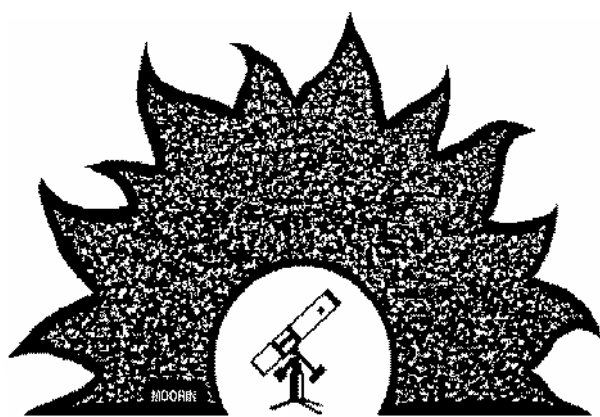




PAStimes

Phoenix Astronomical Society

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February 2009

Volume 61 Issue 6

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

On Thursday February 5th at the Paradise Valley Community College's public library Michael Marron will give the lecture 'Galactic Jets and Cosmic Evolution' which is part 3 of the 'Tails of Plasma' series.

In part 3 'Galactic Jets and Cosmic Evolution' examination of spiral galaxy jets shows how arm structures and metal rich open cluster population I stars are created in giant molecular cloud complexes. A multitude of dwarf, spiral and elliptical galaxies will reveal their explosive natures and the nasty business of star formation. This is not Big Bang Theory.

Michael Marron was born in Michigan

to a family interested in astronomy so he became an amateur astronomer at six years old. At that time his Father gave lectures at the Rodger B. Chaffee Planetarium at the Grand Rapids Museum and they found out he had a hilltop where it was dark. In conjunction with the Grand Rapids Amateur Astronomical Association they built the James C. Veen Observatory behind Michael's parents house. He grew up teaching astronomy to the public, schools, and colleges. When He graduated from Michigan State University He moved to Arizona. His time is often spent repairing a historic ranch house of his grandparents. You might see him with his collection of meteorites

teaching the origin and evolution of our solar system at one of the Phoenix Astronomical Society events. Ask any astrophysics questions and he might have more answers than you were prepared for.



PAS New Years Social Rev 1/10/09

By Terri, Event Coordinator

Did you miss this party? I'm sorry... you missed a laughing good time! Before I review this event I must thank a few people for their assistance in making this event so successful.... Ed, Bette, Bruce, & William - thank you for setting up the tables, doing the table cloths, running the Dart Board Game, bringing more than was requested in the way of food and drink, and fighting for the right White Dwarf Gift. Thank you - Bob for helping set up the tables with table cloths. Thank you Steve for just being an AWESOME assistant! Wow, I never met anyone who could take care of a group of people as well as you did. Your assistance was soooooo appreciated! Thanks to Chris and Tiffany for hosting the party in their home. Thanks to Rod & Sue for bringing the much needed plastic ware and paper dishes. Everyone was looking to eat long before you got there, but we waited until we had something to eat on and eat with. And

many thanks goes to Bob Lopez, the brother in law to Steve Palmer, who supplied, at no charge, the tables and chairs for our event. And many thanks goes to Ed who brought microwave popcorn, for which we snacked on prior to the dishes arriving. It was a life savor for those who can't go without food for very long. It was gobbled up so quickly, that was a sign of appreciation.

So, the Finches & Wursts arrived around 2:30pm for set up. Bob Senzer was already there with Chris. By 4pm when people were to start arriving, we had Don & Steve there. Chris had set up his living room 72" TV to show the astrophotos he has done thus far. Wow, those are really good. Later in the night he also set up the Wii for those who wished to play it instead of being involved in the Dart Game outside in the chilly night air.

Once the plates arrived, and Rod was a

big hit for getting there with them... we all ate. Here are some of the fantastic things people brought for the food this year: Pie, Fried Apples (mmmm these were really good), Salad, Kevin Inspired "Hot" Bean Dip, Hot Chicken Nuggets, a huge Sandwich Ring, Roast Chicken, Macaroni Salad, Beer, Hot dogs, Ice (very much appreciated), Chicken Salad, Potato Salad, Bouble Chocolate Pie, Green Been Casserole, Veggie Tray & Dip, more Pie & Cake. We had pop to drink, coffee was instant, there was Tea but I didn't see anyone drinking it, there was bottled water supplied by PAS and brought by the Wursts. The food was awesome! Thanks to everyone who took the time to think up something different than everyone else when bringing your food item. We had plenty to eat and drink.

After Eating, we started the Dart game. Bruce took over running it. Many thanks goes to Bruce. It was on the honor system, so you choose your darts, when it was your

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turn, walk up to the board on the left, shoot your three darts, follow the dart rules, then move to the board on the right, shoot three more darts and tell Bruce your final results. He then updated the board. In the photos of this event, found at this link: <http://tinyurl.com/7ux3q6> You will see that I photographed the score board several times during the night to show the flow of the scores. It became hot competition as we called "last round." For the longest time, Rod held the lead. Steve and Bruce kept saying that the trophy had their name on it. But Rod, he just kept first place. He didn't start out in first, in fact, he held near last for the longest time and then something happened that he was able to advance very quickly. Maybe he was just giving everyone else a chance to think they were going to get that trophy. The final score was held for the last 1/2 hour in which several of us had a score of 11. Rod then won, on the final round! Congratulations Rod! It was a very competitive game this year. Thanks goes to Bruce for keeping the game going, and for supplying the Boobie Prize dart board. He/She who gets last place, then gets a dart board to practice on for next year. We gave that honor to Chris. Bette and Chris were in last place. Chris was because he dropped out part way through the game so since he was in last, officially, he got the dart board awarded to him. Chris, you must practice up for next year's game. Many thanks goes to Kevin, who didn't get to attend, for lending us his dart board that he won as the Boobie Prize last year, for the game. Bruce & Ed tied at 2nd and we forgot, before taking down the boards, to have them do a shoot off, so we flipped a coin for 2nd and 3rd places. Prizes were awarded later in the evening. Ed then took 2nd and Bruce took 3rd.

Then we cleaned up the tables inside and made a ring of chairs and we began the White Dwarf Gift Exchange. This is the

highlight of the evening. It is the most fun one can have laughing ones head off so much that your sides hurt. Frank was doing this. He was laughing so much I thought he'd pop. Even though the photos are out of order in my photobucket account, you can see the progression of the White Dwarf game. There was much fighting for gifts this year. It was hilarious. And even more fun when we opened the gifts. There was a surprise STARTER gift that was wrapped. Frank got it. He opened it and read it aloud. It said, you may steal from anyone's unopened gift, to start the Stealing Frenzie again, with a minimum of 5 gifts stolen before it can stop. So, the frenzie started all over again and Frank was just laughing up a storm. Then, we drew the ticket to see who got to open their gift first. Here is a list of gifts that were received: Star Wars books, a DVD's on various topics, Chronicles of Riddick movie, set of 2 binoculars, \$30 Gift Certificate to Starizona, Book: 101 Outer Space Projects & a cool nightlight, 2 books: deep Sky Observing, a biography of Einstein and a Sudoku Cube, an Astronomy Calendar, a collection of Pez dispensers of Star Trek, a observing case, Star gazing hand book, Starry Nights, Utah Star Watch and Brief History in Time, a Rocket, Nation Geographic Projector and more. One of the hilarious parts of opening the gifts was the one Chris donated to the game. He had taken a collection, i would guess 15 inter stacking gift boxes, and interstacked and wrapped several of them, to where you unwrap the first, open it and inside is another box, unwrap it, open and there's another one, and Bruce won this prize. At the end of all the laughing and all the boxes, there was an awesome \$30 Gift Certificate to Starizona. Thank you Chris for making this game that much more fun!!!

Door prizes: At every PAS Social we try to award folks for attending. And the donations that were given this year were

more fantastic than last year. Thanks goes to Rod & Sue, Chet, Kevin, Finches, Wursts. If I missed anyone, please accept my thanks. The first prize given for the night was the main door prize. Jerry got upset because I won it and got the suit case. In the suitcase, for which i wanted to win just one more.... were three books. 2 were re gifted from a previous Social, but one other was new. Thank you Jerry for the box. That's the part I wanted the most but when i got home, Kevin and I were really into the other book you included, which was "The Astronomy Cafe." What an interesting book. Thank you! So, I took first door prize. Then Rod got his prize for being 1st place winner of the Dart game. The door prizes were just laying on the same table as the White Dwarf prizes were and he/she who won, just chose something randomly. They are wrapped and disguised just like the White Dwarf game. So, Ed took his 2nd place Dart prize and got a star projector. Bruce took his and got another suitcase... That was a good one donated by Rod. Chris was awarded the Boobie Dart Board to practice on for next year. Rod then presented the Thank You card to Chris for hosting the party. We hope that Tiffany gets to see the card as Chris put it up on his fridge. Elana (daughter of date, Lynn, of Mike's) won a door prize. All the rest of the winners were just the extra door prizes that were donated. Elana got a book about Isaac Asimov. Kevin had donated a door prize which was a Mug "82 in Telescope" and \$15 gift certificate to Star Bucks. Sue sends many thanks for receiving this gift as she loves Star Bucks. Sarah (daughter of Lynn) won the Tetris Cube (read below about the Tetris Cube game). Steve got candy canes, Bette won a plansphere donated by Rod. Bruce won a prize, Mike got a Moon Calendar, Bob got candy canes, Chet, who left early, but Sue was taking care of his ticket, won a Year in Space calendar. Jerry won

PAS New Years Social Rev 1/10/09

some candy canes and he donated it to the attending two girls (Sarah & Elana).

After all the prizes were given out.... we then moved things around and had a movie. I originally put the movie before the White Dwarf Game but when I reviewed the schedule with William, prior to getting to Chris's, he reminded me that Chet leaves early, usually before the White Dwarf game, so this year, I put the movie after the White Dwarf, but Chet left before the White Dwarf again. So, maybe next year we will arrange it differently and maybe do the White Dwarf prior to the Dart game. If you have any ideas on how to make this work to include Chet & Jewel in the White Dwarf game, it would be appreciated.

Movie: Chris had decided to play, on his big screen TV, "Seeing in the Dark." Everyone who stayed after the all the main activities, watched the show. I shot a few

more photos and then Steve and I cleaned up the food and kitchen. We tried to keep it quiet so that those watching TV would be able to hear over what we were doing. When the movie ended the crowd left. Steve & I finished the clean up, hoping not to leave a mess for Tiffany for when she returned home. It was an awesome party.

Oh, one more thing: the Tetris Cube. I had brought this awesome puzzle with me with the hopes of awarding someone with a prize for completing it. I bought this item back in May and no one has solved it yet. It has been at our house for people who visit to try to solve. I took it to the Social, with a story taped to the bottom of the box so that those who wanted to, could read why they are competing to solve the puzzle, as well as try to solve it sometime prior to the end of the party. Elana spent the most time on it. Bruce gave it a try. Mike said he couldn't talk and do it at the same time, so he didn't

try. I saw several folk trying but no one won the prize. The prize was going to be the Tetris Cube that someone one as a door prize. I had wrapped it in such a way that I knew what it was and I was going to award that as the prize for completion, but instead, no one won. So, maybe next year, I'll come up with some other items to bring as entertainment for those who are sitting inside keeping warm while the rest of us were outside playing Darts.

Thanks to everyone who attended. Thanks for all the cool food, fun, and help through the event. I couldn't have done it without the helpers. I look forward to next year's event. If you have any ideas on games to play, things to do at the next event, send them to me and we will discuss the possibility of including it in the schedule. I hope everyone who attended has as much fun as Frank did laughing, and I did by being with all my good PAS friends! ***

Upcoming February PAS Events

By Terri, Event Coordinator

Wow, February snuck up on me so quickly. Already it is time to talk about the events. We don't have that many lined up for February but as they come in, we will be posting more. Schools have been requesting our participation at their locations. Most of them have asked for March - May. Watch for those announcements in future issues of PAStimes as we can use all the help we can get. And Schools are great for star parties, as you get the ooooo's and aaaaaah's from the kids who look through your telescope. It's well worth your time.

2/5 We start our February with the PAS Meeting. Our own, Mike Marron is our Guest Speaker and he has an awesome presentation lined up for you to enjoy. Bring everyone you know. It will be a crowded meeting because Mike has also invited some other groups who are interested in his presentation. We may have limited seating. Meet at 7pm like usual, and Mike wants the full amount of time for the presentation, so we will begin with him as close to 7:30 as possible. Don't be late or you will miss it!

2/12 Every semester we provide one INDOOR/OUTDOOR Astronomy Event at PVCC. We will be doing this event with the help of volunteers. Do you have something cool to share with the public about astronomy? Bring it along on this date. We will set up in G-147 for the indoor portion and those

who can bring telescopes, we need the outdoor portion to have as many telescopes as possible. The RSVP is with Terri for this event and you need to RSVP your plans by Tuesday 2/10. The more volunteers we have, the more fun everyone has. I currently have these RSVP's: Rod with a telescope and Mike with his Meteorites. We need more than those two to make this successful. Get back to me on this right away. Thanks!

2/21 will be the next Mayer CEO PAS Members only Dark Sky star party. What is this? Chris, our awesome Webmaster, hosts a star party at HIS Observatory up in Mayer, AZ. This event is closed to anyone who is not a current PAS Member. To attend, you must RSVP with Chris preferably 2 days prior. Chris goes up to his observatory Friday morning and stays until Sunday afternoon. PAS Members are welcome from Noon on Saturday to Noon on Sunday or longer if confirmed with Chris. You must RSVP so Chris knows you are coming up to join him. Dress warmly as it is quite a difference in temperatures between Phoenix and Mayer. Enjoy!

2/26 PAS Meeting of the Minds. The Business meeting. Topics make the meeting. If not enough topics are acquired to hold the meeting, we cancel it. Send your topics to Terri, today!

2/28 3rd Quarter Moon Star Party in Black Canyon City. The RSVP for this star party is with Rod. If there are no RSVP's public or PAS, the star party will be canceled. Also, watch the weather at this time of year. The star party begins at sundown and a \$2/vehicle fee is collected. PAS PAYS for the use of the park. The park managers turn out the lights and keep the bathrooms open past 10pm, allowing the star gazers (that's us) to enjoy the night without lights and still have bathroom facilities. If you arrive after dark, please come in with only your parking lights on and watch for either a green beam or red flashlights to guide you to a parking spot. The RSVP must get to Rod by Friday.

We hope to see you at a lot of exciting PAS events. This month may not have many listed but we hope to see you at the ones we have scheduled thus far. Below is a brief list of some of the upcoming March School star parties for which we can really use PAS members help. If you aren't a PAS member and would like to assist, please RSVP with Terri to get set up. We welcome your help.

3/3 Chaparral High School, all school star party.

3/6 Glen Burton all school star party

2009 PAS New Year's Social



2009 PAS New Year's Social



Arizona Sky

By Leah Sapir

Orion and Taurus are the centerpiece of our sky this month. Last month we discussed nebulae; but Orion and Taurus also have several interesting open clusters that are worth looking at.

The Hyades cluster, about 150 light years from us, makes up most of the V-shaped head of Taurus the bull. The bright star Aldebaran, sometimes considered to be the “eye of the bull”, is a foreground star at about half that distance.

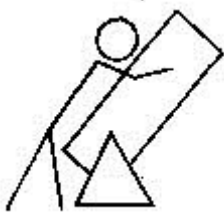
About 3 degrees northeast of Aldebaran is a charming open cluster, NGC 1647, about 1800 light years away; and about 6 degrees further northeast is open cluster NGC 1748, about 2000 light years away. NGC 1748 appears to be one large cluster, but it could actually be several overlapping clusters, which have been given the NGC numbers 1750 and 1758. And about 7 degrees south of NGC 1748 is a side-by-side pair of clusters, NGC 1817 and the smaller NGC 1807. NGC 1817 is estimated to be about 6000 light years away; the distance to NGC 1807 is unknown.

About 14 degrees east of NGC 1817, in Orion’s upraised arm, is another cluster known as NGC 2169. However, many people just call it “the 37 cluster”. Take a look at it and you’ll see why – the stars are arranged in the form of the number 37! NGC 2169 is about 3000 light years away.

Although the Winter Circle is still center stage, Leo is rising in the east, bringing Saturn with it. Saturn rises at around 9 pm at the beginning of the month, a little earlier at the end of the month, and will be visible all night.

Venus will be high in the west at sunset, and is beginning to show its phases. Over most of the past six months, when viewed through a telescope, Venus was just a small circle. But now it is starting to look like a half-circle, and during the month of February it will move into the crescent phase.

We’ve been watching Venus getting brighter and brighter over the past months, and this is not a coincidence. Venus is closer to us in the half phase than it is in the full/gibbous phase that we saw in the summer and fall; and



when it appears as a crescent, it is even closer. So the half phase is larger and brighter than the full phase; and the crescent phase is even brighter – even though only part of the planet is lit up.

Interestingly, it was the phases of Venus that provided proof to Galileo that the planets revolve around the sun.

Galileo’s telescope was small – with an aperture of about 1 inch, and magnifying power of 20-30 times – but it was the first time that any optical instrument had been pointed at the sky. Galileo’s discovery of sunspots and moon craters provided useful new information, and his discovery of Jupiter’s moons showed that other objects besides the earth could have satellites, and that these satellites would not be “left behind” as the planet moved. But it was the phases of Venus that provided the actual proof of the Copernican theory.

Galileo began to observe Venus in the summer and fall of 1610. He noted that at first he saw Venus as a small circle; around October it began growing in size, but still remaining approximately circular; then gradually he saw it becoming a half-circle in November, with the round side towards the sun; and by the end of December it began to move into the crescent phase.

These observations were in contradiction to what was expected from the Ptolemaic-Aristotelian theory. Prior to Copernicus, it was believed that Venus and the sun both orbited the earth, at approximately the same speed (explaining why Venus is always seen close to the sun – either a little after sunset or a little before dawn). In order to explain why Venus is sometimes a morning star and sometimes an evening star, the theory assumed that Venus moved

in an “epicycle” – a small circle in which it moved along its regular orbit.

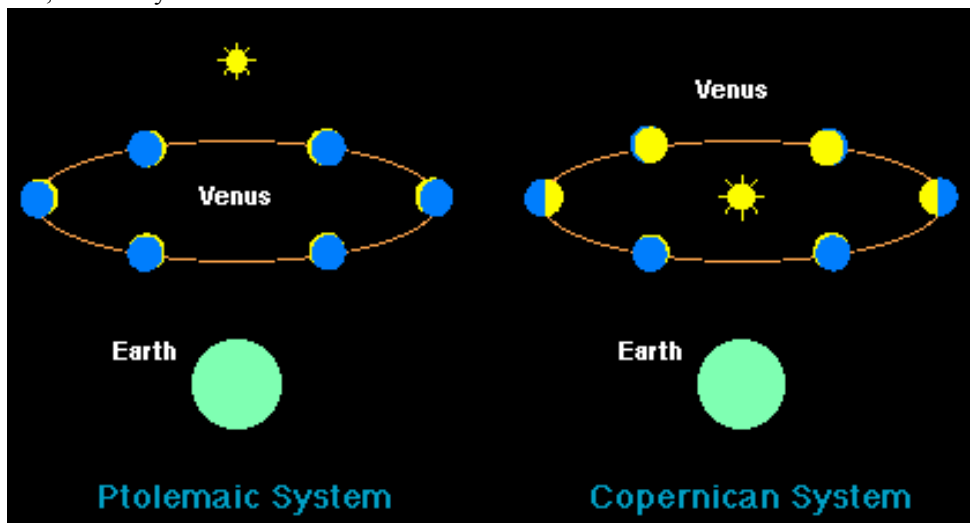
According to this theory, Venus would also have phases, but the question was: which ones? It depended on whether Venus was located between the earth and sun, or beyond the sun. If Venus were located between the earth and sun, it would vary from a small crescent to a semicircle to a larger crescent as it moved through its epicycle, but it would never show a gibbous or full phase. On the other hand, if Venus were beyond the sun, it would vary from a small circle to a larger circle (at times slightly gibbous) but would never show a crescent phase. The difference in sizes between the small and large crescent, or the small and large circle, would depend on the size of the epicycle.

But Galileo’s observation of both the circular/gibbous and the crescent phase, and the fact that the crescent is larger than the gibbous, proved that Venus orbits the sun. These phases can be explained only if Venus is sometimes between us and the sun, and sometimes beyond the sun.

Another theory at the time (“celestial light”) concerned the source of the planets’ light. Did the stars and planets produce their own light, or did they reflect sunlight? This question was relevant because, if the planets produced their own light, they would either not have phases, or their phases would be unpredictable.

Based on his observations, Galileo’s conclusion was that planets reflect the sun’s light; but that the stars produce their own light. How did he reach this conclusion?

Galileo observed that Mars, when closest to the earth, can appear brighter than



Arizona Sky

Jupiter, even though Jupiter is much larger; and that Saturn always appears dimmer than either Mars or Jupiter due to its greater distance from the sun. This would indicate that they are all shining with reflected light.

On the other hand, the stars are much farther away than the planets, and should therefore be much much dimmer if they only reflected sunlight. Their brightness shows that they produce their own light.

We do not know how Galileo reached his conclusions regarding the relative distances of the planets, although a logical possibility would be the length of their

orbits, as seen in the amount of time it would take for each one to return to the same position in the zodiac.

Today we take these conclusions for granted; but it is amazing how Galileo and Copernicus reached their conclusions without the knowledge that we have today.

Regarding the other planets, early risers will have a treat this month. Mercury will be a morning star all month, joined after mid month by Jupiter and our long-lost friend Mars, which hasn't been seen since it faded into the sunset in November. Jupiter and Mars will be in conjunction on February

16-17 (but very close to the horizon); Jupiter will then start moving towards Mercury, and on February 22, early birds will be able to see a nice lineup of the crescent moon with Mercury, Jupiter, and Mars (in that order, going towards the horizon). Mercury will begin moving down towards the horizon, and will have a conjunction with Jupiter on February 23, and with Mars on February 28.

Join us next month when we continue to explore the winter and spring constellations. And till then – wishing you clear skies, and happy observing!

January PAS Meeting Review 1/8/09

That's right. We had a January PAS Meeting. It's the first in a long time. Now that we are back in sequence, let's start seeing more people at the meeting. For this meeting, we had Frank Timmes. Frank did a very interesting topic. This is rather funny because his topic was announced as Supernova. Yes, he did talk about supernova but what was interesting about it is that 2 days later (read about it in this issue) we had the White Dwarf Gift Exchange. The type of Supernova we were learning about was White Dwarf Supernova. So, even though I didn't know the specifics when I scheduled his presentation, Frank told us about the Gift Exchange, indirectly! I thought that was a funny coincidence.

So, Frank did a fantastic presentation. You should have been there. We started the day, I mean prior to our PAS meeting, having to change our meeting location. It was forgotten that the January PAS meeting would fall on Winter break for the college. So, PVCC had its library, among other doors, locked. So, I got word from Dave we were to hold the meeting in G-147. I made some signs, and thanks goes to Matt for hanging them for me. Then, we found ourselves in G-147 watching this very energetic, and hard to photograph Guest Speaker, Frank. I can't say I got any good photos of him doing his presentation but feel free to visit this link <http://tinyurl.com/8ao4j7> and see the photos that were gathered.

The meeting opened a little late. Having arrived late I asked the Speaker if I could borrow about 10 minutes and he didn't seem to have any problem with that. So, I went around and delivered Year in Space Calendars and PAS Name Badges. If you didn't

pick up your badge or calendar at this meeting, be sure to catch me at a future one. I will have them at PAS Meetings (1st Thurs of month) unless someone specifically requests that I bring them to another event prior to that event.

I wish to thank Sam for bringing the popcorn, for which I missed out on. Thanks to the Wurst's for bringing the water. Bob brought another box of Oreo Cookies which were a hit. At the back of the room, we put the snacks. I wish to thank everyone who donated to the snack fund. I used that money to purchase the water supply for the rest of the season - to May I believe we are taken care of. So, any other funds coming in through the snack fund can then be turned into cookies.

We had Chris talk about his Observatory and that the next Cuttin' Edge Observatory star party in Mayer (CEO) is on Jan 24th. We had Jerry tell us about the big rocket launch coming up on the last weekend of January 26 to Mar 1. If you are interested in attending these events, please see the website for CEO on the calendar date, and visit the back page of the Newsletter for the link to the Rocket Launch.

The 50/50 was won by Steve Palmer this time. \$34 was raised, 1/2 to Steve, 1/2 to the club. And at the handout section in G-147 I asked that everyone attending the Social list what they wanted to bring to the event in the way of food. This was like pulling teeth. I don't see why people can't plan ahead. We did very well, though. We had a nice variety and only one person doubled someone else's item because HE wouldn't review the list at the meeting, prior to the party. I wish

to also thank Steve Palmer for being our Host and getting everyone to sign in at the meeting. I really appreciate his help. John Pulis, the official PAS Host isn't doing well health wise, so having Steve fill in for him really made things go smoother for me. Thanks Steve! And many thanks goes to Dave (PVCC) for opening up the room to us when he didn't have to (Winter Break), and for putting on the awesome constellation lights on the ceiling and the note taking lights for which I appreciated so I could photograph the Speaker. And many thanks goes to Jerry for donating a couple MOON calendars to go with the 50/50 raffle. That was a nice surprise

Then we turned it over to our Fabulous Speaker. Frank talked all about White Dwarf Supernova and it was very informative and enjoyable. Thank you Frank!!!

At the next PAS Meeting, please come have a viewing of a display, put up by Bob Senzer, in the Library of his Flashlight collection. You won't want to miss this at the February PAS meeting. Thanks goes to everyone who attended the January PAS Meeting. We hope to see you at future events as well. Welcome to the club, new PAS member Elaine. And Thanks goes to Tim and his lovely children for attending this meeting as well. See you at the next event!!! ***

ASU WEST STAR PARTY

March 4, 2009, 7pm - 9pm
Volunteers needed. More info in next issue.



Severe Space Weather

by Dr. Tony Phillips

Did you know a solar flare can make your toilet stop working?

That's the surprising conclusion of a NASA-funded study by the National Academy of Sciences entitled *Severe Space Weather Events—Understanding Societal and Economic Impacts*. In the 132-page report, experts detailed what might happen to our modern, high-tech society in the event of a “super solar flare” followed by an extreme geomagnetic storm. They found that almost nothing is immune from space weather—not even the water in your bathroom.

The problem begins with the electric power grid. Ground currents induced during an extreme geomagnetic storm can melt the copper windings of huge, multi-ton transformers at the heart of power distribution systems. Because modern power grids are interconnected, a cascade of failures could sweep across the country, rapidly cutting power to tens or even hundreds of millions of people. According to the report, this loss of electricity would have a ripple effect with “water distribution affected within several hours; perishable foods and medications lost in 12-24 hours; loss of heating/air conditioning, sewage disposal, phone service, fuel re-supply and so on.”

“The concept of interdependency,” the report notes, “is evident in the unavailability of water due to long-term outage of electric power—and the inability to restart an electric generator without water on site.”

It takes a very strong geomagnetic storm to cause problems on this scale—the type of storm that comes along only every century or so. A point of reference

is the “Carrington Event” of August-September 1859, named after British amateur astronomer Richard Carrington who witnessed the instigating solar flare with his unaided eye while he was projecting an image of the Sun on a white screen. Geomagnetic storms triggered by the flare electrified telegraph lines, shocking technicians and setting their telegraph papers on fire; Northern Lights spread as far south as Cuba and Hawaii; auroras over the Rocky Mountains were so bright, the glow woke campers who began preparing breakfast because they thought it was morning!

“A contemporary repetition of the Carrington Event would cause ... extensive social and economic disruptions,” the report warns. Widespread failures could include telecommunications, GPS navigation, banking and finance, and transportation. The total economic impact in the first year alone could reach \$2 trillion (some 20 times greater than the costs of Hurricane Katrina).

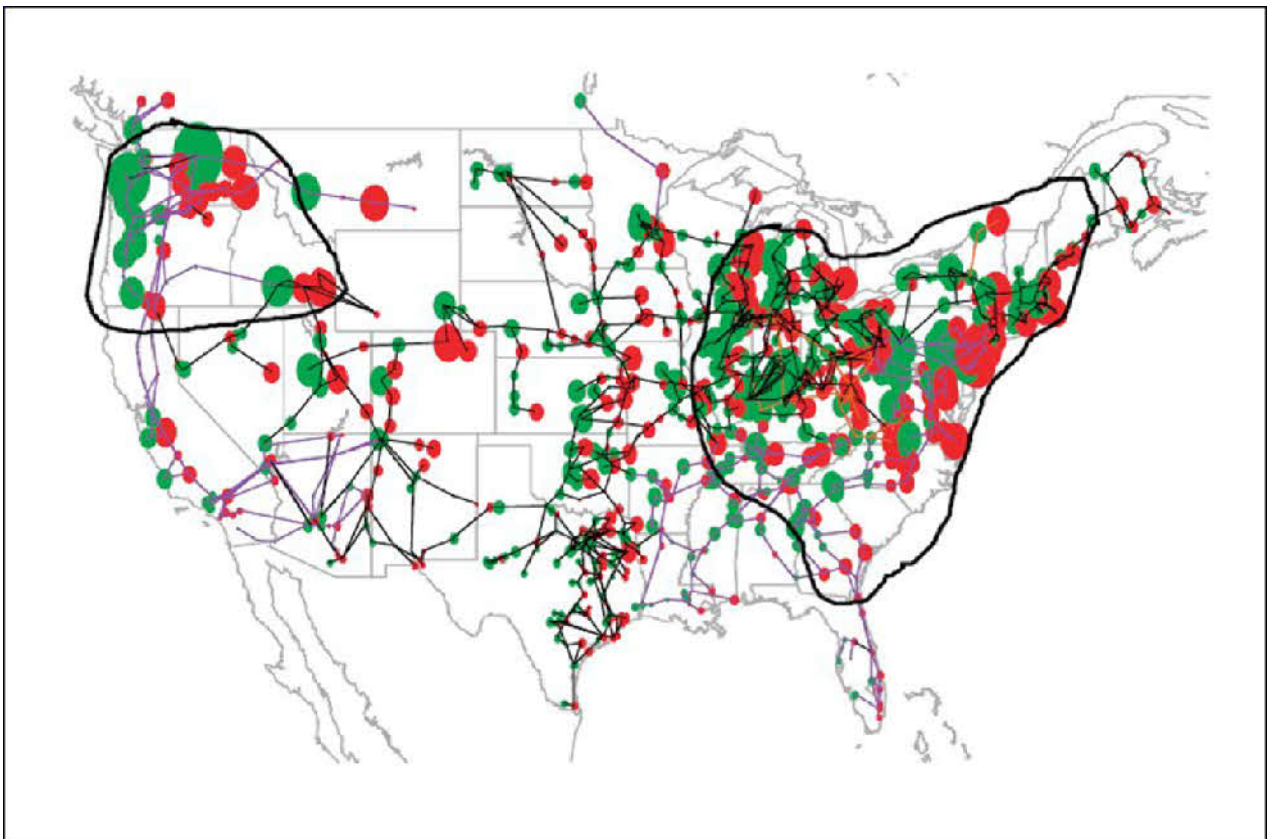
The report concluded with a call for infrastructure designed to better withstand geomagnetic disturbances and improvements

in space weather forecasting. Indeed, no one knows when the next super solar storm will erupt. It could be 100 years away or just 100 days. It's something to think about ... the next time you flush.

One of the jobs of the Geostationary Operational Environmental Satellites (GOES) and the Polar-orbiting Operational Environmental Satellites (POES) operated by NOAA is to keep an eye on space weather and provide early warning of solar events that could cause trouble for Earth.

You can keep an eye on space weather yourself at the National Weather Service's Space Weather Prediction Center, www.swpc.noaa.gov. And for young people, space weather is explained and illustrated simply and clearly at the SciJinks Weather Laboratory, scijinks.gov/weather/howwhy/spaceweather.

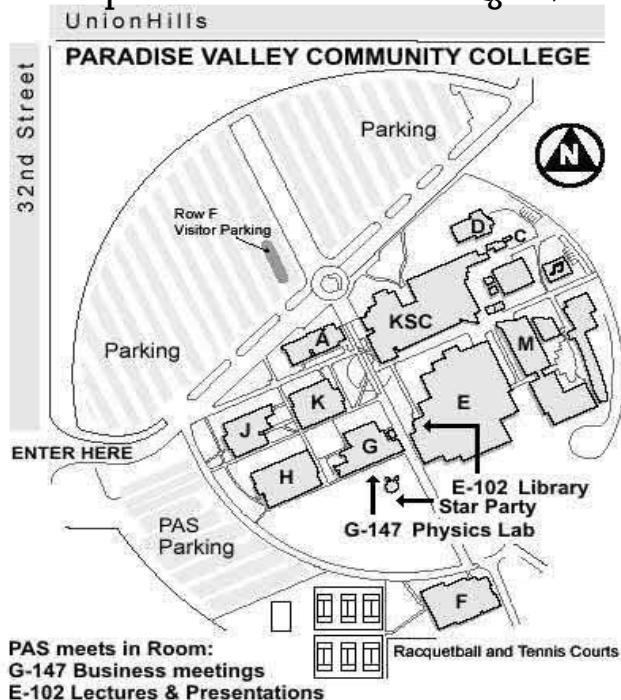
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



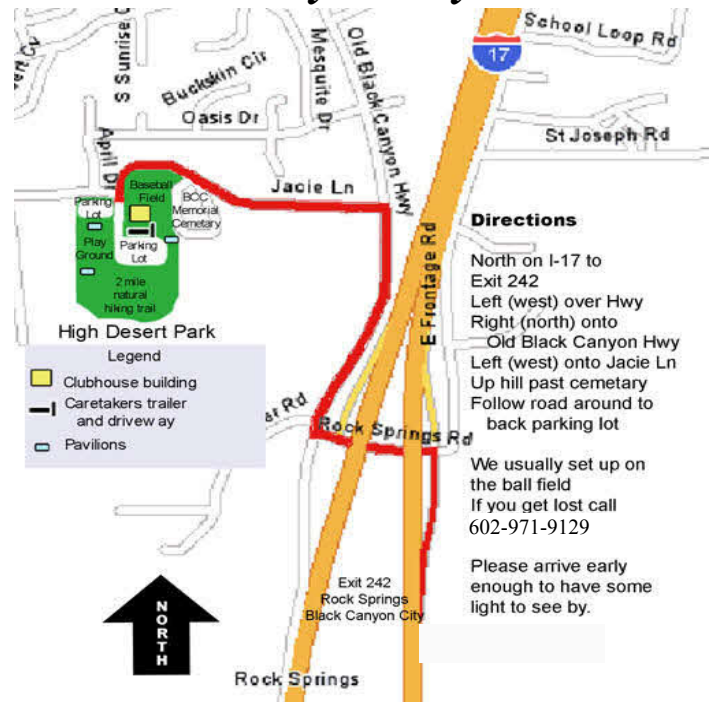
On this power-grid map of the United States, the black-circled areas are regions especially vulnerable to collapse during an extreme geomagnetic storm. Inside those boundaries are more than 130 million people.

Credit: National Academy of Sciences report on severe space weather.

Map to PAS Meeting Location



Black Canyon City Site



For More Information on events See Page 3

February 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5 PAS General Monthly Meeting	6	7
8	9	10	11	12 PAS/PVCC Indoor/Outdoor Astronomy Event	13	14
15	16	17	18	19	20	21
22	23	24	25	26 PAS MEETING OF THE MINDS (Business Meeting)	27	28 3rd Quarter Moon Star Party at High Desert Park in BCC

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February 15 2009

Sunrise: 07:09
Sunset: 18:14

What's Up For February?

By Rod Sutter, PAS President

Planets

Name	Date	Rise	Set
Mercury	02-1-09	08:04	18:33
Venus	02-1-09	10:02	20:53
Mars	02-1-09	06:55	16:47
Jupiter	02-1-09	08:00	18:12
Saturn	02-1-09	22:01	10:33
Uranus	02-1-09	10:23	22:03
Neptune	02-1-09	09:03	19:49
Pluto	02-1-09	05:31	16:08

All Times Arizona Time



New: January 26



Q1: February 3



Full: February 9



Q3: February 16