

Southwest Florida Astronomical Society

SWFAS



The Eyepiece

March 2013

A MESSAGE FROM THE PRESIDENT

It's time to Leap Forward!

Our meeting for February with the PST auction was great! We collected a large portion of the funds for the PST and the club agreed to cover the difference until other equipment was sold that should fully cover the cost. The PST is in and works great on the club's CPC-800.

The *Kiwanis Science Fair* at FGCU on Feb 2nd was great. Dick Gala and I were there the whole time and Carole and Torbjörn Holmberg came out for several hours. We had to watch out for falling soda bottle rockets as Glen from the Edison Home was launching them behind us on the basketball court!

Kelly Flaherty had a small group for *Astronomy for Amateurs* and Tony Heiner and Steve Cobb and I went out and had a very good night out there. Unfortunately, the next night at the CRP Star Party, after looking like a good night, clouds rolled in shortly after dark and did not let up! We had a good turnout of people, just too many clouds.

Carol Stewart had a large turnout for the *Moonstruck* event at CNCP. Weather looked bad and she basically told people to not bother. She really could have used the help as it did clear.

Due to weather, we called off the *Rotary Park Star Party* for Fri Feb 15th. We rescheduled it for Sat Mar 2nd, but at this time, the weather is looking bad.

Weather did cooperate on Feb 23rd for the *Burrowing Owl Festival* at Rotary Park in Cape Coral and the *Edison Day of Discovery* at the Imaginarium. Dick Gala came out to help me at the BOF and Carol Stewart had help from Tony Heiner and Richard Sozio at the Imaginarium.

This month's meeting program is *Twelve Greatest Astronomical Events* by Jack Berninger. Jack will also present *Astro-geology* for the April meeting.

We have a major event at the Lee County School Board building at Metro/Colonial on March 9th during the day for their *STEMtastic* event. We will have scopes setup outside as well as displays inside and hands on presentations. Last year they had 2000+ come through! We can use all the help we can get for this! 10am – 2pm (CRP Star party and CNCP Spring Stargazing are later that evening.)

Kelly Flaherty has another *Astronomy for Amateurs* on March 15th at Hickey's Creek.

How about doing a club Bar-B-Que at CRP on the afternoon of April 13th prior to the Star Party that night? This way we can all get together in the daytime!

Moon: Last Quarter 4th, New 11th, 1st Quarter 19th, Full 27th.

Planets: Mars is very low in the west at sunset. Jupiter is high in Taurus near the Hyades at sunset. Venus and Mercury both pass the sun this month. Saturn is rising after midnight and well placed in the morning sky. We have both Comets Lemmon and PanSTARRS to watch out for. Check online information for the latest details on observing them!

Dues for 2013 are now due. I sent out email notifications to all members who have not already paid. Please pay at the meetings or events we are holding or send your payment in to SWFAS P.O. Box 100127, Cape Coral, Florida 33910. If you have any questions about your dues, contact me.

Club Positions

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Upcoming Events

- * Thurs Mar 7th Monthly meeting at the Calusa Nature Center Planetarium, 7:30pm (Jack Berninger: *Twelve Greatest Astronomical Events*)
- * Sat Mar 9th STEMtastic Lee County School Public Education Center (Colonial/Metro) 10:00 am - 2:00 pm
- * Sat Mar 9th Club Star Party at Caloosahatchee Regional Park (Dusk -?)
- * Sat Mar 9th *Spring Stargazing* at the Calusa Nature Center Planetarium 7:30-9:00pm (Carol Stewart: cjstewart@mindspring.com)
- * Fri Mar 15th Astronomy for Amateurs Hickey's Creek Park 6:45 pm (Kelly Flaherty: kflaherty@leegov.com)
- * Thurs Apr 4th Monthly meeting at the Calusa Nature Center Planetarium, 7:30pm (Jack Berninger: Astro-geology)
- * Sat Apr 6th Star Party at Shell Point Village (Dusk)
- * Sat Apr 13th Club Bar-B-Que at Caloosahatchee Regional Park, afternoon
- * Sat Apr 13th Club Star Party at Caloosahatchee Regional Park (Lakeland Christian School will be there) (Dusk -?)
- * Sat Apr 27th Skyline Elementary 25th Anniversary (Carol Stewart) Solar Observing

March Meeting

Our March monthly meeting will be held on March 7th at 7:30 pm at the Calusa Nature Center Planetarium. Jack Berninger will give a talk entitled *Twelve Greatest Astronomical Events*.

Request from Meadow Park Elementary

Moore Observatory is on the campus of Edison State College in Punta Gorda near the Punta Gorda Airport/I-75. The school is in Port Charlotte. If you are interested in doing something with them, please contact her and let me know. – Brian (swfasbrisley@embarqmail.com)

We are holding an event at the Moore Observatory on March 8th. We would like to invite astronomy club members to visit with our parents and students while they are waiting their turn in the observatory with Professor Hansen. Thank you in advance for your consideration.

- Marjorie Rice, 941-661-4168, marjoriesrice@gmail.com

Astronomy Program at Big Cypress National Preserve

I would like to invite you to our third astronomy program of the year at Big Cypress National Preserve. This will also be our last astronomy program of the winter/spring season as Cassie and I are seasonal employees and our positions here will end the first week of April.

We are particularly excited about this event as Bryan Bodie, President of the International Dark-Sky Palm Beach Chapter, is scheduled to attend. He may also bring some members along. We plan to discuss the potential of designating Big Cypress as an International Dark-Sky Park during his visit.

This event will take place on Friday, March 15 at the Big Cypress National Preserve Welcome Center (located between MM 73 and 74 on US Hwy 41). We will begin ~6 PM with an introductory interpretive program on astronomy for the general public. This will conclude ~7 PM, when we will head outside and hopefully observe comet PANSTARRS, among other night sky objects.

- Luke Gommermann, Park Ranger (Environmental Education/Interpretation), Big Cypress National Preserve, luke_gommermann@nps.gov

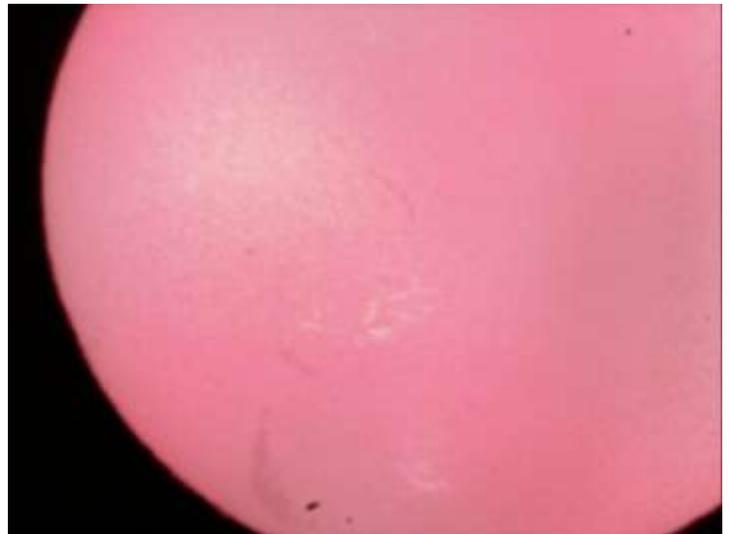
CRP Star Party Schedule

The 2013 Caloosahatchee Regional Park schedule has now been set. Star Parties for 2013 will be March 9, April 13, May 11, June 8, July 6, August 3, September 14, October 5, November 2, November 30, and December 28.

Report on SWFAS' New PST

The PST worked real well. I am testing eyepieces in it. I want to get some other feedback when we have it out again at a public event. I tried the 8.8 Meade UWA I often use with it and also the Scopetronix

15mm that Mike Harden donated a while back that is part of the CPC accessories. (I tried others, but eye relief and too small of an image were main issues. These two I personally like the most, but I am willing to try others in the 8-16mm range (outside of that it is too magnified or too small), the more impressive the prominences the better IMO.)



This image is a shot I took with the Modified Microsoft Cinema Webcam that Norm donated. (I also used the Meade B&W video eyepiece that Gary McFall donated and it showed surface detail surprisingly well, but was a little weak on prominences.)

I could see surface detail better with the cameras than the naked eye! I'll have to try a variable neutral density filter to see if I can bring out surface stuff more easily to the eye.

Nice filament, and quite a few prominences. I have to test doing this where I can use a monitor and see how things look outside in full daylight.

- Brian Risley, President, Southwest Florida Astronomical Society, Inc.

Solar Cycle Update: Twin Peaks?

Something unexpected is happening on the sun. 2013 is supposed to be the year of Solar Max, the peak of the 11-year sunspot cycle. Yet 2013 has arrived and solar activity is relatively low. Sunspot numbers are well below their values in 2011, and strong solar flares have been infrequent for many months.

The quiet has led some observers to wonder if forecasters missed the mark. Solar physicist Dean Pesnell has a different explanation: "This *is* solar maximum," he suggests. "But it looks different from what we expected because it is double peaked."

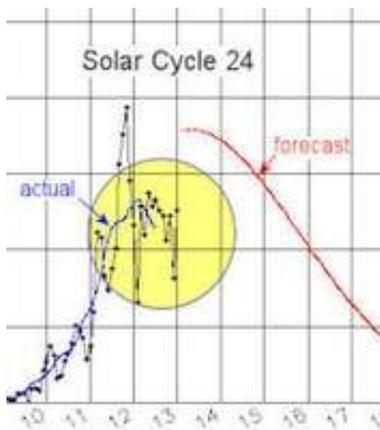
Conventional wisdom holds that solar activity swings back and forth like a simple pendulum. At one end of the cycle, there is a quiet time with few sunspots and flares. At the other end, Solar Max brings high sunspot numbers and solar storms. It's a regular rhythm that repeats every 11 years.

Reality, however, is more complicated. Astronomers have been counting sunspots for centuries, and they have seen that the solar cycle is not perfectly regular. For one thing, the back-and-forth swing in sunspot counts can take anywhere from 10 to 13 years to complete; also, the amplitude of the cycle varies. Some solar maxima are very weak, others very strong.

Pesnell notes yet another complication: "The last two solar maxima, around 1989 and 2001, had not one but two peaks." Solar activity went up, dipped, then resumed, performing a mini-cycle that lasted about two years.

The same thing could be happening now. Sunspot counts jumped in 2011, dipped in 2012, and Pesnell expects them to rebound again in 2013: "I am comfortable in saying that another peak will happen in 2013 and possibly last into 2014," he predicts.

Another curiosity of the solar cycle is that the sun's hemispheres do not always peak at the same time. In the current cycle, the south has been lagging behind the north. The second peak, if it occurs, will likely feature the southern hemisphere playing catch-up, with a surge in activity south of the sun's equator.



Left: Recent sunspot counts fall short of predictions.

Pesnell is a member of the NOAA/NASA Solar Cycle Prediction Panel, a group of solar physicists who assembled in 2006 and 2008 to forecast the next Solar Max. At the time, the sun was experiencing its deepest minimum in nearly a hundred years. Sunspot numbers were pegged near zero and x-ray flare activity flat-lined for months at a time. Recognizing that deep minima are often followed by weak maxima, and pulling together other threads of predictive evidence, the panel issued a decision that *"the next solar cycle (Cycle 24) will be below average in intensity, with a maximum sunspot number of 90. Given the date of solar minimum and the predicted maximum intensity, solar maximum is now expected to occur in May 2013."*

Given the tepid state of solar activity in Feb. 2013, a maximum in May now seems unlikely. "We may be seeing what happens when you predict a single amplitude and the Sun responds with a double peak," comments Pesnell.

No one knows for sure what the sun will do next. It seems likely, though, that the end of 2013 could be a lot livelier than the beginning.

- Author: Dr. Tony Phillips, Credit: Science@NASA

http://science.nasa.gov/science-news/science-at-nasa/2013/01mar_twinpeaks/

Comet PanSTARRS Update

Long awaited, Comet PanSTARRS is on track to peak at only magnitude +2 or +3 in the March evening twilight for Northern Hemisphere skywatchers, not -1 as originally predicted.

Bring binoculars to pick Comet PanSTARRS (C/2011 L4) out of the twilight low in the west. Don't expect it to look as obvious as this!

Comet PanSTARRS (C/2011 L4) will emerge from the Sun's glare low in the western twilight in early and mid-March of 2013. But how bright will it be? Fainter than originally predicted.

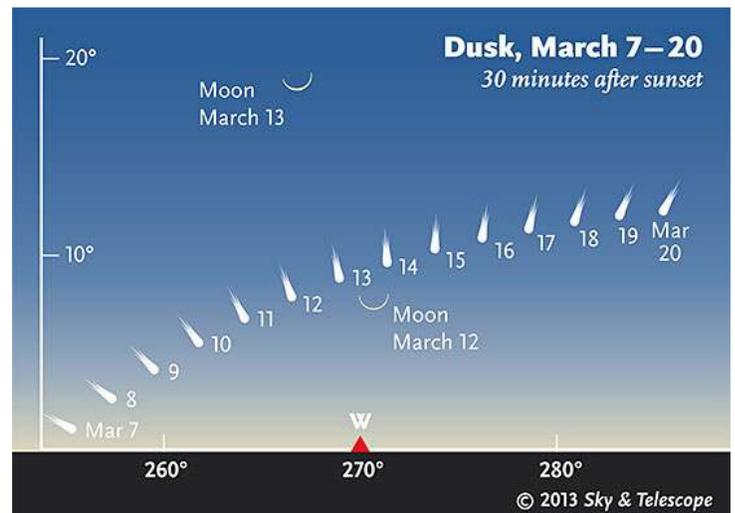
More than a month ago, using brightness measurements coming from Southern Hemisphere observers, Seiichi Yoshida, editor of *Weekly Information about Bright Comets*, changed his magnitude formula for Comet PanSTARRS. His new predicted light curve had the comet peaking at only magnitude +3 in early March.

In the month since then, with many more brightness estimates coming in from Southern Hemisphere observers, there has been little or no change in that new prediction.

The slightly hyperbolic orbit of PanSTARRS indicates that it's a fresh comet from the outer Oort Cloud being warmed by the Sun for the first time. Such comets have quite a history of brightening early with the promise of great things to come, and then weakening after a thin, virgin coating of volatiles on the nucleus evaporates off.

Look west after sunset in early and mid-March for Comet PanSTARRS. Binoculars may be needed to pick it out of the sunset glow. Look too early and the sky will be too bright; too late and the comet will be too low. On the altitude scale at left, 10° is about the width of your fist held at arm's length.

This diagram is drawn for a viewer near 40° north latitude. If you're south of there, the comet will be a little higher above your horizon early in the month than shown here. North of 40°, it will be even lower in early March than shown here, but higher than here as it fades after midmonth.



For further news as it develops, and recent images, bookmark our *Updates on Comet PanSTARRS*: www.skyandtelescope.com/observing/highlights/Update-on-Comet-PanSTARRS-187930541.html

- by Alan MacRobert, *Sky and Telescope magazine*

Hello Kitty In Space: Seventh Grader Launches Rocket With Weather Balloon

A seventh grader has launched a Hello Kitty toy with a weather balloon into space.

Lauren Rojas of Antioch, California, sent her Hello Kitty doll more than 90,000 feet into space for a science project. Footage of the doll's journey to the final frontier is catching quite an audience. Lauren Rojas, 13, a seventh-grader, recently sent the doll into space as part of a class science project.

Lauren mounted four small cameras to a Hello

Kitty rocketship toy and attached a weather balloon. She released the toy and it flew around 18



miles, with the cameras rolling. The balloon was airborne for an hour and a half before it burst in the thin air of upper atmosphere, and the rocket began a slow fall back to Earth.

YouTube Video of Balloon Space Mission:

www.youtube.com/watch?v=5REsCTG4-Gg&feature=player_embedded

Kepler Spies Smallest Exoplanet Yet

NASA's Kepler spacecraft, patiently measuring the light of distant suns to find the tell-tale dimming caused by the passage of unseen planets, has discovered a solar system 210 light years from Earth with the smallest planet yet found orbiting another sun-like star.

Dubbed Kepler-37b, the planet is smaller than Mercury and only slightly larger than the moon. The Kepler data also revealed two other planets, one slightly smaller than Earth and one twice as large.

All three orbit their host star closer than Mercury orbits the sun. Kepler-37b takes just 13 days to complete one orbit - Mercury takes 88 days to circle the sun - giving the newly discovered world an estimated temperature of more than 800° Fahrenheit.

The other two planets are only slightly farther out, with Kepler-37c orbiting every 21 days and Kepler-37d taking 40 days to complete a circuit.

Launched in 2009, the Kepler space telescope is equipped with a 95-megapixel camera that acts as an ultra-sensitive photometer, continually monitoring the light from more than 150,000 stars in a patch of sky in the constellation Lyra.

Planets passing in front of targeted stars cause a very slight dimming, roughly comparable to watching a flea creep across a car's headlight at night. By timing repeated cycles, computer analysis can ferret out new worlds, including potential Earth-like planets orbiting in a star's habitable zone where water can exist as a liquid.

The probability of finding sun-like stars with Earth-like planets in orbits similar to ours - and aligned so that Kepler can "see" them - is about one-half of 1%. Given the sample size, however, that still leaves hundreds of potential discoveries.

To accurately measure a planet's size, astronomers must first know the size of the star in question. The Kepler science team determined the size of the star Kepler-37 by precisely measuring subtle flickering caused by sound waves moving through the star.

Researchers determined Kepler-37 is three quarters the size of the sun with an uncertainty of just 3%, a new record in the fast-moving search for exoplanets.

"Even Kepler can only detect such a tiny world around the brightest stars it observes," Jack Lissauer, a planetary scientist, said in NASA's statement. "The fact we've discovered tiny Kepler-37b suggests such little planets are common, and more planetary wonders await as we continue to gather and analyze additional data."

Since launch, Kepler has discovered 114 confirmed exoplanets and nearly 3,000 planet candidates requiring additional observations. Combined with other searches, astronomers have identified some 700 exoplanets to date.

- *By William Harwood, CBS News*

NASA Johnson Style

Check out the Gangnam Style parody "NASA Johnson Style" video created by college students working at JSC. This video has garnered close to 4.5 million views since its December 14th release, making the video the most watched clip on the agency's "Reel NASA" YouTube channel. The upbeat video highlights the center's achievements in human space exploration and research through footage of the International Space Station, Mission Control, and JSC's Rocket Park.

<http://www.youtube.com/watch?v=2Sar5WT76kE>

Russia Meteor's Origin Tracked Down

Astronomers have traced the origin of a meteor that injured about 1,000 people after breaking up over central Russia earlier this month.



Using amateur video footage, they were able to plot the meteor's trajectory through Earth's atmosphere and then reconstruct its orbit around the Sun.

As the space rock burned up over the city of Chelyabinsk, the shockwave blew out windows and rocked buildings.

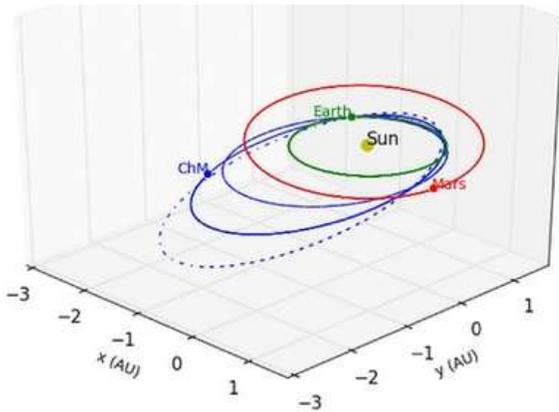
Numerous videos of the fireball were taken with camera phones, CCTV and car-dashboard cameras and subsequently shared widely on the

web. Furthermore, traffic camera footage of the fireball had precise time and date stamps.

NASA later estimated the meteor's mass to be between 7,000 and 10,000 tons. NASA estimates the size of the object was about 55ft.

Using the footage and the location of an impact into Lake Chebarkul, scientists were able to use simple trigonometry to calculate the height, speed and position of the rock as it fell to Earth.

To reconstruct the meteor's original orbit around the Sun, they used six different properties of its trajectory through Earth's atmosphere. Most of these are related to the point at which the meteor becomes bright enough to cast a noticeable shadow in the videos. The Chelyabinsk meteor (labelled ChM) appears to have been on an elliptical orbit around the Sun



The results suggest the meteor belongs to a well known family of space rocks - known as the Apollo asteroids - that cross Earth's orbit.

Of about 9,700 near-Earth asteroids discovered so far, about 5,200 are thought to be Apollos. Asteroids are divided into different groups such as Apollo, Aten, or Amor, based on the type of orbit they have.

Dr Stephen Lowry, from the University of Kent, said, "It certainly looks like it was a member of the Apollo class of asteroids. Its elliptical, low inclination orbit, indicates a solar system origin, most likely from the asteroid belt between Mars and Jupiter." Dr. Lowry added: "Perhaps with more data, we can determine roughly where in the asteroid belt it came from."

- By Paul Rincon, Science editor, BBC News website, Paul.Rincon-INTERNET@bbc.co.uk
<http://www.bbc.co.uk/news/science-environment-21579422>

Factoids about the Russian Meteor Event

The impact event occurred on February 15th at 3:20:26 UTC (9:20 AM local time in Chelyabinsk), coming from the East to the West.

It was also observed from Tyumen, Ekaterinaburg, and Northern Kazakhstan

A few fragments have been recovered ~80 km west of Chelyabinsk (near a village called Satka)

Based on the latest infrasound reports, the mean period for the event was 32.5 seconds, this corresponds to an equivalent yield of 470 kT TNT (which, in turn, equates to a size of ~17 meters; which, in turn, equates to a mass of ~10,000 metric tons.)

Velocity of the impact was ~18 km/s (just over 40,200 mph)

There is no relation to 2012 DA14 as DA14 was on a South-to-North path over the Earth.

Largest reported fireball since Tunguska impact (which was on 30 June 1908)

1200 + injured (no reported deaths)

Blast wave damaged 3000+ structures (shallow graze, probably ~20 deg elevation; airburst and subsequent shockwaves from explosion)

Why didn't we see it coming?

- It came at us from 'out of the Sun'. On Earth we are afflicted by this thing we call 'daylight' and so ground-based observatories were not ideally suited to detect the small asteroid
- Small objects like this (just under 20 meters) would likely be fainter than 25th mag which is below our capability to detect right now

Here's a good compilation of a variety of videos: <http://zyalt.livejournal.com/722930.html>
(For those who speak Russian: some of the language is a bit salty, but normal under the circumstances. Some speculate about whether it's a missile or aircraft or attack of some sort.)

- *Rob Landis*

After Meteor Blast in Russia, Lab Plans to Smack an Asteroid

A meteor blast over Russia is putting new focus on a transatlantic effort to crash a spacecraft into a far-flung asteroid in a bid to prove that incoming objects from space can be knocked from their path. Researchers from Johns Hopkins University are preparing a decade-long, \$350 million project to propel a rocket into the asteroid Didymos as it passes close to Earth. If successful, it would be the first time an asteroid is knocked off course by human intervention.



"There is a science aspect to it and a planetary

defense aspect to it," Andy Cheng, the chief scientist of the physics laboratory, said.

The conceptual study has support from NASA and the European Space Agency. They jointly published an initial plan for the project in May. If the plan goes forward, NASA would help Cheng's group fund and launch "the impactor." The ESA would launch a second spacecraft to assess the impact and its effect.

Defense of the planet against asteroids, a longtime focus of former astronauts, astronomers and amateur hobbyists, became the topic of worldwide discussions recently as the largest meteor to explode near Earth in a century blew out windows and injured 1,200 near the city of Chelyabinsk in central Russia, near the border with Kazakhstan.

The meteor blast over the Chelyabinsk region, which has a population of 3.6 million people, was the largest recorded since one flattened more than 800 square miles of Siberian forest in 1908. The object entered the atmosphere at 9:20 a.m. local time Feb. 15, hours before an unrelated asteroid half the length of a football field hurtled past Earth.

The twin punch, which scientists said was coincidental, served as a warning that space continues to hold dangers for humankind. A space object, if it is big enough and hits in the right spot, could destroy a city or worse. Scientists blame an asteroid more than six miles in diameter for wiping out the dinosaurs 66 million years ago.

Cheng describes his project as straightforward. Didymos, Greek for "twin," is actually two asteroids in one: a larger object with a smaller, moonlike rock circling it. And it is predicted to pass 6.5 million miles from Earth in 2022.

In 2021, Cheng's laboratory would launch a spacecraft into the path of the smaller of the two bodies, which is 492 feet in diameter. Cheng expects the collision to knock the smaller asteroid from its established path around the larger one, an impact that he said can be charted from high-powered telescopes on Earth.

By targeting the smaller member of the "binary system," the mission would produce "an orbital deflection which is both larger and easier to measure" than if it hit an asteroid circling the sun, according to the ESA's preliminary report last year.

"It is important to note that the target Didymos is not an Earth-crossing asteroid, and there is no prospect that the deflection experiment would create an impact hazard," the agency said in its report, which Cheng helped draft.

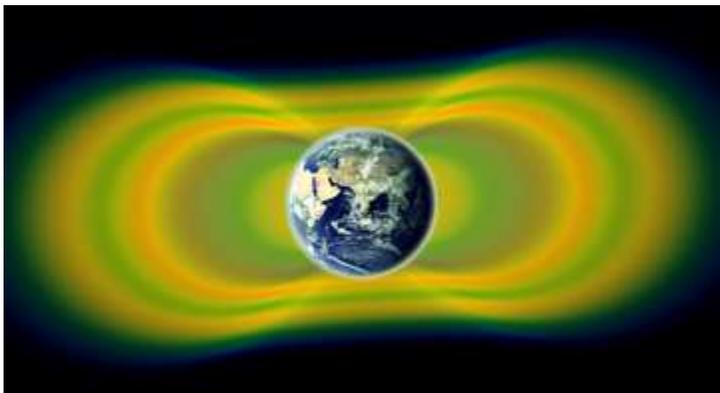
Finding asteroids is not just about danger; it is also about research. Cheng said the second spacecraft would measure the crater caused by the crash and look for additional details about the composition and nature of the asteroid.

- By Mark Drajem,

www.washingtonpost.com/business/economy/after-meteor-blast-in-russia-laurel-lab-plans-to-smack-an-asteroid/2013/02/24/3cc08720-7bc4-11e2-82e8-61a46c2cde3d_story.html

NASA Discovers New Radiation Belt Around Earth

A ring of radiation previously unknown to science fleetingly surrounded Earth last year before being virtually annihilated by a powerful interplanetary shock wave, scientists say.



Caption: Two giant swaths of radiation, known as the Van Allen Belts, surrounding Earth were discovered in 1958. In 2012, observations from the Van Allen Probes showed that a third belt can sometimes appear. The radiation is shown here in yellow, with green representing the spaces between the belts.

NASA's twin Van Allen space probes, which are studying the Earth's radiation belts, made the cosmic find. The surprising discovery — a new,

albeit temporary, radiation belt around Earth — reveals how much remains unknown about outer space, even those regions closest to the planet, researchers added.

After humanity began exploring space, the first major find made were the Van Allen radiation belts, zones of magnetically trapped, highly energetic charged particles first discovered in 1958.

"They were something we thought we mostly understood by now, the first discovery of the Space Age," said Daniel Baker, a space scientist at the University of Colorado.

These belts were believed to consist of two rings: an inner zone made up of both high-energy electrons and very energetic positive ions that remains stable in intensity over the course of years to decades; and an outer zone comprised mostly of high-energy electrons whose intensity swings over the course of hours to days depending primarily on the influence from the solar wind, the flood of radiation streaming from the sun.

The discovery of a temporary new radiation belt now has scientists reviewing the Van Allen radiation belt models to understand how it occurred.

The giant amounts of radiation the Van Allen belts generate can pose serious risks for satellites. To learn more about them, NASA launched twin spacecraft, the Van Allen probes, in the summer of 2012. The satellites were armed with a host of sensors to thoroughly analyze the plasma, energetic particles, magnetic fields and plasma waves in these belts with unprecedented sensitivity and resolution.



Left: The identical Radiation Belt Storm Probes will follow similar orbits that will take them through both the inner and outer radiation belts. The highly elliptical orbits range from a minimum altitude of approximately 373 miles to a maximum altitude of approximately 23,000 miles.

Unexpectedly, the probes revealed a new radiation belt surrounding Earth, a third one made of super-high-energy electrons embedded in the outer Van Allen belt

about 11,900 to 13,900 miles above the planet's surface. This stable ring of space radiation apparently formed on Sept. 2 and lasted for more than four weeks.

"The feature was so surprising, I initially foolishly thought the instruments on the probes weren't working properly, but I soon realized the lab had built such wonderful instruments that there wasn't anything wrong with them, so what we saw must be true," Baker said.

This newfound radiation belt then abruptly and almost completely disappeared on Oct. 1. It was apparently disrupted by an interplanetary shock wave caused by a spike in solar wind speeds.

"More than five decades after the original discovery of these radiation belts, you can still find new unexpected things there," Baker said. "It's a delight to be able to find new things in an old domain. We now need to re-evaluate them thoroughly both theoretically and observationally."



Left: On Aug. 31, 2012, a giant prominence on the sun erupted, sending out particles and a shock wave that traveled near Earth. This event may have been one of the causes of a third radiation belt that appeared around Earth a few days later, a phenomenon that was observed for the very first time by the newly-launched Van Allen Probes. This image of the prominence before it erupted was captured by NASA's Solar Dynamics Observatory.

It remains uncertain how this temporary radiation belt arose. Van Allen mission scientists suspect it was likely created by the solar wind tearing away the outer Van Allen belt.

"It looks like its existence may have been bookended by solar disturbances," Baker said.

Future study of the Van Allen belts can reveal if such temporary rings of radiation are common or rare.

- by Charles Q. Choi, SPACE.com Contributor, www.space.com/20004-earth-radiation-belt-discovery.html

Group Aims to Send 2 Humans on Mars Mission in 2018

If newly unveiled plans pan out, a man and a woman may represent humanity on one journey that has never been attempted before: a mission to Mars.

"It's incredibly feasible. It's not crazy talk," Taber MacCallum, CEO of Paragon Space Development Corp., told CNN.

MacCallum and millionaire Dennis Tito announced their plans to send a couple of earthlings on a 501-day trip in a spacecraft that would fly by the red planet.

The mission would lift off in 2018, they said. It would not involve landing on Mars, making the proposed journey infinitely easier than putting people on the planet's surface, which NASA wants to do later this century. But the spacecraft would pass within 100 miles of the planet.

Tito has founded the Inspiration Mars Foundation, a nonprofit organization spearheading this effort. No stranger to space, the one-time NASA engineer became in 2001 the first space tourist flying on a Russian rocket to the International Space Station.

The public-private initiative could, according to MacCallum, use an existing rocket and capsule.

"If you take existing chemistry and technology and add some improved technologies,"

MacCallum told CNN, "you can get a mission together." A life support system also would have to be developed.

The group is not asking NASA for money, he said. "This is a philanthropic effort to be done for America," MacCallum said. It could be accomplished for under \$1 billion, he said, a figure that's cheap compared with the tens of billions of dollars a NASA landing on Mars would cost.

Despite MacCallum's optimism, pulling off such a feat within five years is no small task.

Besides life support for the crew, one of the biggest challenges would be the return into the Earth's atmosphere. Heat shielding for a high speed re-entry hasn't been tested. NASA isn't even testing its new system on the Orion spacecraft until next year at the earliest. Orion is in development to take astronauts back to the moon and on to Mars.

And there's also concern about radiation exposure. The man and woman whom MacCallum and Tito want to send would likely be a married couple. Because of the radiation risk, MacCallum said, they'd be older and "out of the childbearing years."

Dr. Jonathan Clark, a former NASA flight surgeon and chief medical officer of Inspiration Mars Foundation, said the crew should be selected six months to a year before the mission to allow time for a full health screening. And the mission planners will have to prepare for the possibility of a crew member perishing.

"If we wanted a guarantee, we wouldn't be doing this," he said.

Water and oxygen will be recycled in flight, so the crew will be drinking and breathing the same resources over and over throughout the journey, Inspiration Mars representatives said. The year for the mission was chosen because Mars then will be 36 million miles away, about as close as it ever gets to Earth.

But consider: The humans who have traveled the farthest from Earth were the Apollo astronauts – nearly a quarter-million miles to the moon. Next to the Mars journey, that's like a walk around the block.

Still, Tito said Wednesday, "This is a challenging but attainable goal for advancing human ... knowledge. Now is the time."

- By John Zarrella, CNN, http://lightyears.blogs.cnn.com/2013/02/27/group-aims-to-send-2-humans-on-mars-mission-in-2018/?hpt=hp_t1

X-ray Telescopes Measure Black Hole Rotation

An innovative X-ray telescope has directly measured the rotation of a supermassive black hole lurking at the heart of a distant galaxy.

The observation confirms predictions made by Einstein's theory of general relativity regarding gravity's ability to twist and distort the fabric of the cosmos and gives astronomers a powerful new tool to probe the evolution of galaxies and the black holes that now appear to be a common, if not required, feature.

"For the first time, we can definitely interpret features seen in the X-ray emissions from a supermassive black hole as due to the hole's incredibly strong gravity," said Fiona Harrison, principal investigator of NASA's Nuclear Spectroscopic Telescope Array, or NuSTAR, X-ray telescope mission.

"What's amazing in this observation is we can see the warping and twisting of spacetime, the black hole distorting the very fabric of our universe. This distortion enables us to measure how fast the black hole is spinning."

The galaxy in question, known as NGC 1365, is 56 million light years from Earth. The black hole at the core of the galaxy is two million times as massive as the sun.

By definition, black holes are not directly visible because their gravity is so intense electromagnetic radiation cannot escape. But they can be detected by the telltale radiation generated as gas and dust particles are sucked in and heated to extreme temperatures. Material falling into a black hole can form an accretion disk of debris spiraling in toward the hole's event horizon, the point defined by the body's mass and gravity beyond which nothing, including light, can escape. Once an object crosses the event horizon, it is forever lost to the known universe.

To measure the rotation of the black hole at the heart of NGC 1365, data from NuSTAR was combined with observations by the XMM-Newton satellite, which is sensitive to lower X-ray energies.

The overlap allowed researchers to rule out alternative explanations, resulting in a three-day observation that "resolved a two-decade long problem," Harrison said. "We can now say the features in the X-ray colors seen from massive black holes can definitely be used to measure the black hole's spin."

In this case, the spacecraft studied X-rays reflected from the accretion disk around the black hole at the core of NGC 1365. Harrison said the rotational energy was equivalent to the output of a billion stars over a billion years.

Asked if she could translate that into a more readily understandable velocity, she pointed out that "black holes are really weird. It's not like we can paint a little dot on the black hole, on the event horizon, for example, and watch it spin around at some velocity. It's probably the most accurate to think of the amount of rotational energy captured, if that makes sense."

"We know spinning black holes actually twist spacetime and distort it," she said. "If you were standing near the event horizon of this particular black hole, you would have to turn around, because your spacetime is twisting, you would be turning around once every four minutes just to stand still."

Regardless of the mind-boggling physics involved, the ability to directly measure the rotation of supermassive black holes gives astronomers a potentially powerful tool for studying galactic evolution.

"We know that today most, if not all, galaxies have a supermassive black hole at their center," said Arvind Parmar, head of Astrophysics with the European Space Agency. "The one at the center of our Milky Way galaxy, for example, weighs as much as four million suns.

"We believe that these black holes were born when the universe was only about 10% of its current age. And when they were born, they only weighed 20 to 30 times the mass of the sun. The real question is how do they grow from these small objects to the supermassive black holes we see today?"

There are at least two possibilities. Black holes can grow by accretion, that is, by sucking in surrounding material, or by collisions, when one black hole effectively merges with another. Accretion can cause rapid spinning while black hole mergers can lead to different rates depending on the orientations of the colliding holes. The ability to measure that rotation could help astronomers figure out which process is more common and what effect that has on a galaxy's evolution.

"Even with these two wonderful missions, we can only measure the spins of these black holes in nearby bright galaxies," Parmar said. "What we'd really like to do is extend these studies to the more distant universe and see how the average black hole spin changes with cosmic time.

"And this would allow us to probe the importance of accretion and the importance of merger in creating the universe we see today," he said. "It would help us understand why the universe looks like it does today."

- By William Harwood, CBS News



Tackling the Really BIG Questions

By Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, *New Worlds, New Horizons in Astronomy and Astrophysics* was completed in 2010. It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will "set the nation firmly on the path to answering profound questions about the cosmos." It defines space- and ground-based research activities in the large, midsize, and small budget categories.

The recommended activities are meant to advance three science objectives:

Deepening understanding of how the first stars, galaxies, and black holes formed,
Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slitless spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would

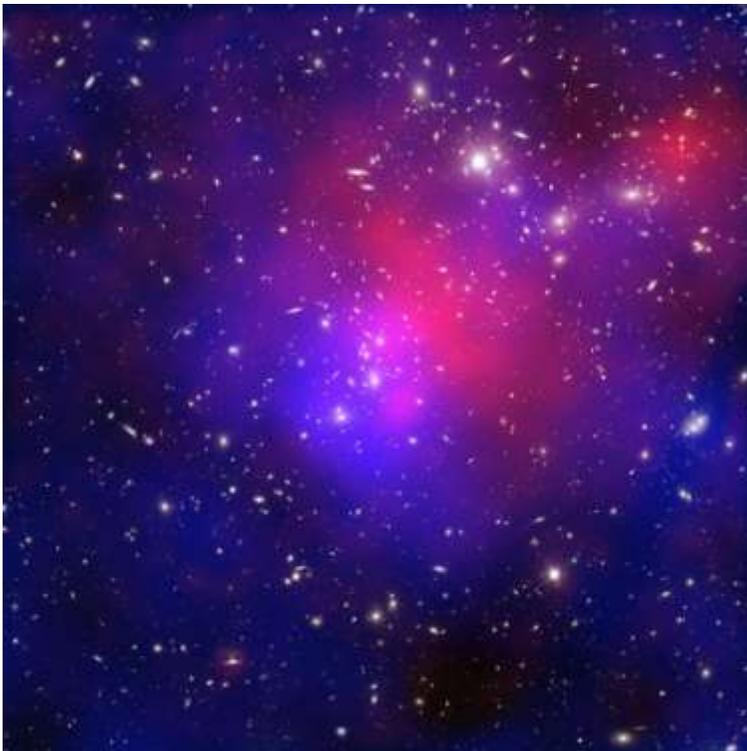
advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system.

Naturally, NASA's strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also addresses the Decadal Survey science objectives for WFIRST would remain a high priority.

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

For a summary of NASA's plans for seeking answers to the big astrophysics questions and to read the complete Astrophysics Implementation Plan (dated December 2012), see <http://science.nasa.gov/astrophysics/>.



Caption: *Clusters of galaxies collide in this composite image of "Pandora's Cluster." Data (in red) from NASA's Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory's Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.*

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

Night Sky Network

Astronomy Clubs bringing the wonders of the universe to the public

Comet Pan-STARRS in early March: Naked-eye?

In early March, Comet Pan-STARRS will pass about 100 million miles from Earth (about the same distance as between the Earth and the Sun). Most experts expect it to become naked-eye about as bright as the stars of the Big Dipper.

Add a little sizzle: Entertain visitors at your comet-viewing events by Cooking Up a Comet. (http://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=258)

Find out the latest news from NASA on the comet at <http://science.nasa.gov/science->



Marni Berendsen is Retiring!?

At the end of March, Marni Berendsen will be retiring from the Astronomical Society of the Pacific after more than 10 years of service to the amateur astronomy community in her capacity as Education Project Coordinator. Along with colleagues at NASA and the ASP, she spearheaded the research and development of the NASA Night Sky Network.



Marni has helped to create (with lots of help from you all) eleven Outreach ToolKits, conducted studies on our hobby, designed and implemented the Network's robust club management system in use today, and has shown NASA how amateur astronomers are the backbone of astronomy

outreach in the USA.

We will miss her terribly but along with all of you she has built a vibrant, thriving Network on a sturdy foundation. The ASP and NASA's commitment to the program remains strong. Together we'll make her proud and keep the astronomy outreach community flourishing.

Nights without Stars? Three more chances for the GLOBE at Night campaign

Spend a few minutes helping scientists by measuring the brightness of your night sky. Just match the appearance of the constellations of Orion or Leo with star maps of progressively fainter stars - and submit your measurements by computer or smart phone.

Involve your whole astronomy club and take the Adopt-A-Street Challenge (NEW FOR 2013): Here's a club project where your members can participate to create a map of light pollution in your own city. This can be used for a variety of applications such as informing your city and government officials, providing data for scientists and even for students doing science fair projects.

Three more opportunities in 2013 to participate in GLOBE at Night: March 3 - 12, March 31 - April 9, and April 29 - May 8

More information is at <http://www.globeatnight.org/aas2013.php>



Mars in March: NSN Telecon on March 26th



While she is briefly back on Earth Time at the end of March, Dr. Aileen Yingst, senior research scientist, will update us with the latest from the Mars Curiosity Rover.

Mark your calendar for this exclusive Night Sky Network Telecon and join us: Tuesday, March 26th at 9:00 pm EDT, NSN Club members are invited to join the live telecon by calling the toll-free line:

1-888-455-9236

Call up to 15 minutes before the telecon begins. An operator will answer and:

- You will be asked for the passcode: NIGHT SKY NETWORK
- You will be asked to give your NAME and the CLUB you belong to, and

number of people listening with you.

PowerPoint slides will be available mid-March.

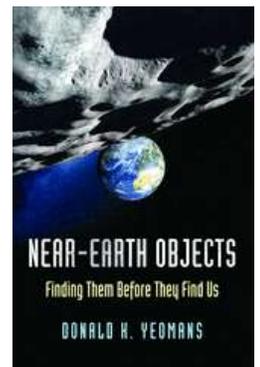
Telecon Recording Available for NEOs: Finding Them Before They Find Us

PowerPoint slides, recording, and transcript of Dr. Don Yeomans' fascinating Telecon on January 29th are available for download here:

http://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=507

His latest book is *Near-Earth Objects: Finding Them Before They Find Us*

Of all the natural disasters that could befall us, only an Earth impact by a large



comet or asteroid has the potential to end civilization in a single blow. Yet these near-Earth objects also offer tantalizing clues to our solar system's origins, and someday could even serve as stepping-stones for space exploration. In this book, Donald Yeomans introduces readers to the science of near-Earth objects, its history, applications, and ongoing quest to find near-Earth objects before they find us.

Participate in Survey of Science Hobbyists

North Carolina State University is asking for your help with a new National Science Foundation sponsored research study to investigate the characteristics and educational experiences of people who are active in science hobbies. Go to <http://tinyurl.com/NCSUhobbysurvey> to participate. Please contact the researchers with any questions at ced_stemhobby@ncsu.edu
Clear skies!



Vivian White & Marni Berendsen
The Night Sky Network Team
nightskyinfo@astrosociety.org

The NASA Night Sky Network is a nationwide coalition of over 425 amateur astronomy clubs. The NASA Night Sky Network is managed by The Astronomical Society of the Pacific.

SWFAS Minutes

Meeting Date: February 7, 2013

CALL TO ORDER: The monthly meeting of the Southwest Florida Astronomical Society was held at the Calusa Nature Center and Planetarium, Ft Myers Florida, on Thursday, 02/07/2013 The meeting convened at 7:30pm, President Brian Risley presiding, and Lee Kraemer, secretary.

MEMBERS IN ATTENDANCE: There were approximately 38 members in attendance.

OPENING REMARKS: Brian Risley, President

Piggyback PST on CPC 800 makes it easier to keep PST aligned and display white light and hydrogen/alpha view of the sun.

Vote to order club PST while special offer is in place passed.

Covered upcoming events listed in the 02/07/2013 agenda.

Added STEMtastic event March 9th.

VICE PRESIDENT'S REPORT: Bruce Disette, Vice President

See Viewing Coordinators Report

NEWSLETTER EDITER'S REPORT: Carole Holmberg, Newsletter Editor

Mentioned Upcoming viewing opportunities - Jupiter Mercury and Comets

SECRETARY'S REPORT: Lee Kraemer, Secretary (read and submit minutes for approval)

Accepted as published

TREASURER'S REPORT: Tony Heiner, Treasurer, reported a balance of \$2205.62

VIEWING COORDINATOR'S REPORT: Chuck Pavlick, Tony Heiner, and Bruce Disette, viewing Coordinators

9 People at CRP - Decent conditions. Equestrians showed interest and may return

LIBRARIAN'S REPORT: Maria Berni, Librarian, None

CLUB HISTORIAN: Danny Secary, None

EQUIPMENT COORDINATOR: Brian Risley

WEBSITE COORDINATOR: Dan Fitzgerald

ASTRONOMICAL LEAGUE COORDINATOR (ALCOR): Carol Stewart

"I want to thank Steve Berni for continuing to run astronomy programs two days a week and also Lee Kraemer, Scott Flaig, Ron Madl, and Bruce Dissette for training and learning to run astronomy shows and volunteering their time to support CNCP. Also, I'd like to thank Alice Mack, Brian Risley, Ray Medhurst, Lee Kraemer, Dick Gala, and Ron Madl for coming out with their scopes and to assist with the evening astronomy programs at CNCP. And, thank you to Brian Risley, Alice Mack, and Ron Madl for their assistance with the 'Wine Under the Stars' event. We will be having our next evening astronomy program on Saturday, Feb. the 16th, 'Moonstruck' from 7:30-9:00 PM and if anyone would like to come out and help that would be great."

Evening Program: Auction to raise money for Club PST as well as gifts raised in excess of \$400. Total amount raised to be determined.

Carole Holmberg gave an excellent presentation on the Green Bank Radio Observatory. Including an overview of radio astronomy and details of day to day operation.

ADJOURNMENT: Thursday March 7th 2013 7:30pm was set as the next regular meeting. The meeting was adjourned.

Lee Kraemer, Secretary

Southwest Florida Astronomical Society, Inc.

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Cape Coral, FL 33910

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