Newsletter of the Pomona Valley Amateur Astronomers

There is the sky, which is all men's together.
Euripides

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President's Address

February will be a busy month for PVAA. We will be having four public star parties (three of them in one week). On February 11th we have a star party at the main branch of the Ontario Library. On the 12th we will be at Sycamore Elementary School on 13th street in Upland for their "Space Science Night." I believe this is the fourth year that we have been invited to participate in this event. In the past we have had a big turnout at Sycamore with lots of interest from both students and parents.

In fact the "Space Science Night" at Sycamore has been such a success that Pepper Tree Elementary School (also in Upland School District) has invited us to have a star party with them as well. Pepper Tree Elementary is on 18th Street and the star party will be on February 13th.

After a week of rest, on February 26th we have another public star party at Colony Branch of the Ontario Public Library. The library is located on the campus of Colony High School on Riverside Drive in southeast Ontario. This is our second star party at this location. The first was well attended.

This is a lot of star parties in a short time. Please keep these dates in mind and attend with your telescopes or binoculars. If you can't attend all four make it to as many as you can. We need everyone's help to make these four events successes.

Ron Hoekwater

Site Legend
(AB) Anza-Borrego
(CS) Cottonwood Springs campground, Joshua Tree Natl. Pk
(MB) Mecca Beach Campground
(MS) Mesquite Springs campground, Death Valley National Pk
(WM) White Mountains (Grandview Campground)

January Speaker

NASA's latest venture into the solar system is the ambitious and exciting Dawn mission, launched in September 2007. The spacecraft will orbit both Ceres and Vesta, which are among the last unexplored worlds in the inner solar system. They are the two most massive residents of the asteroid belt, a vast collection of bodies between Mars and Jupiter. Ceres is so large that it is included in the new category of dwarf planets, along with Pluto. The alien landscapes Dawn will reveal should provide humankind with a new perspective on the solar system. Remnants from the time that planets were formed, Ceres and Vesta hold clues that will help scientists understand the dawn of the solar system. Dawn will be the first spacecraft ever to orbit an object in the asteroid belt and the first ever to orbit two targets. Such a mission would be impossible without the use of ion propulsion, a technology that has mostly been in the domain of science fiction, but which was tested extensively on the successful Deep Space 1 mission, paving the way for Dawn.

Dr. Marc Rayman will describe the Dawn spacecraft and its use of ion propulsion as well as its two exotic destinations. He will also share the excitement of flying a mission in deep space.

PVAA Events Calendar

Month	Star Party	General	Board
February	9(AB)	22	14
March	8(MS)	21	13
April	5	18	10

Integrated Video Observing — Making Faint Fuzzies History

Amateur astronomers throughout the world share one thing in common. We are constantly searching for equipment and technology that will improve our views of the universe. At one time or another most of us have experienced aperture fever. Amateur astral imagers often stumble upon the right combination of telescope, camera and processing software to produce beautiful images of the universe. One group of amateur astronomers remains almost "underground"; video observers. This relatively small number of amateur astronomers accomplishes visual astronomical observations through the technology of integrated video cameras. Over the past few years integrated video technologies have improved dramatically. There are many video systems available to choose from. Where the systems vary in some respects, their underlying operations remain the same. A video camera is adapted to work well in a low light environment. The camera is connected a telescope in place of the eyepiece. The video signal is then transmitted to a TV monitor to be observed.

One system that is catching accomplished visual observers by surprise is the Astrovid Stellacam II. I purchased a Stellacam II in 2006. The results have been very rewarding. In this case the manufacture's claims of out of the box operations are true. Just about everything you need is included in the purchase price. Connecting the camera to the telescope is very easy. A 1.25" C adapter screws into the front end of the camera. The Stellacam II has no lens and operates at prime focus. Once the C adapter is attached the camera simply slides into the telescope's 1.25" opening. A composite video cable attaches the back of the camera to the back of the monitor via BNC and RCA connectors.

The Stellacam II system is monochrome (detects only black and white) and are said to produce greater details. A high resolution black and white monitor is recommended; however almost any TV monitor with a video in jack will work. Monitors ranging in size from 8" to 12" provide very pleasing views. A 12" monitor seems to be the choice among video observers. For public events some imaginative observers are using big screen TVs in the back of vans and SUVs to create mini observatories.

A fast telescope when connected to a Stellacam II will produce a brighter and a wider field image. I reduce my f/10 Schmidt Cassegrain telescope down to f/5. A screw-in focal reducer screws into the open end of the 1.25" adapter produces a brighter tighter light cone. The reducer has a pop-on rubber cap that acts as an additional block against static dust accumulating onto the cameras exposed chip.

The Stellacam II is controlled by way of a separate control box. Three settings will produce stunning real time images of deep sky objects. A large dial controls the time which light is allowed to accumulate (integrate) on the camera's sensor. The Integration times range from 1/30th of a second to 8.5 seconds. Effectively this acts as a shutter for the camera without having the draw backs of a mechanical shutter. Signal strength is controlled by a smaller dial, and a gamma switch allows the operator to control the contrast of the transmitted object. That' it! No more settings. For in-depth studies and discussions of an image, the operator of the Stellacam II can choose a desired image and "freeze" it on the monitor via a red Freeze button found on the side of the control box. Even while a cloud completely obscures your target you are able to study and enjoy a previously frozen image. Depressing the Freeze button returns you to live observations.

The most popular integrating video cameras available on the market come equipped with on board micro computers. These tiny yet powerful computers are continuously receiving, storing, converting, and transmitting the signal received from the telescope. Initially the signal from the telescope is received as an analog signal. The camera's micro computer quickly converts this analog signal to digital. Settings of frame accumulation, gain and gamma help to improve the image. Within split seconds the micro computer converts the improved signal back to analog and transmits it to the monitor, ready to be enjoyed.

The Stellacam II was designed strictly for Deep Sky Objects observations. The cameras fastest exposure of 1/30th of a second is still to slow for solar system objects. The newer Stelalacam 3 does allow for live transmissions of solar system objects. For those who are looking to get in from the cold and would enjoy observing from the comfort of their home or other enclosure, the Stellacam systems will soon be equipped with wireless systems. A wireless controller and an inexpensive video link will allow you wireless operations and transmission , through walls up to 150 feet. Line of sight (no walls) operations can be accomplished up to 300 feet. Cost is $395.00. If noise concerns you due to weather temperatures or exposure duration a regulated cooling is available for both the Stellacam II and the Stellacam 3 .

My biggest enjoyment of the my Stellacam II has been the amount of backyard observing I am able to accomplish. No longer are city lights or moon an issue. From my back yard in Pomona with a 9 day moon I am able to enjoy live detailed and sharp views of galaxies, many nebulas and globular clusters. Easily visible are the dust lanes of the Sombrero galaxy, wide spread nebulosity of the Orion nebula and resolved stars close to the core of M13. To see these targets through the eyepiece from my backyard I would need to use averted imagination, as averted vision does not do much. With the Stelacam II, I sit and enjoy views on my monitor which are better than dark sky observations through the eyepiece. When I do venture out to dark skies with the Stellacam I see more detail and I am able to go deeper in space. Faint Fuzzies are indeed history.

Integrated video observing will never replace the beauty of a well taken CCD or DSLR image taken by an experienced astral imager nor will it ever replace that special feeling you get when distant photons which have traveled trillions of miles hit your eyes through an eyepiece. But for now with my old man eyes and feet I will sit down and enjoy video observing.

Next, maybe a warm camper with wireless transmissions in a secluded dark sky location. Hmmm...

Frank Busutil

Japan vs China – A New Space Race?

What's up with Japan and China in rival orbits around the Moon? Well, it looks like a showy contest to see who can do the best lunar exploration from orbit since the U.S. and Russia raced rocket to rocket decades ago. The two ancient Asian enemies have both gone into lunar orbit this past autumn with patriotic spacecraft. It's a battle of legendary ladies, the Japanese have Kaguya (a Moon Princess) and the Chinese, Chang'e 1(Moon Goddess 1). Where are these suddenly expansive nations getting the money for all this? Well, as I look around my house I see that all my electronics are products of Japanese corporations, everything else is "made in China." Remember when we were #1 in lunar exploration?

But I'll put my money on the most electronically experienced. That would be the Japanese, having already reached the moon in 1991 with their probe Hiten (flying angel). Sadly its transmitter failed and its orbit was quite loopy. Things went from bad to worse and Hiten plunged to the lunar surface in 1993. But defeat is unknown to the Japanese and now they're back in orbit with a much more technologically sophisticated craft.

First called Selene (Greek Moon Goddess) perhaps to appeal to Western scientists, the craft soon took on the nationalistic name of a Japanese lunar princess. Kaguya is a folktale princess born on Earth and destined by divine fate to return to her rightful home, the Moon. Like a proud princess Kaguya will give birth to two "baby" satellites attached to it. Also having a traditional name, Okina (originally called Rstar) will relay radio signals and study the Doppler shift when Kaguya goes behind the Moon. Ouna (originally called Vstar) will measure lunar gravity. This masterful orbiter has already transmitted the first high definition television moving images (HDTV) ever taken of the lunar surface. Flying low over the rarely photographed lunar South Pole region Kaguya took spectacular motion picture shots of both Earthrise and Earthset. It peered into deep rugged valleys (where the sun never shines) in hopes of finding the most valuable substance on the Moon – water ice.

Meanwhile, the smaller Chinese spacecraft arrived a month later, snapped a few photos and transmitted a heroic concert of Chinese songs like "My Beloved Motherland" and "I Love The Yangtze River." However there's more to come, Chang'e 1 has a CCD stereo camera, laser altimeter, gamma ray spectrometer, and other instruments to prepare for "potential future landings." No way those chauvinistic Japanese are going to get the upper hand.

Of course the Japanese have all these instruments and much, much more. Kuguya's object is to obtain advanced scientific data for "future total lunar exploration." Both countries jingoistically refer to their programs as "the first lunar scientific examination." I think if the Chinese finally land the Japanese will probably be there to greet them. It doesn't matter who "wins" this new space race, it can only add to our overall knowledge of the Moon.

Lee Collins

December Star Party

With the price of gasoline being what it is and the possibility of unfavorable weather conditions, I considered skipping the December 1th Mecca Beach star party. In fact the last weather forecast that I saw before leaving home predicted fog. But I am glad that I made the 120 mile drive out to Mecca Beach Campground on the northeast shore of the Salton Sea. The view of the sky was good and the company was great.

By a lucky coincidence, the PVAA star party was the same night as the park was having a campfire program on astronomy. So even though Karen Chapman and I were the only PVAA members to make it out to the star party, there were several people with an interest in astronomy in the campground that night. During the campfire program we saw the International Space Station go over. Also, I got to meet some of the other campers and invite them to come over to the telescope later. The program started at dusk and by the time it ended it was dark enough to start observing.

The sky was clear but the seeing was not very steady. We spent some time looking at Mars but it was impossible to see much surface detail. Deep sky objects were better. Of the deep sky objects that we looked at, my personal favorite was IC 443. This is a faint supernova remnant in Gemini. We also looked at M1, the Crab Nebula. I love to look at what's left of exploded stars. During the evening, Karen and I talked about astronomy and other stuff. She retired from the same school district that I work for. It added to the evening to have someone else to observe with and talk to. I learned some things about the school district.

In the morning Karen was kind enough to make breakfast for us both. I took my time packing up and took some photos of the birds. There were quite a few pelicans (both brown and white) that day. Around noon or maybe a little later, I headed home. It was a pleasant trip.

Ron Hoekwater

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Even Thin Galaxies Can Grow Fat Black Holes

NASA's Spitzer Space Telescope has detected plump black holes where least expected -- skinny galaxies. Like people, galaxies come in different shapes and sizes. There are thin spirals both with and without central bulges of stars, and more rotund ellipticals that are themselves like giant bulges. Scientists have long held that all galaxies except the slender, bulgeless spirals harbor supermassive black holes at their cores. Furthermore, bulges were thought to be required for black holes to grow.

The new Spitzer observations throw this theory into question. The infrared telescope surveyed 32 flat and bulgeless galaxies and detected monstrous black holes lurking in the bellies of seven of them. The results imply that galaxy bulges are not necessary for black hole growth; instead, a mysterious invisible substance in galaxies called dark matter could play a role. "This finding challenges the current paradigm. The fact that galaxies without bulges have black holes means that the bulges cannot be the determining factor, " said Shobita Satyapal of the George Mason University, Fairfax, Va. "It's possible that the dark matter that fills the halos around galaxies plays an important role in the early development of supermassive black holes." Satyapal presented the findings today at the 211th meeting of the American Astronomical Society in Austin, Texas. A study from Satyapal and her team will be published in the April 10 issue of the Astrophysical Journal.

Our own Milky Way is an example of a spiral galaxy with a bulge; from the side, it would look like a plane seen head-on, with its wings out to the side. Its black hole, though dormant and not actively "feeding," is several million times the mass of our sun. Previous observations had suggested that bulges and black holes flourished together like symbiotic species. For instance, supermassive black holes are almost always about 0.2 percent the mass of their galaxies' bulges. In other words, the more massive the bulge, the more massive the black hole. Said Satyapal, "Scientists reasoned that somehow the formation and growth of galaxy bulges and their central black holes are intimately connected."

But a wrinkle appeared in this theory in 2003, when astronomers at the University of California, Berkeley, and Observatories of the Carnegie Institution of Washington, Pasadena, Calif., discovered a relatively "lightweight" supermassive black hole in a galaxy lacking a bulge. Then, earlier this year, Satyapal and her team uncovered a second supermassive black hole in a similarly svelte galaxy.

In the latest study, Satyapal and her colleagues report the discovery of six more hefty black holes in thin galaxies with minimal bulges, further weakening the "bulge-black hole" theory. Why hadn't anybody seen these black holes before? According to the scientists, bulgeless galaxies tend to be very dusty, letting little visible light escape. But infrared light can penetrate dust, so the team was able to use Spitzer's infrared spectrograph to reveal the "fingerprints" of active black holes lurking in galaxies millions of light years away. "A feeding black hole spits out high-energy light that ionizes much of the gas in the core of the galaxy," said Satyapal. "In this case, Spitzer identified the unique fingerprint of highly ionized neon -- only a feeding black hole has the energy needed to excite neon to this state." The precise masses of the newfound black holes are unknown.

If bulges aren't necessary ingredients for baking up supermassive black holes, then perhaps dark matter is. Dark matter is the enigmatic substance that permeates galaxies and their surrounding halos, accounting for up to 90 percent of a galaxy's mass. So-called normal matter makes up stars, planets, living creatures and everything we see around us, whereas dark matter can't be seen. Only its gravitational effects can be felt. According to Satyapal, dark matter might somehow determine the mass of a black hole early on in the development of a galaxy. "Maybe the bulge was just serving as a proxy for the dark matter mass -- the real determining factor behind the existence and mass of a black hole in a galaxy's center," said Satyapal.

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For graphics and more information about Spitzer, visit
http://www.spitzer.caltech.edu/spitzer and
http://www.nasa.gov/spitzer

Tech Trek

Our Club member and occasional speaker, Dr. Joann Eisberg, would like to share with us a great program along with letting us know about a related educational opportunity being presented at Chaffey College's Milliken Planetarium Saturday, January 26th at 10 a.m.

Tech Trek is put on by the American Association of University Women (AAUW). Local middle school girls apply to the program and the AAUW picks up $800 cost for each camper. Campers then attend a week-long summer science camp at UC Santa Barbara. Last year, six girls were selected from our area.

To help fund the Trek camperships, the local AAUW Chapter is working with the Chaffey College science department to sponsor a fundraiser. Dr. Eisberg will present the program and her presentation should interest PVAA members. It will cover both the history of astronomical spectroscopy, which is the key source of the information telling us what stars really are, and a neat (and very pretty) demonstration of the spectra of many different elements.

If you'd like to help with this great program designed to bring science and an awareness of college opportunities to our local young people or if you'd just like to attend a terrific lecture; put the event on January 26th into your schedule. Cost for the lecture is $5 for community members and free for students. Checks should be made payable to Tech Trek 2008.

Claire Stover and ***Joann Eisberg***