Star Dust

National Capital Astronomers, Inc.

December 2008

Volume 67, Issue 4

http://capitalastronomers.org

Next Meeting

When: Sat. Dec. 13, 2008

Time: 7:30 pm

Where: UM Observatory

Speaker: Kevin Marvel, AAS

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Directions to Dinner/Meeting

Members and guests are invited to join us for dinner at the Garden Restaurant located in the UMUC Inn & Conference Center, 3501 University Blvd E. The meeting is held at the UM Astronomy Observatory on Metzerott Rd about halfway between Adelphi and University Blvd.

Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting at the observatory. Please try to let him know in advance by e-mail at rigel1@starpower.net.

Dec. 2008: Dr. Kevin B. Marvel, Executive Officer, American Astronomical Society

Astronomy Policy in the United States, a Brief Introduction to a Messy Business

Abstract: The United States is the largest funder of astronomy research (and also basic science research in all subjects) in the world. The way in which this funding is provided and decisions about its distribution determined is a messy, but learnable process. With nearly ten years experience in the trenches of Washington, DC actually lobbying for astronomy, I will explain how US Astronomy is funded, how the US funding system operates and how the American Astronomical Society and its members interact with the process to bring about positive results. I will also provide a summary of the US Decadal Survey process, prognostications on how the US election results will impact science funding and provide ample time for questions and discussion.

Biography: Kevin Marvel was born at the Air Force Academy in Colorado Springs in September 1967. Moving throughout his childhood, he ultimately graduated from J.J. Pearce High School in Dallas, Texas. He subsequently attended the University of Arizona, where he received B.S. degrees in Astronomy and Physics with minors in Physics and Mathematics, respectively. He attended New Mexico State University from 1990 to 1996, earning a M.S. in Astronomy in 1994 and a Ph.D. in 1996. In 2006, he received the Distinguished Alumni award from NMSU's College of Arts and Sciences.

His dissertation research was carried out at the National Radio Astronomy Observatory using the Very Long Baseline Array, a distributed set of 10 antennas spread across the United States from Hawaii to Puerto Rico. Using this telescope, he was able to measure the motions of small radio frequency emitting gas clouds known as masers found around large evolved stars and more accurately determine the distance to several of them with high accuracy. Such measurements help constrain models of stellar evolution and uncover the dynamics of the extended atmospheres of such stars.

Beginning in 1996, he served as a postdoctoral fellow at the California Institute of Technology's Owens Valley Radio Observatory where he helped test and implement a new system to correct for the atmospheric degradation of short wavelength radio waves observed with the millimeter array radio telescope. During his spare time at OVRO he enjoyed fly-fishing, hiking in the beautiful Sierra Nevada Mountains and exploring Death Valley National Park.

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Observing after the Meeting

Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

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Thank you!

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In 1998, he accepted a position at the American Astronomical Society as Associate Executive Officer for Public Policy and Employment Policy programs. In 2002 he was named Deputy Executive Officer. His responsibilities have mainly focused on direct lobbying of policy makers as well as managing various smaller programs within the AAS executive office.

In July 2006, he was chosen as Executive Officer and is now responsible for all aspects of Society operations, including the publishing of the primary research journals in Astronomy, the *Astrophysical Journal* and *Astronomical Journal*.

He is married to Tamara Koch and lives in Alexandria, VA with their two cats Rhett and Scarlett. They enjoy boating, house renovation and travel. Their favorite vacation is a camping trip at the San Juan River in Northwestern New Mexico, where the fly-fishing is great and the green chile hot.

Middle School Astronomy Outreach in Fairfax

Dave Eastin

On 24 October 2008 I met with three 6th grade classes at Villa Middle school in Fairfax, VA. Mrs. Lowrey, their science teacher contacted me through a mutual friend and asked if I could help with their astronomy unit. I agreed, and dusted off a presentation that I created for "bring your child to work" day last year. The slideshow included photos of observatories I have visited, a brief tutorial on the size and scale of the solar system, photos of all of the planets and their major moons, and images of handful of deep sky objects. I drew upon the NASA and STSCI websites for the images. The images are from the Voyager, Galileo, Cassini, MESSENGER, NEARand Deep Impact missions and the Hubble, Spitzer and Chandra space observatories. I pointed out features of interest in each of the images; such as craters on Earth, ice caps on Mars, aurora on Jupiter, cracks in the icy surface of Europa, kinks and knots in the rings of Saturn, and areas of star formation in some of the images of deep-sky objects.

The students were extremely well behaved, disciplined, and attentive. We spent a lot of time on question and answer. Their questions and interests were surprisingly diverse and informed for children of this age. Interests ranged from space travel, to the prospect of extraterrestrial life, to relatively exotic objects such as quasars. For one class I played "space sounds". These were recordings of a pulsar "heart beat", sounds of Earth's aurora from the ESA cluster mission, and sounds of Cassini crossing the ring plane in orbit around Saturn.

A few weeks after the event the students sent me a large manila envelope of thank you notes. In their own words every child described what they learned and listed what they thought to be the "coolest" aspect of presentation. Some of the notes are currently taped to my office door. The letters draw lots of attention from co-workers.

It is fairly clear to me that educators today don't always have the resources they need to do justice to certain subjects. I think astronomy is one of these subjects. Educators simply do not have enough time to specialize in or to create lesson material with great levels of detail on such subjects. In fact, they are not even paid for performing such out-of-class research. They can certainly use our help as amateur astronomers and as outreach volunteers. This is a simple way that each of us can take direct action to improve our educational system and influence the education of a young person.

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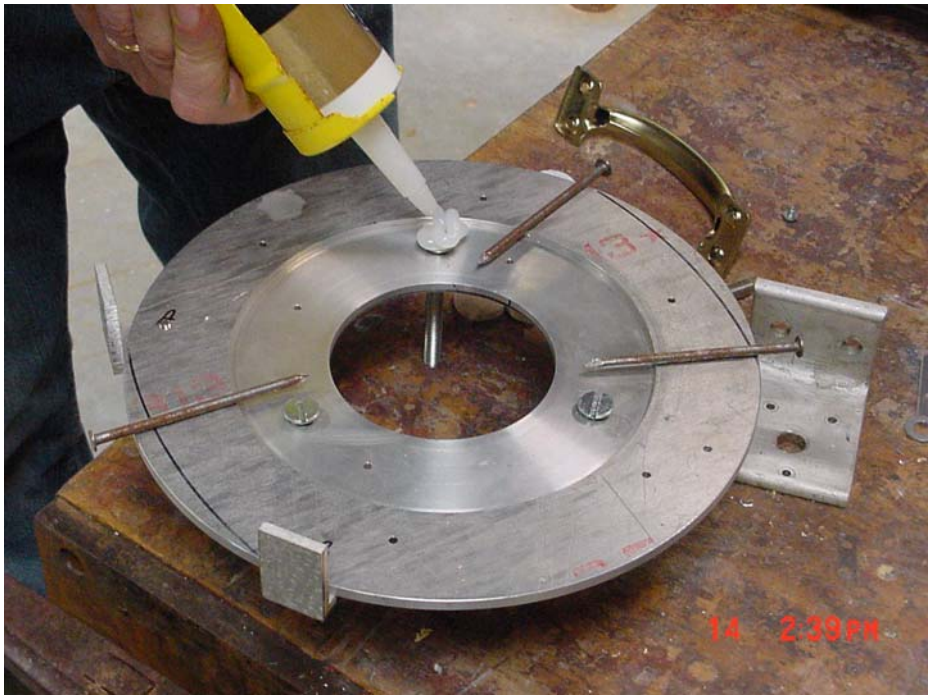
Mounting a Large Secondary Mirror

Michael Chesnes

At NCA's telescope making class in Chevy Chase, instructor Guy Brandenburg puts the finishing touches on a cell he constructed for holding a secondary mirror. The mirror resembles one from a Newtonian telescope, but has a different purpose. It is part of an optical tester that Guy is building with students from the class. Unlike our current testers, this one will reflect light twice off of a telescope mirror when measuring it, making it twice as sensitive to surface errors. In addition, a parabolic telescope mirror in this tester will produce fringes of light which are straight, making them easier to interpret. Light used to test a telescope mirror will pass through the hole in the center of the mirror Guy is caulking in these pictures before coming to a focus.



Science News

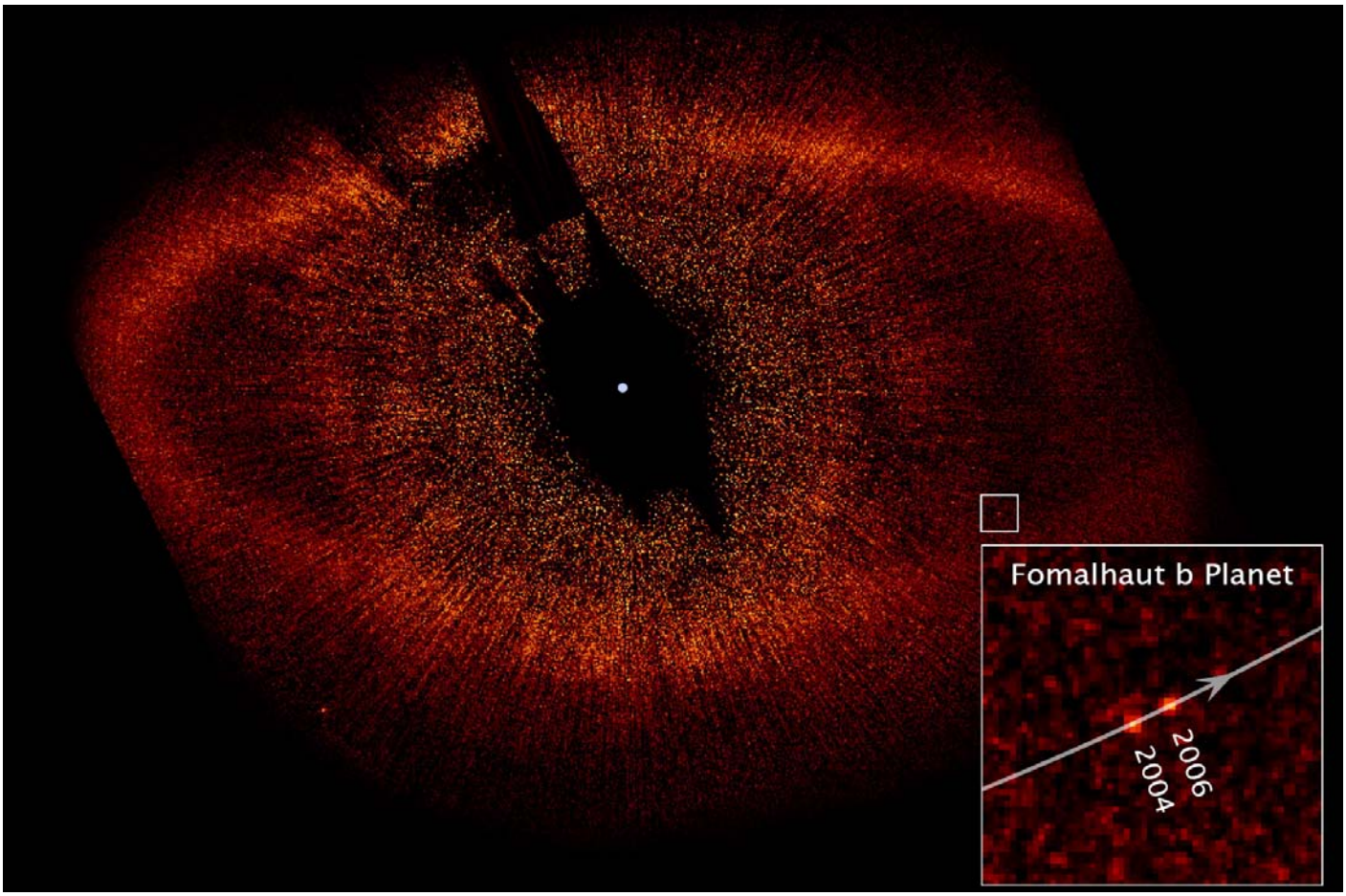
Exoplanet Images Announced

Michael Chesnes

November witnessed a pair of exciting astronomical discoveries announced back to back. For the first time, astronomers have taken pictures of planets around stars besides the Sun. Previously astronomers could only detect the presence of other planetary systems through indirect methods, such as monitoring how extrasolar planets dim the light of their parent stars, or alter their spectra.

The first image below was taken by the Hubble Space Telescope. The bright star Fomalhaut in the southern constellation Piscis Australis is located in the center of the picture, but its glare is blocked by an instrument called a coronagraph. The coronagraph prevents Fomalhaut from overwhelming the light of the planets orbiting it. The image is mostly composed of this planetary system's dust, but a close-up in the inset portion of the picture clearly shows a planet. The second image is of a planetary system discovered by Gemini Observatory and imaged in greater detail by Keck Observatory. This image from Keck shows the star HR 8799 located 140 light years away in the constellation Pegasus.

(Photo Courtesy: Space Telescope Science Institute)



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Thank you Nancy Grace Roman for finding the articles on this page.

Planets Turned to Dust

From Phil Berardelli
Science/NOW Daily News
25 September 2008

Astronomers have discovered the remains of a collision of two planet-sized bodies in a well-established planetary system in the Milky Way. They think this kind of event is rare, but the findings suggest that there's no such thing as a safe stellar neighborhood.

Although collisions between young planets are commonplace, other than occasional and relatively small-scale smash-ups, such as Comet Shoemaker-Levy's 21 pieces pelting Jupiter in 1994, no nearby worlds have been destroyed for billions of years.

Not so in a system located about 300 light-years away in the constellation Aries. When, in 2004, a team of astronomers discovered a huge cloud of dust encircling a binary star system called BD+20 307, they thought it was a young star. Now measurements using NASA's orbiting Chandra X-ray Observatory and Tennessee State University's automated ground-based instrument have revealed two old stars, each about the same age as the Sun, locked in close orbit. That means the dust must have come from a collision between two planetary bodies, a collision that must have occurred recently because the dust is hanging so close to the twin stars, and there was no other reason for it to be there. Over time, dust particles will either spiral into a star or be blown away by stellar winds. Based on the mass of the dust clouds which is a million times heavier than the dust hanging in our own solar system, the crash involved "planets with at least the mass of our moon or Mercury" and possibly even as large as Earth.

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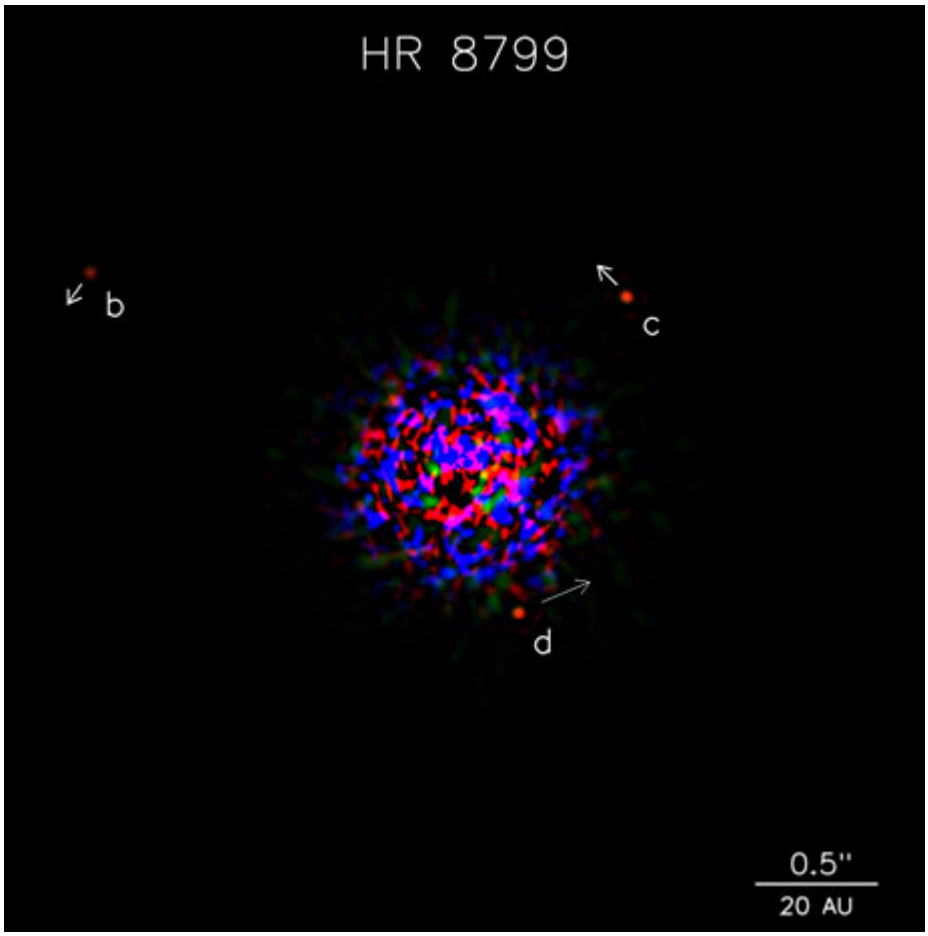
(Photo Courtesy: Keck Observatory)



Comet Tuttle's Split Personality

From Science/NOW Daily News
14 October 2008
By Govert Schilling

Radar observations of the small, icy nucleus of a comet known as Tuttle suggest that it consists of two clumps that touch each other, like the two halves of the number eight. "It's almost certainly a contact binary," says John Harmon of the Arecibo Observatory in Puerto Rico.

Since the 1980s, a handful of cometary nuclei have been observed close-up by visiting spacecraft. Although these comets exhibit a wide variety of shapes and surface features, all of them

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Fourth Annual Eastern Astronomy Show at Hands on Optics

Michael Chesnes

Amateur astronomers from all over Maryland came to Hands on Optics in Damascus, MD for the Fourth Annual Eastern Astronomy Show. The show ran all day, from 10 AM to 6 PM on Saturday, November 8. The show included speaker, door prizes, and representatives from astronomical equipment manufacturers. One of the speakers was NCA president Elizabeth Warner, who spoke on the Deep Impact mission.

Mike A'Hearn Honored with AAS Kuiper Prize

Michael Chesnes

The American Astronomical Society's Division of Planetary Science acknowledged the contributions University of Maryland astronomy professor and NCA Member Mike A'Hearn made to the study of comets. Three areas where Prof. A'Hearn made particularly influential contributions were: comet nuclei, the classificiation of comets, and the Deep Impact mission. A video of Prof. A'Hearn addressing the Division of Planetary Science this October can be viewed at:

http://www.aas.org/divisions/meetings/dps2008/index.html

Check the mid-afternoon session on this webpage to hear his talk.

70th Anniversary Video

Michael Chesnes

If anyone is interested in receiving a DVD copy of the video Elizabeth Wallace produced for NCA's 70th Anniversary celebration, please contact me at m.chesnes@verizon.net or (301) 317-0937. I have a few copies ready, and will make another batch.

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are dark, irregular aggregates of ice, dust, and pebbles, measuring a few kilometers across. So far, every single comet has been observed to be, well, single.

But not Tuttle. This comet, orbits the sun every 13.6 years. On 2 January 2008, it flew within 40 million kilometers of Earth, enabling astronomers to study its nucleus in detail. The Arecibo radar observations by Harmon and his team are best explained by a contact binary, with the individual components measuring 5.6 and 4.4 kilometers across. The pair rotates around each other once every 11.4 hours--slowly enough not to fly apart through centrifugal forces. Brightness variations of Tuttle's nucleus, spotted with the Hubble Space Telescope, also indicate a very complex shape, supporting the radar team's findings.

Tuttle's split personality lends credence to the recent idea that the early solar system went through a chaotic period some 3.8 billion years ago, when small, icy bodies were thrown around by the gravity of migrating planets. "In some cases, they may have collided, possibly creating the peanut-shaped cometary nuclei that have also been observed," says Michael Mumma. In other cases, as Tuttle demonstrates, a gentle collision would lead to a contact binary.

Indeed, observations of Tuttle's outgassings, observed in January by Mumma and his colleagues with large ground-based telescopes, showed a surprising mix of volatiles, as though the comet has sampled different regions of the primordial nebula. It all fits together if the two components of the contact binary came from different locales, says Mumma.

Hopewell Observatory Open House Nov. 1

Michael Chesnes

On Saturday, November 1 I carpooled with NCA member Guy Brandenburg and one of his coworkers to the Open House at Hopewell Observatory. Hopewell is a private observatory near Haymarket, VA with some members who also belong to NCA. In spite of the partly cloudy weather, we had an enjoyable evening, with dinner, hot chocolate, and views of a few Messier objects in between the clouds. Hopewell's guests this Open House included a group of software engineers, and I encourage NCA members to visit this local astronomical resource at its next Open House.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Fridays, Dec. 5, 12, 19, and 26, 6:30 to 9:30 pm at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg@yahoo.com. In case there is snow, call (202) 282-2204 to see if the CCCC is open.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00 pm (Nov-Apr) or 9:00 pm (May-Oct). There is telescope viewing afterward if the sky is clear.

Dinner: Saturday, Dec. 13 at 5:30 pm, preceding the meeting, at the *Garden Restaurant* in the University of Maryland University College Inn and Conference Center.

Upcoming NCA Meetings at the University of Maryland Observatory

Dec. 13, 2008

Dr. Kevin Marvel, AAS

Astronomy Policy in the United States

Jan 10, 2009,

Dr. Sean Solomon (Carnegie Institution DTM)

The MESSENGER Mission to Mercury

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Dr. Kevin Marvel

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