeteria to check on Mike and back, at least 4 times during the night. It was awesome to have Rodney there as our volunteer. The agreement was for 3 scopes and Mike.

Around 8pm, Mark said we could pack it in, but about that same time, several students and staff came over to look through our scopes. They could only see the Moon and Jupiter, but they seemed to have a great time. The principal came by and so did the wonderful Lady from the PTA, Karen Rindy. It was awesome talking with them both.

We look forward to doing another event for Cholla, next school year. Thanks to my Telescope Team for being patient with the clouds. As we were packing up, it became totally clear skies. Grrrrrr.

Kevin writes: Cholla Middle School star party: They came in from the West and stayed all night.... Those darn clouds! It was a cloudy night with just teases of the Moon, Jupiter and M42 during the brief breaks in the canopy. Cholla Middle School hosted the event on Wednesday, 3-12. We arrived for set up (Terri, William, Mike, Rodney and I) at approximately 6:00 and saw a buzz of activity around the school campus. The announcements indicated that there were various science booths, star viewing (cloud viewing), a book fair and various other activities. We hosted about 150 kids at the scopes and had mixed results with the sky, I stayed focused on the Moon for a good part of the night and did a small hint at the Orion nebula when I could. William got some really nice Moon closeups, including a masterful view of Tycho, while Terri was able to capture some nice views of Jupiter (and a moon transit). Rodney kept the attendees informed and did some monitoring of the scope usage. Mike was set up with his meteorite table in the gym area.

I debuted my rendition of the solar system across the basketball court and was able to engage some kids and families to play along while relaying facts about our solar neighborhood.. Just in case you are wondering, the planets are each represented by various types and sizes of balls... certainly not to scale, but somewhat relative in size.

The Sun is a very large yellow exercise ball. Mercury is a small red playground ball approx. 1.5 times bigger than a softball. Venus is a 12" beachball. Earth is the same size as Venus and is actually a blow-up globe. I have some small, moon-like stress balls that were used to represent Luna and the asteroid belt. Jupiter is a 20" beach ball with "red spot" colored onto it. Saturn (my

finest creation) is a 14" beach ball inflated within a standard issue pool floaty ring. Uranus and Neptune are Purple and blue 15" playground balls and poor little Pluto is a small blue racquetball ball.

Although the sky was uncooperative, it seemed as though some kids were impressed by the sights they did see and a few spent considerable time trying to photograph objects with their cell phones pressed up to the eye pieces. I personally learned that Pluto is credited with now having 5 moons, thanks to Terri's diagram.

William writes: The star party at Cholla Junior High was mostly a success. Had a steady amount of small fluffy clouds for most of the night that had small gaps between them to get quick glimpses of the Moon and Jupiter. For a brief moment the Orion Nebula was also visible. I am very thankful the students were patient as they enjoyed the momentary glimpse of the Moon between the clouds. Kevin's portable Solar System illustration using beach balls was also very popular.

New PAS Officers

By Terri, Event Coordinator

At the Apr 24 Awards Ceremony, the attendees voted in the new PAS Officers for the 2014/2015 PAS year. These new Officers take their positions starting in September 2014. Congrats to the new Officers! Returning as President: Bruce Wurst, Returning as Vice President: Terri Finch, Returning as Editor: Don Boyd, and Returning as Treasurer: Mike Marron. The New Host is Rodney Fong. We are keeping the Member At Large who has the 2 year term, Jenny Weitz, and we have a new Member at Large: Alfred Fantegrossi. Congratulations to the New Officers!§

Antenna's Mar 25

By Eric Steinberg

After some days of weather-watching and schedule juggling I chose Tuesday the 25th of March as the best day for a dark-sky trip, and so headed to the Antennas site, arriving around 5:30. At that point, the sky was mostly obscured by heavy cumulus clouds that appeared frozen in place. This seemed odd since there was a pretty good breeze blowing at ground level, but it didn't budge the clouds. I set up anyway, along with one other observer there and waited for sunset. As time passed the clouds grew

more ragged, and marvelously evaporated once it got dark leaving some of the best skies I've ever seen out there. At 300X Sirius remained a bright point and Jupiter showed lots of fine detail, though the breeze was troublesome on and off. I was able to observe 42 Herschel 400 objects, mainly because 41 of them were galaxies in Ursa Major! I also tried out new filters: a DGM NPB band-pass and a Lumicon H-Beta. The NPB performed spectacularly giving great view of the Rosette, and Flame nebulae as well as M42 and M43; the H-Beta was good also, though the Horsehead was only barely visible. One other standout was M51 with great detail and structure and the stream of matter easily visible flowing between the two galaxies. I observed until about 1:00 am, taking some time just to watch the stars wheel overhead. The weather also stayed warm, helping to make a really excellent night. It's a long drive and an overnight but well worth it.§

Arizona Sky

By Leah Sapir



This month we will have a great view of Mercury! Usually it is difficult to see Mercury because it is so close to the Sun – it is only visible during dusk or dawn, often only during twilight. But when Mercury is an evening star in the spring, or a morning star in the autumn, it is higher than usual in the sky, and easier to see because it sets later or rises earlier. Mercury will be visible in the west after sunset from around May 6 to June 8.

Like Venus, Mercury has phases. You can look for Mercury's phases through a telescope during the coming weeks as Mercury goes from gibbous to half phase to crescent. The half phase is expected around May 20 and the crescent after around May 30.

Mercury orbits the Sun at an average distance of 36 million miles (0.39 AU), but its orbit is quite elliptical, and its distance varies from 29 million to 43 million miles from the Sun. One orbit around the Sun takes 88 Earth days, and it was once thought that each rotation on Mercury's axis was 88 days as well, so that Mercury would always be keeping the same side facing the Sun. But radar measurements in the 1960's showed that Mercury actually makes a complete turn on its axis in 59 days. One full "Mercury day" (e.g. from sunrise to sunrise) is 176 Earth days - two orbits around the Sun or three rotations on Mercury's axis.

Due to this unusual situation of Mercury's "day" being 2/3 of its "year", the Sun behaves very strangely in Mercury's sky. During one "day" on Mercury, the Sun at first rises and moves from east to west, but at some point before it reaches the western horizon it stops, moves a little from west to east, stops again, and only then continues towards the western horizon. Day and night are about 3 months each.

Mercury's surface temperatures are extreme due to its slow rotation and its proximity to the Sun. Daytime temperatures can reach 500F (at aphelion) to 800F (at perihelion), and nighttime temperatures can go down to -290 F.



So far Mercury has been visited by only two spacecraft: Mariner 10 in 1974-1975, and MESSENGER (Mercury Sur-

face, Space ENvironment, GEochemistry, and Ranging) from 2008 to the present.

Mariner 10 did several fly-bys and photographed about half of Mercury's surface. It could not see more because of Mercury's slow rotation – it could only photograph the parts that were in daylight. On the other hand, Mercury cannot be imaged by the HST because it is so close to the Sun.

In 2008-2009, MESSENGER flew by Mercury several times, and the spacecraft has orbited Mercury since 2011. Most of Mercury's surface has now been imaged.

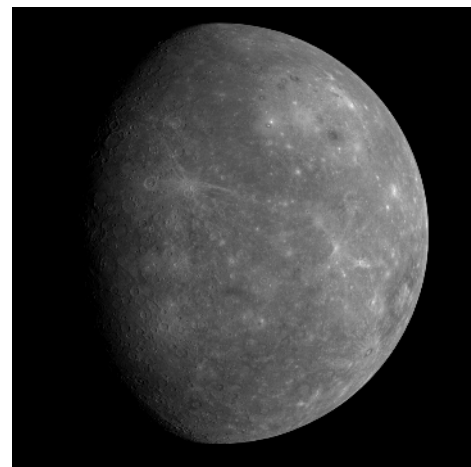
Mercury's diameter is 3000 miles, a bit larger than Earth's Moon but smaller than Jupiter's moon Ganymede or Saturn's moon Titan. At its center is a large metallic core, partly molten. The core has a radius of 1240 miles, which is 80% of the planet's radius. Mercury's outer shell (comparable to Earth's mantle and crust) is about 250 miles thick and is composed of silicate rock. At the surface is a regolith, as on Earth's Moon – a layer of dust and small rocks, broken off from the surface by meteoroid impacts.

Mercury is covered with impact craters, created by collisions with meteoroids. Features on Mercury are named after authors, composers and artists. The terrain is similar to Earth's Moon, but the craters are shallower due to Mercury's higher gravity compared to the Moon.

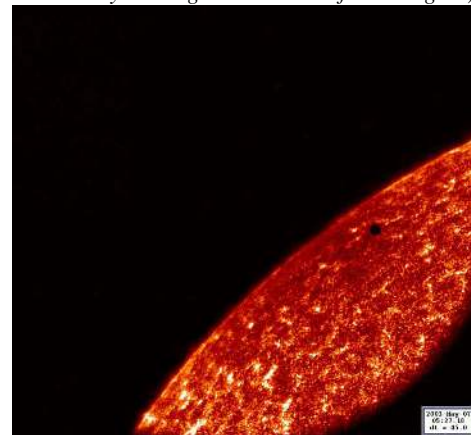
The largest impact basins such as Caloris (960 miles in diameter) or Rachmaninoff (190 miles in diameter) were produced by asteroid impacts, rather than meteors, in the early days of the solar system. The impact that created the Caloris Basin was very significant: on the other side of Mercury, exactly opposite the location of Caloris Basin, is a jumble of hills called the "Chaotic Terrain" or "Weird Terrain"; it is theorized to have been formed by shock waves converging on the other side of Mercury after the impact that created Caloris.

Some of the deeper craters in polar regions are in permanent shadow and might contain ice.

Mercury also has scarps (cliffs) hundreds of miles long and up to a mile high; these were produced when the interior of Mercury cooled and contracted, causing cracks in the outer surface. And besides its craters, Mercury has many shallow, irregular depressions called "hollows", which



Mercury as seen from MESSENGER. Caloris Basin at top right. (Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington)



Mercury transit imaged by SOHO in 2003 (credit: NASA Goddard Space Flight Center)

may still be forming today. The mechanism for their formation is not yet clear.

Above its surface, Mercury has a very thin atmosphere – so thin that its density and pressure are less than a millionth of a millionth of Earth's atmosphere. It is more accurately called an exosphere, because it is comparable to the thinnest upper layer of Earth's atmosphere, just before the atmosphere merges into space. Mercury's exosphere contains oxygen, sodium, hydrogen, helium and potassium, with traces of other elements. It is constantly being formed when micrometeoroids and the solar wind bombard Mercury and knock neutral atoms off of its surface. Some of the hydrogen and helium might originate in the solar wind itself. The atoms quickly escape into space, and the solar wind blows them into a tail of neutral particles, just like it does for comets. Calcium and magnesium have been detected in the tail as far as 10,000 miles from

Arizona Sky

Mercury, and sodium has been found even 30,000 miles away.

Mercury has a very slight magnetic field (about 1% as strong as Earth's) that interacts with the magnetic field of the solar wind to occasionally create "magnetic tornadoes". These direct the solar wind down to the surface, causing it to hit neutral atoms and throw them high into the sky.

Besides being fun to watch, Mercury has played an important role in the history of physics. Astronomers in the 19th century, when analyzing Mercury's orbit, found slight differences between Mercury's actual orbit and what was expected by Newtonian physics. These discrepancies were later explained by Einstein's theory of relativity, and were one of the proofs of Einstein's theory.

Jupiter, Mars and Saturn are putting on a show for us this month! Jupiter will be in the west after sunset, setting around midnight at the beginning of May, 10 pm at the end of May, and 9 pm at the end of June. At the beginning of May, Mars will be high in the east at sunset, with Saturn just beginning to rise, and both planets will be up all night. During May and June, both planets will rise and set earlier, with Mars setting around midnight by the end of June, and Saturn setting around 2 am.

Mercury will also be easily visible as an evening star in May and part of June. Watch for Mercury in the west after sunset starting around May 6 and continuing till around June 8. At its height, from May 15 to June 3, Mercury will be staying up past 9 pm! And don't miss the conjunction of

Mercury with the crescent Moon on May 30.

Uranus and Neptune are morning stars. Neptune rises at 3 am at the beginning of May, 1 am at the end of May, and 11 pm at the end of June. Uranus rises about two hours later.

Venus is also a morning star, rising around 3 am and shining brightly before dawn.

Moon phases for May and June are: new moon on May 28 and June 27, first quarter on May 7 and June 5, full moon on May 14 and June 13, and 3rd quarter on May 21 and June 19.

Join us next time when we continue to explore the Arizona sky. And till then, wishing you clear skies and happy observing!§

Messier Marathon in Carefree Mar 28

By Sam Insana & Other Attendees

On March 28th, PAS held a public star party at Mike Marron's in Carefree. We had a potluck at 5 pm which included Church's Chicken with mashed potatoes and gravy and biscuits, deli sandwiches, chips, coleslaw, potato salad, chocolate cream pie, donut holes, Hanson's root beer, and other goodies. Mike Marron, Rodney Fong, Kevin Witts, Sam Insana, Howard Moneta, and Bob Senzer attended the pot luck. The skies in Carefree were predicted to be an average of 7% clouds by 8 forecasting stations. However, they missed it by an order of magnitude since it was about 70% cloudy. The good news was a spectacular sunset. By 7:30 pm the sky cover was only about 50% so we set up our telescopes and started observing. Eric Steinberg brought his 16 inch scope along with Mark and Michelle Peterson, who brought their telescope. Sam, Kevin, Rodney and Howard also had their scopes. By about 9 pm the skies were only 20-35% cloudy. We all looked at Messier objects and of course, the planets Jupiter, Mars and Saturn. I was able to see 10 new Messier objects I had never observed before. They were all open star clusters. The handouts we had on the 110 Messier objects with the RA and Declination, magnitude and constellation info helped me a lot in locating them easily. At 10:30 pm a golfing friend of mine, Bud and his wife, arrived. They spent an hour looking through the 6 telescopes and saw the 3 planets, some galaxies, globular clusters, open clusters, dou-

ble stars, with only about 10% cloud cover at the time. They then enjoyed Mike's meteorite collection. It started getting chilly around 11:30 pm so most of the people packed up their scopes. Bob, Sam, Howard, and Mike then watched a new SciFi movie called LEXX. It was very strange and entertaining. The skies over Carefree were totally clear at 1:15 am, but Howard and Sam packed it up and left. It was a fun time.

Howard writes: The star party on March 28 at Mike's house was really fun. We had six telescopes and everyone shared the views they had with the other people. Many of the Messier objects were visible to us. Some were hidden from view due to the horizon, dusk, or low clouds. I spent most of my time looking at double stars. One thing I developed at this party was a desire to start writing my observations in a journal. Documenting and drawing the most beautiful double stars, open clusters, and other night sky items will help me to learn and teach others. The weather ended up pretty clear but when clouds did roll in, we took the opportunity to take a break and sit in our lawn chairs and talk. After a few minutes, this sky would clear up and we returned to observing. The most memorable experience for me came later in the night. After the telescopes have been packed up, we went inside and watched a DVD. After the show, we went back outside to find that the sky was completely clear and with more stars than I've ever seen. It was late at night so

the positions of the stars and planets were different than I'm used to. Finding things in the dark clear starry sky was a fun challenge.

Eric writes: On March 28th I attended what was supposed to be a Messier Marathon at Mike's. Unfortunately, cloud cover was persistent and got worse through the evening. Using my 16" dob manually, I did a casual "see what we can see" look for Messier objects and got 31 before having to leave around 11pm. The objects I observed were: M52, M103, M76, M34, M45, M42, M43, M78, M1, M35, M36, M37, M38, M41, M93, M46, M47, M50, M44 (Binos), M48, M67 (Binos), M95, M96, M105, M65, M66, M81, M82, M108, M109, M3.

Rodney writes: Messier night at Mike's. in attendance were Michelle & Mark Peterson, Sam Insana, Howard Moneta, Kevin Witts, Eric Steinberg, Mike Marron, Bob Senzer & myself. There were some wisps of thin clouds but dark night condition was acceptable. Those with larger, more capable scopes were able to pull in fainter objects. Michelle & Mark's goto system went "Hal" (as in the evil computer in "Space Odyssey 2001") doing whatever it wants, but I think (hope) they sorted it out later. Several of Sam's friends arrived later and were treated to views of various Messier objects and other objects as well as Jupiter & late arrival Saturn. A fun night at Mike's, as always. §

Wigwam / Litchfield Star Party Mar 13

By Terri, Event Coordinator

Attending this event from PAS was William Finch with his 10" Dob, Terri Finch with 8" SCT, Bruce Wurst with 20" Dob, Don Boyd with 8", Mike marron with Meteorites and Eric Steinberg with 22". Also attending was Ora Kurland to help Eric. This was a private party held at the Wigwam Resort in Litchfield Park. Our contact at this event was JoAnn Galbreath, a very nice lady to work with!

The event started with the knowledge that we were going to have to put up with clouds for the night. So, we set up and it was cloudy most of the night. At times we had some clear patches to see Jupiter, and the Moon. Because we knew ahead of time there would be clouds in the sky, I brought Q & A to do with the kids. We also had Mike there to fill in between views. And we all talked about our telescopes, when possible.

The attendees of the Corporate event seemed disappointed in the cloud cover, but

one of them told me that they have been to 4 events so far with Telescopes, and all 4 times now, it has been cloudy.

JoAnn was awesome! She provided what we needed. We got there early, Don, William and I, to scout out the set up area. We were told the sprinklers would come on, on the grassy area we were setting up on, at 9:30, which was the end of the event. JoAnn, knowing the cost of some of the scopes, did an awesome job of getting those sprinklers turned off for the night. That was a relief and many thanks to JoAnn for doing that.

The evening started with clouds. Jupiter and the Moon and Sirius were the highlights for the whole night. Set up was 6:30, the event was from 7:30 to 9:30. We fought the clouds from 7pm to 9:30, and then as we were packing up, the sky became total overcast.

One lady mentioned to me, while looking at a close up of the craters on the Moon,

"Are you sure this is in focus?" And I replied, it is in focus, however, you are currently looking at the Moon through the clouds. She sat and looked for a while longer and realized the clouds were in the way of the Moon.

One little girl, probably about 3-3.5 years old, in her Mom's arms was asked a Q & A question for which I gave her a prize. I asked her what she knew about the Moon. Her reply was "It's in the sky."

The event, overall, was good. The temperatures were good. Not too cold or too hot, and the grass was a bit damp, so my boxes got a little wet, but overall the event was great. A few photos were taken and will be added to the PAS Photo Gallery, soon. Many thanks to JoAnn for having us at her event. Thanks to my Telescope Team, as they did a great job with the many questions, putting up with the clouds and just over all having a great time and sharing that time with the attendees. §

Lone Mountain School Star Party Mar 14

By Rodney Fong, PAS Member

Mike's meteor presentation, as always, was a "crowd pleaser." Many "Wow" reactions from the children and adults, too.

Around the auditorium were various science-related displays, some offer problem solving challenges such as building stable

structures out of sticks and pegs, or working with dimensions. It was a very fun and educational night. §

Private Telescope Workshop Mar 17

By Eric Steinberg

On Monday March 17th, PAS member Eric Steinberg provided private instruction for a family in Cave Creek. The scope was a new Meade LX-90 in good working order but needing to be configured. After showing the owner how to do the leveling and basic Autostar setup as well as troubleshooting the fact that the controller had been programmed for the wrong scope model, Steinberg went through the alignment procedure and showed them how to locate objects. Observed were Regulus, M42, M37 and the Moon. He also gave a sky tour where clouds permitted and gave them a number of suggestions and links for sky information and scope improvements.

One interesting observation is that new Autostar handbox is now called the "Audio-Star" and plays a dramatic description of each object while it is slewing to it.

Beth Gustafson writes: Terri, Eric was extremely helpful and knowledgeable about how to get my dad's scope to work correctly:) When my dad called the next morning to share with me about his time was Eric he couldn't have sounded more thrilled. He said that Eric got his scope to work properly, that he was extremely kind, patient and super smart. He truly enjoyed his time with Eric and we plan to hold onto his number for "refresher lessons" for many years to come. Thanks to you guys my brothers and

I no longer have to come up with a birthday gift for dad:) We hit this one out if the park!

Eric took the time to follow up with my dad the next day and informed him places in Carefree/Cave Creek to star gaze! My niece and nephew are heading there this weekend and they are excited to see the moon up close as well as the dig dipper:) We don't get the chance to see much of the night sky in the city:) I am looking forward to my return to Arizona in a few weeks and to use a working scope and to enjoy the night sky as well. We will be sure to spread the word about you all to their friends! Thanks you for all you did to help me arrange this and for following up! Be well, Beth §

Sell Your Astronomical Equipment

By Terri, Event Coordinator

The PAStimes Newsletter is your means to selling your old, unwanted, but loved and used astronomical equipment.

Write an ad with description & photos, get it in the next issue of the PAStimes Newsletter. PAS Members may post items for

sale, in the newsletter, for free. Send them to Events@PASaz.org.

Night Sky Training Session on Mar 22

By Terri, Event Coordinator

In attendance at this really awesome event was Rodney Fong w/scope, Don Boyd w/scope, Mike Marron, William & Terri Finch w/scopes, Bob Senzer, Bruce Wurst w/scope, Ed & Bette Wurst, Rick Cunningham w/scope, Sam Insana w/scope, Howard Moneta w/scope, Kevin Witts w/scope, Eric & Ora Steinberg w/scope, Michele & Mark Peterson w/ scope, Kevin Harcey, Alfred Fantegrossi w/scope, and Terry Dancer w/scope.

The event started with food, as most of our events at Mike's home do. The food was awesome. There was pizza, calzone, chicken, homemade cookies, several desserts. Plenty to eat and enjoy.

Then we set up our telescopes for this evening's goal of the Night Sky Training Session. Our first goal of the night was to have everyone align on Jupiter and test the tracking, if they had tracking on their telescopes. We did that. Mark & Don were lagging behind so we gave them some extra time to get their scopes to cooperate. Then, while on Jupiter, we went from scope to scope comparing views with different filters. The idea behind this was so everyone could compare Jupiter through filters to see which filters they may want to purchase in the future. This was a very interesting thing we did. So we stopped at William's scope first in which he had a 9mm eyepiece with an 82A filter. Then we visited my scope where I had a 17mm eyepiece and no filter. Don showed Jupiter through a 6mm eyepiece with a Didymium Filter. Terry showed it through his 9mm with a 21 Orange filter. That was a very nice view. Eric showed Jupiter through his 82 degree 6.7mm eyepiece and a Didymium filter. We also visited Sam with a 4.7mm eyepiece and a green filter. Bruce had a 7mm Nagler with an LPR Light Pollution filter and then we went back to William's scope in which he used an 80A filter. We talked about how the

same number, by a different manufacturer, can be a different color filter.

Then we moved on to Orion Nebula and did the same thing. Terry had a Sky Glow filter, Don did a Sky Glow, Bruce did the LPR, I had a Nebula Filter, Don did the Didymium Filter, Kevin used his O3 Lumicon filter, Eric used a Hydrogen Beta. These views were really something to be compared and enjoyed.

Then it got dark enough, around 9pm to do a sky tour. I let Eric do a fantastic, really good, covering all of the sky that could be seen, sky tour for the attendees while I looked for the Sombrero Galaxy. Every time Eric does his sky tour, he adds more info to it. I learned so much from this sky tour, that I didn't know from past presentations by Eric. Thank you Eric. The kind of info Eric shares about the constellations and the names of the stars and folk lore is what I want to learn to make my sky tour presentations more interesting and informative to listen to, also. Just haven't had time to put that together yet.

We then asked if anyone needed or wanted to learn about Setting Circles and Sam took a small group over to his telescope and shared how to set them up, how to use them, how to read them and the group seemed pleased with that info. Thank you Sam.

Due to a request by Bob Senzer, we then had a conversation about Green Laser Safety. William brought up some awesome thoughts to share and everyone seemed involved in the discussion. It is always best to be aware of where your green laser is pointing. Thank you William.

By then, I had found the Sombrero Galaxy. It was in the mush and some sky glow but I did catch it. Everyone wanted to know where it was so I pointed out where I was looking in the sky and then Bruce and a few others, pointed their scopes towards

Sombrero. Alfred had done his homework for this session and the Sombrero Galaxy was one of the items he asked to view that night.

By the way, the Homework assignment for this class was to list an object that you have not seen through your telescope, that you would like to see, and that was visible that night. Next event like this will be on Sept 20 and will have a different or revised homework assignment. Alfred is a new member of PAS.

Sam and Terry had found Mars and around 11:30pm Michele, Mark, Eric, Bruce all packed up and were headed home. The only problem with that is there was a delay, traffic jam. We had double parked around the house, so everyone in the center, closest ring to the house, had to move their vehicles to let the others out. It was midnight before Bruce left. I packed up my scope during this time, and then went indoors.

The rest of us went indoors while those members were packing up and snacked and talked and warmed up, as the temperatures had dropped about 11:30pm, and we were all looking for our jackets.

About 1am Saturn was the highlight. So, several of us came out, took a view of Saturn for about ½ hour and then we all packed up and departed. Mike was in bed before the last one of us left.

Many thanks to Mike for hosting this event. It was very successful. We had 13 telescopes in attendance. That's the most we have had at Mike's house at one time. Thanks to all who attended and for doing your homework. Many objects, old friends and new ones, were seen this night. We hope for another successful event like this one in September. Plan to attend. Even if you know the night sky, let's get more info out to the newbies who join us. §

"Gravity" movie Apr 12

by Terri, Event Coordinator

In attendance at this Private event at Eric's home was William & Terri Finch, Rick Cunningham, Don Boyd, Darlene Ahlefeld, Sam & Vera Insana & the Host of the party, Eric Steinberg and his lovely wife, Ora. Many thanks to the hosts of this party.

The movie began late, scheduled for 7pm but William and I were running late and Eric was nice enough to hold the movie until we got there. We all grabbed snacks, provided by Eric, and donated to by the attendees. Bottled water was provided, this time, by William & Terri Finch. The movie

was awesome. The snacks were yummy and it was so nice of Eric and Ora to invite us to movie night. The next movie night is being planned for either during the summer months, or September, and we will be watching "Apollo 13." §



The Power of the Sun's Engines

By Dr. Ethan Siegel

Here on Earth, the sun provides us with the vast majority of our energy, striking the top of the atmosphere with up to 1,000 Watts of power per square meter, albeit highly dependent on the sunlight's angle-of-incidence. But remember that the sun is a whopping 150 million kilometers away, and sends an equal amount of radiation in all directions; the Earth-facing direction is nothing special. Even considering sunspots, solar flares, and long-and-short term variations in solar irradiance, the sun's energy output is always constant to about one-part-in-1,000. All told, our parent star consistently outputs an estimated 4×10^{26} Watts of power; one *second* of the sun's emissions could power all the world's energy needs for over 700,000 years.

That's a literally astronomical amount of energy, and it comes about thanks to the hugeness of the sun. With a radius of 700,000 kilometers, it would take 109 Earths, lined up from end-to-end, just to go across the diameter of the sun once. Unlike our Earth, however, the sun is made up of around 70% hydrogen by mass, and it's the individual protons — or the nuclei of hydrogen atoms — that fuse together, eventually becoming helium-4 and releasing a tremendous amount of energy. All told, for every four protons that wind up becoming helium-4, a tiny bit of mass — just 0.7% of the original amount — gets converted into energy by $E=mc^2$, and that's where the sun's power originates.

You'd be correct in thinking that fusing $\sim 4 \times 10^{38}$ protons-per-second gives off a tremendous amount of energy, but remember that nuclear fusion occurs in a *huge* region of the sun: about the innermost quarter (in radius) is where 99% of it is actively taking place. So there might be 4×10^{26} Watts of power put out, but that's spread out over 2.2×10^{25} cubic meters, meaning the sun's energy output *per-unit-volume* is just $18 \text{ W} / \text{m}^3$. Compare this to the average human being, whose basal metabolic rate is equivalent to around 100 Watts, yet takes up just 0.06 cubic meters of space. In other words, **you emit 100 times as much energy-per-unit-volume as the sun!** It's only because the sun is so large and massive that its power is so great.

It's this slow process, releasing huge amounts of energy *per reaction* over an incredibly large volume, that has powered life on our world throughout its entire history. It may not appear so impressive if you look at just a tiny region, but — at least for our sun — that huge size really adds up!

Check out these “10 Need-to-Know Things About the Sun”: <http://solarsystem.nasa.gov/planets/profile.cfm?Object=Sun>.

Kids can learn more about an intriguing solar mystery at NASA's Space Place: <http://spaceplace.nasa.gov/suncorona.> §

There's More Than One P.A.S.

(Continued from page 4)

Robyn replies on Oct 13, 2012 with: Dear Terri, I'm gutted that you won't bring your telescope to new Zealand - where's your dedication??!!!! Just joking! Thank you for replying, now I won't think the NZ society has not replied! I have followed up my request with a phone call and it's all been sorted, I'm taking my class to an observatory to learn about stars. I bet the night sky is pretty awesome in Arizona, thanks for replying. Happy stargazing! Robyn §

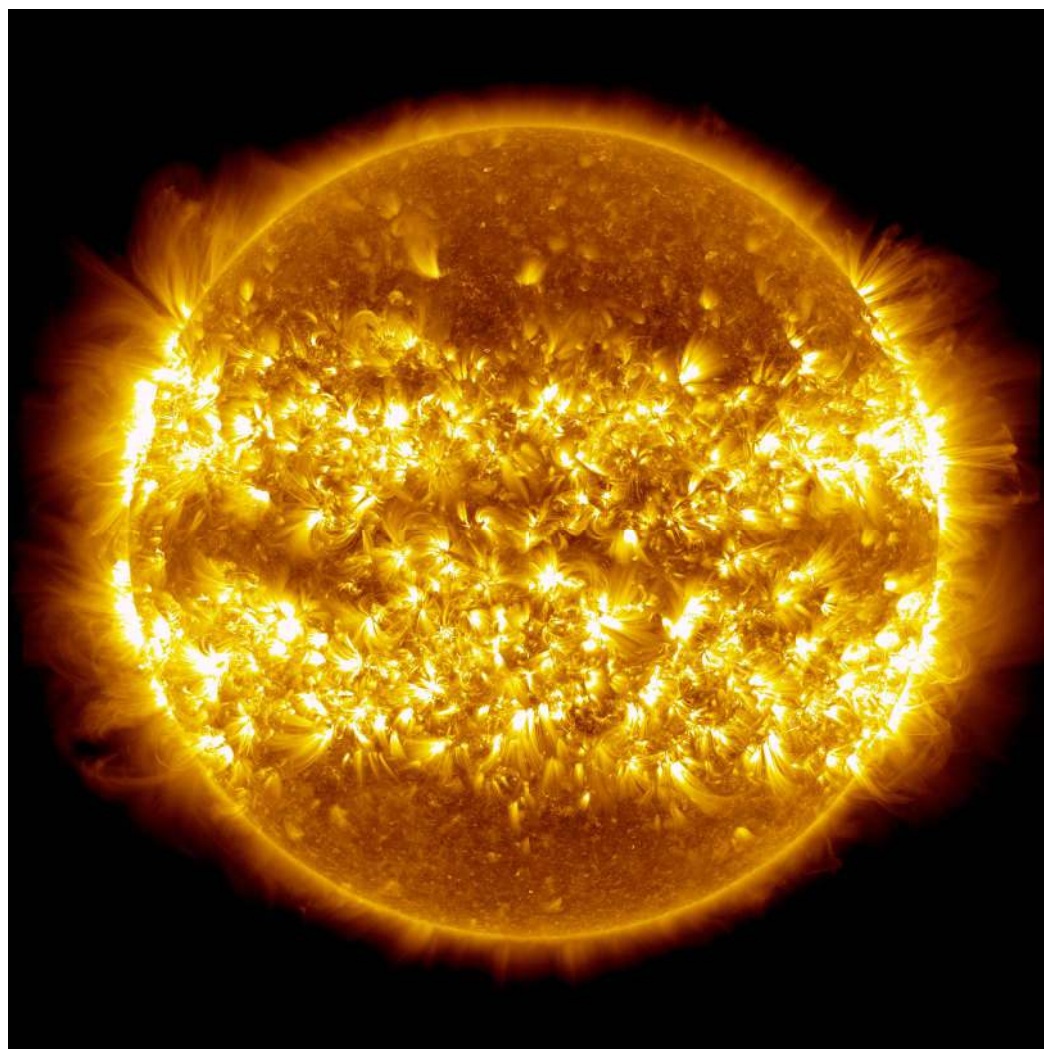
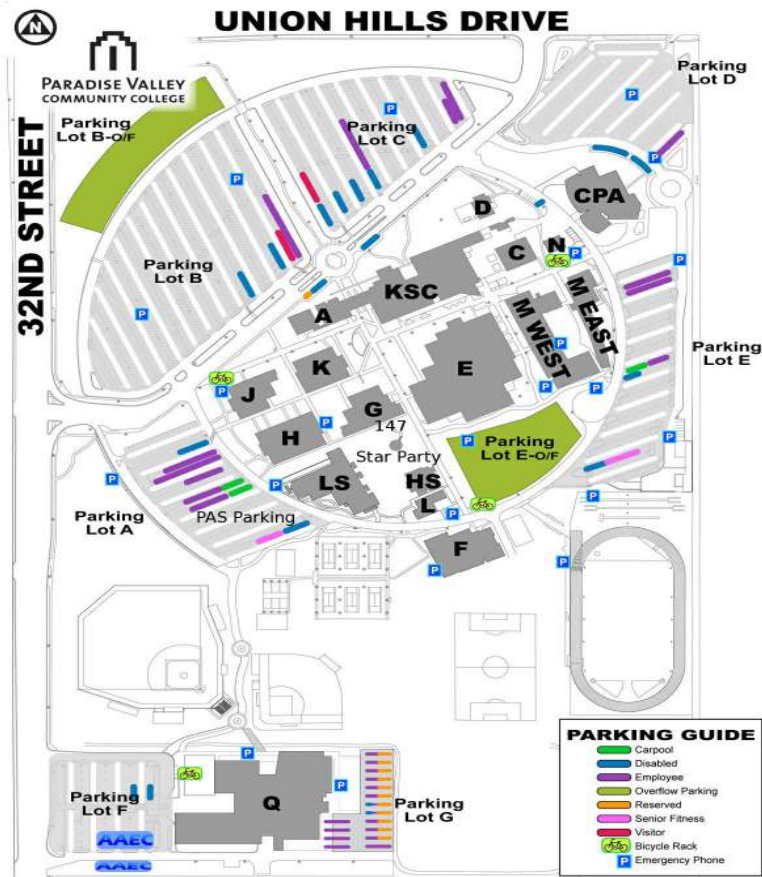


Image credit: composite of 25 images of the sun, showing solar outburst/activity over a 365 day period; NASA / Solar Dynamics Observatory / Atmospheric Imaging Assembly / S. Wiessinger; post-processing by E. Siegel.

Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032



Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



Telescope Workshop at PVCC of Apr 10

By Terri, Event Coordinator

In attendance at this event from PAS was: Rodney Fong, Mike Marron, William & Terri Finch, Kevin Witts, Alex Vrenios, Eric Steinberg, Bob Senzer and Jenny Weitz. Additional Friends of PAS who attended was Kevin Adams.

From the public, we had Paul Cleary with his C114 Newtonian and Alex & Rodney assisted Paul. Wayne Schwab brought

his C Nextar 6SE and attended with Bonnie. Kevin helped Wayne. We had Thomas Kieffer with his Orion Starblast 4.5" table top, of which Eric assisted Thomas. Dick Newell came to find out what to purchase in a scope, and William assisted Dick. Welcome new PAS Member Dick Newell! And Ross came with his Meade 4504, and Eric assisted him.

Jenny had her class here and there during the event. We completed the event about 8:30 so I sent a text to Jenny to let her know we were packing up and ready to leave, so she could lock up the room. It was great seeing Jenny again! Thank you Jenny, for all you do for PAS! And thanks to my Telescope Team members for being such a great, helpful TEAM!§

Telescope Workshop at Bookmans Apr 13

By Terri, Event Coordinator

It was a very interesting time at this Telescope Workshop. We had 3 RSVP's. Stuart Samberg brought his Bushnell scope. William assisted him with it. Terry Scherr brought his C8 and his Dad, Jim, brought his Orion Starblast 4.5 EQ. I helped with Terry's 8" as it is just like mine but orange.

Terry had bought it from previous PAS member Jeff Hopkins. Jeff had a counterweight on it that was making it impossible to move the scope on the mount, so we removed it. Howard & William were also assisting Terry with this puzzle. Welcome new member Terry Scherr.

In attendance and helping at this event was Howard Moneta, Rodney Fong, Earl DeLong, Don Boyd, and William & Terri Finch.

Many thanks to the Telescope Teachers. Many thanks to Rodney for help with set up and take down of the PAS table.§

Don Boyd
PAStimes Editor
3039 W. Peoria Ave 102-188
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To:

2014 PAS GUEST SPEAKER LINE-UP

By Terri, Event Coordinator Events@pasaz.org

Do you have an idea for a Guest Speaker? Email me the details. Here's the scheduled Guest Speakers at PAS:

<http://www.pasaz.org/index.php?pageid=meetings>

Sept 4: Members Night - Anyone Sign up to do a mini presentation.

Oct 2: Mark Murison: Topic: TBA

Nov 6: David Williams: Topic "Mars: From Mariner to Curiosity & Beyond: A History of Mars Exploration."

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What's Up For May

By Rod Sutter, PAS Past President

Name	Date	Rise	Set
Mercury	05-15-14	06:33	20:58
Venus	05-15-14	03:39	16:03
Mars	05-15-14	15:33	03:26
Jupiter	05-15-14	09:04	23:14
Saturn	05-15-14	28:43	05:28
Uranus	05-15-14	03:35	16:06
Neptune	05-15-14	01:56	13:09
Pluto	05-15-14	22:42	09:00

All Times Arizona Time

May 15 2014

Sunrise: 05:28

Sunset: 19:21



New: April 28



Q1: May 6



Full: May 14



Q3: May 21