Next Meeting
When: Sat. March 9, 2013
Time: 7:30 pm
Where: UMD Observatory
Speaker: Paul Ray (NRL)

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Directions to Dinner/Meeting
Our new location for dinner with the speaker before each meeting is at Mulligan’s Grill and Pub on the UM Golf Course. Mulligan’s is one intersection closer to the observatory on Route 193 than UMUC. One turns on to "Golf Course Road" and drives a few hundred feet to the golf course building, where "Mulligan's Grill and Pub" is located.

The dinner menu can be downloaded from mulligans.umd.edu/

The meeting is held at the UMD Astronomy Observatory on Metzerott Rd about halfway between Adelphi Rd 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.

March 2013: Paul Ray, Naval Research Laboratory
Attack of the Gamma-Ray Spiders from Space!

Abstract: The Fermi Gamma-ray Space Telescope has been surveying the sky in the gamma-ray band (photon energies of 100 MeV and greater) since August 2008. The Large Area Telescope, Fermi's prime instrument, has revealed a large population of γ-ray sources associated with active galactic nuclei, pulsars, and several other source classes. However, about a third of the γ-ray sources are unassociated with any known γ-ray emitting object. A worldwide effort to search for pulsars powering these sources has been extremely successful, discovering 47 new millisecond pulsars (MSPs), about 1/4 of all known MSPs in the Galaxy. A striking feature of these new MSPs is that many of them are so-called 'black widow' systems that are eating away their companions with powerful beams of particles and high energy radiation. Another class being found is the 'redback', named after the Australian cousin of the black widow spider. These systems may be the missing link between accreting X-ray binaries and millisecond pulsars. I will describe the Fermi mission, our radio searches and some of the surprising systems we have discovered.

Biography: Paul Ray is an Astrophysicist at the Naval Research Laboratory. He is an active member of the Fermi Large Area Telescope collaboration and the leader of the Fermi Pulsar Search Consortium. He has been studying neutron stars, predominately pulsars, at radio, X-ray, and γ-ray wavelengths for over twenty years. He did his undergraduate work in physics at Berkeley and then went on to a Ph.D. in physics at Caltech. He started at NRL in 1995 as an NRC postdoc and has been a civil servant scientist since 1997.
**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!*

**Reminder**
After the meeting, everyone is invited to join us at Plato’s Diner in College Park. Plato’s is located at 7150 Baltimore Ave. (US Rt. 1 at Calvert Rd.), just south of the university’s campus. What if it’s clear and you want to stick around and observe? No problem -- just come over when you’re through. This is very informal, and we fully expect people to wander in and out.

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**Arecibo Up Close**
*Sarah Elieti Brown*

These photos were from a 2005 trip to Arecibo and I included them just to give folks an idea of the magnitude of the site. When you walk out of the building and see the receiver/transmitter room (1000 tons suspended on cables), you are amazed at the size of it (as portrayed in the photo)... but more breath taking is when you walk to the edge of the viewing platform and you can see the sheer drop to the edge of the telescope you get an idea of the magnitudes involved. The telescope is not a perfectly circular valley and the feedhorn is designed to compensate for the irregularities of it's shape. The size of the support towers are shown in other photos and I included a photo of what I believe to be the smallest observer resident at the facility. I really went to the site because I was interested in (and participating in) the SETI program and a managerial study of the site construction philosophy. I’ve since changed the focus of my computers (they’re much larger now) to participate in the SETI Astropulse program (search for pulsars) and other BOINC astronomy projects (most deriving their information from Arecibo).
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**APS Mid-Atlantic SeniorPhysicists Group**

http://www.aps.org/units/maspg/  

March 2013 Event

**Date:** Wednesday, March 20, 2013

**Speaker:** Harry Dowsett  
U. S. Geological Survey & George Mason University

**Topic:** The Analysis of Past (Pliocene) Global Climate as an Aid in Understanding Future Climate Change

**Time and Location:** 1:00 PM, with Q&A to follow, in a 1st floor conference room at the American Center for Physics (www.acp.org), 1 Physics Ellipse, College Park, MD-- off River Rd., between Kenilworth Ave. and Paint Branch Parkway.

**Abstract:** The Pliocene world provides an unequalled paleo-laboratory to test the sensitivity of the physical models we rely upon to estimate future warming impacts. It challenges our understanding of the sensitivity of key components of the climate system and how we simulate that system. The USGS Pliocene Research, Interpretation and Synoptic Mapping (PRISM) Project is a collaborative data analysis and climate simulation effort that strives to 1) accurately and comprehensively reconstruct and understand Pliocene climate and climate dynamics in order to gain insight into a warmer than present world that may resemble a future climate; and 2) construct Pliocene paleoenvironmental / paleoclimatic boundary conditions as an aid to general circulation model experiments designed to explore the impacts of climate forcings and feedbacks.

In recent years, PRISM has developed new surface and deep ocean temperature, topographic, land cover and ice volume reconstructions based upon new climate proxy data and refinements in methodologies. These reconstructions are analyzed within the framework of an internally consistent digital data set that is being used by 8 international climate modeling groups in the Pliocene Model Intercomparison Project (PlioMIP) arm of the Paleoclimate Modeling Intercomparison Project (PMIP). Joint USGS-PlioMIP experimental results are being utilized to assess the performance of models in the North Atlantic, tropics and upwelling cells, to define the role of changes in bathymetric gateways in past global warming, to reconstruct changes to deep ocean circulation, and to improve understanding of the sensitivity of the Earth climate system to changes in radiative trace gases. PRISM’s current work focuses on improved data collection in geographic regions where data – model discord is greatest and refining our products to better serve the climate modeling community.

**Biography:** Harry Dowsett earned a Ph.D. in Geological Sciences from Brown University in 1988, studying under John Imbrie. He is currently the Project Chief of the Pliocene Research, Interpretation & Synoptic Mapping group (PRISM) at the U.S. Geological Survey in Reston, Virginia. His primary research focus includes all aspects of Pliocene paleoclimate, but he specializes in the application of planktic foraminifera to climate change research. PRISM’s research is a vital part of the Pliocene Model Intercomparison Project (PlioMIP), providing the only existing Pliocene climate dataset to participating model groups.

Harry also serves as Editor of the journal Micropaleontology and is an adjunct professor of Geology at George Mason University. From 2002 to 2003, Dr. Dowsett was Associate Director of the Paleoclimatology Program at the National Science Foundation. His start at the USGS came after being awarded a National Research Council Post-Doctoral Fellowship in 1987. In 2012 Harry was awarded the Paleontological Association’s President’s Medal in recognition of his "outstanding contributions to micropaleontology and palaeoclimatology."
March 17 Grazing Occultation Maps

Graze zone for SAO 93941 on Mar. 17, 2013

Graze zone for SAO 93973 on Mar. 17, 2013 in Maryland

Graze zone for SAO 93973 on Mar. 17, 2013 in Virginia
Mid-Atlantic Occultations and Expeditions

David Dunham

Asteroidal and Planetary Occultations

Date | Day | EDT | Star | Mag. | Asteroid | mag | s | Location
--- | --- | --- | --- | --- | --- | --- | --- | ---
Mar 23 Sat | 2:00 | 2UC28020267 | 12.4 | 2000 G146 | 12.4 | 4 | 0 | TNO; Americas?
Mar 24 Sun | 0:36 | SAO 139450 | 9.2 | Nevanlinna | 5.7 | 3 | 4 | nCVA, cWV, cOH
Mar 24 Sun | 2:24 | 2UC25784167 | 11.9 | Pulvia | 3.5 | 16 | 8 | NC, VA, MD, NJ, DC?
Mar 25 Mon | 20:13 | TYC12870041 | 10.1 | Irakli | 6.8 | 1 | 5 | VA, NC? Sun -10
Mar 26 Tue | 1:56 | 2UC38920906 | 11.4 | Isolda | 1.8 | 10 | 7 | PA, MD, DC; alt. 9d
Mar 29 Fri | 4:58 | TYC68090680 | 11.1 | Lacadiera | 2.4 | 10 | 7 | OH, PA, NJ, MD?
Apr 2 Tue | 23:07 | 2UC4802741 | 12.1 | Wilhelmina | 3.2 | 3 | 8 | OH, PA, NJ, MD, DC?
Apr 10 Wed | 22:13 | 2UC35366530 | 13.4 | Tergeste | 0.8 | 4 | 10 | KY, TN, VA, NC
Apr 11 Thu | 4:23 | TYC73360428 | 10.5 | Chandra | 4.9 | 5 | 6 | Delmarva, eVA, eNC

Lunar Grazing Occultations (*, Dunham plans no expedition)

Date | Day | EDT | Star | Mag. | % | alt | CA | Location
--- | --- | --- | --- | --- | --- | --- | --- | ---
Mar 17 Sun | 19:45 | SAO 93941 | 7.5 | 34+ | 59 | 10N *Sykswil, Towson, MD; Milford, DE
Mar 17 Sun | 21:50 | SAO 93973 | 7.1 | 34+ | 36 | 11N *Wentzandfres, VA; BelAltn, MD
Mar 19 Tue | 19:43 | SAO 95293 | 9.0 | 54+ | 70 | 12N *Elradsbr, Piksvil, MiddleRiv, MD
Mar 20 Wed | 22:54 | SAO 96442 | 8.5 | 63+ | 51 | 14N *Charltnv, Henrico, Langley, VA
Mar 22 Fri | 21:56 | 45 Cancri | 5.6 | 80+ | 60 | 13N *Toronto; Walden, NY; Stratford, CT

Total Lunar Occultations

DATE | Day | EDT | Ph | Star | Mag. | % | alt | CA | Sp. | Notes
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Mar 17 Sun | 19:35 | D | SAO | 93941 | 7.5 | 34+ | 61 | 20N AO Sun -5; good n MD graze
Mar 17 Sun | 23:01 | D | SAO | 93998 | 7.4 | 34+ | 23 | 26B K0
Mar 18 Mon | 19:54 | D | ZC | 793 | 6.2 | 43+ | 66 | 6SN G8 Sun -8; mg2 10.9*, PA204d
Mar 18 Mon | 22:58 | D | SAO | 94517 | 8.4 | 44+ | 33 | 65N P5
Mar 19 Tue | 22:18 | D | SAO | 95402 | 7.8 | 53+ | 49 | 88S G5
Mar 19 Tue | 23:05 | D | 71 Orionis | 5.2 | 53+ | 40 | 62B P6 ZC 947; mg2 11.13*, PA202
Mar 19 Tue | 23:54 | D | SAO | 95461 | 7.7 | 54+ | 31 | 56B G5
Mar 20 Wed | 0:08 | D | SAO | 95475 | 7.2 | 54+ | 28 | 51B P8 mg2 11, sep. 5*, PA 135
Mar 20 Wed | 0:36 | D | SAO | 95485 | 7.0 | 54+ | 23 | 34B K0
Mar 20 Wed | 20:29 | D | SAO | 96393 | 7.6 | 62+ | 69 | 78S A2
Mar 20 Wed | 21:20 | D | NP Gem | 6.0 | 62+ | 65 | 36B M1 ZCI072; maybe close dbl
Mar 20 Wed | 23:40 | D | SAO | 96487 | 7.2 | 63+ | 42 | 77B N5
Mar 21 Thu | 1:12 | D | ZC | 1083 | 7.6 | 63+ | 24 | 49N P5 mg2 9, sep. -.3*, PA 57
Mar 22 Fri | 21:34 | D | 45 Cancri | 5.6 | 80+ | 64 | 49N A3 ZCI039, maybe close dbl
Mar 23 Sat | 18:37 | D | omega L | 5.5 | 87+ | 30 | 56B P5 Sun-8, ZCI037, close dbl
Mar 25 Mon | 0:02 | D | RX Sex | 6.7 | 94+ | 54 | 72B A3 ZCI258, close double?
Mar 25 Mon | 21:42 | D | 43 Leonis | 5.4 | 98+ | 39 | 65N AO ZC 1623
Mar 28 Thu | 4:37 | R | 49 Vir | 5.5 | 99+ | 27 | 62B K2 AA 255, ZCI184, TermD 18*
Mar 29 Fri | 0:52 | R | ZC | 2002 | 6.8 | 96+ | 31 | 85N KO AA 277
Mar 29 Fri | 4:33 | R | ZC | 2003 | 6.4 | 95+ | 30 | 34B K1 AA 217
Mar 29 Fri | 5:08 | R | SAO | 158333 | 7.2 | 95+ | 27 | 75B GA AA 257
Mar 30 Sat | 1:07 | R | ZC | 2136 | 6.6 | 90+ | 24 | 36N X1
Mar 31 Sun | 5:24 | R | SAO | 184105 | 7.4 | 80+ | 30 | 33B K3 close double?

Explanations & more information are at http://iota.jhuapl.edu/exped.htm .

David Dunham, dunham@starpower.net ,
Phone 301-526-5590

Thank you Nancy Grace Roman for composing this article.

Center of the Milky Way Galaxy

Based on Articles from Science Now and NASA Press Releases

The Milky Way's center houses a supermassive black hole so sleepy that it probably hasn't swallowed a decent meal for years. Yet a growing body of evidence indicates that the now-dormant beast, about as massive as 4 million Suns, fueled a firestorm of activity just a few million years ago, including the sustained emission of some of the highest energy radiation in the universe. A new study offers a dramatic explanation for these past fireworks: The sleeping giant woke when a smaller black hole from another galaxy smashed into it.

Last year, astronomers discovered a pair of gamma-ray emitting gas bubbles, each the size of a small galaxy, emanating from the Milky Way's center and apparently fueled by some kind of violent event at the core of the galaxy. The core also contains an intermediate-mass black hole apparently fueled by some kind of firestorm of activity just a few million years ago, including the sustained emission of some of the highest energy radiation in the universe. A new study offers a dramatic explanation for these past fireworks: The sleeping giant woke when a smaller black hole from another galaxy smashed into it.

All three phenomena could result from the same event: the dregs of a small satellite galaxy, housing an intermediate-mass black hole about as heavy as 10,000 Suns, smacking into the Milky Way's center about 10 million years ago. The Milky Way's gravity would slowly have stripped the satellite galaxy of most of its mass since the body first began falling toward the Milky Way about a billion years after the big bang but would still be hefty enough to make a stir.

Continued on Page 6
The collision would have churned up gas orbiting within the innermost 5000 light-years of the Milky Way, pushing the gas into the center. Some of the incoming gas would have fallen onto the Milky Way's supermassive black hole, generating the bubbles of gamma-ray-emitting gas like a belch after a good meal. Other inflowing gas would provide the raw material for making the young stars observed at the center today. And interactions between the Milky Way's black hole and the smaller one from the satellite galaxy could have flung out old stars from the center as the two black holes merge.

NASA's newest set of X-ray eyes in the sky, the Nuclear Spectroscopic Telescope Array (NuSTAR), has caught its first look at the giant black hole parked at the center of our galaxy. The observations show the typically mild-mannered black hole during the middle of a flare-up. These data will help us better understand the gentle giant at the heart of our galaxy and why it sometimes flares up for a few hours and then returns to slumber."

NuSTAR, is the only telescope capable of producing focused images of the highest-energy X-rays. Active black holes tend to gobble up stars and other fuel around them. Sgr A* is thought only to nibble or not eat at all, a process that is not fully understood. When black holes consume fuel -- whether a star, a gas cloud or, as recent Chandra observations have suggested, even an asteroid -- they erupt with extra energy.

NuSTAR, is picking up X-rays emitted by consumed matter being heated up to about 180 million degrees Fahrenheit (100 million degrees Celsius) and originating from regions where particles are boosted very close to the speed of light.

The Stratospheric Observatory for Infrared Astronomy (SOFIA) captured images of a Circumnuclear Ring (CNR) of gas and dust seven light-years in diameter surrounding the supermassive black hole. and of a neighboring cluster of extremely luminous young stars embedded in dust cocoons.

The mid-IR images reveal in detail the structure of the warm dust in the CNR, a torus of material orbiting the supermassive black hole at the Galactic center, as well as the prominent streamers of ionized gas and hot dust within the CNR that compose the HII region Sgr A West. The emission at 19.7 microns from the dust in the CNR closely traces the ionized gas emission as observed in the radio and near-IR, whereas the emission at 31.5 and 37.1 microns trace a cooler distribution of dust located at a slightly greater radius in the CNR. This is consistent with the prevailing view that the CNR material is heated and excited by the massive Central Cluster of stars interior to the CNR.

The Quintuplet Cluster (QC), located about 35 pc from the Central Cluster, was also imaged by SOFIA/FORCAST. The QC contains the "Pistol Star", a blue hypergiant that illuminates material of the Pistol Nebula ejected from the star. Cool dust cocoons surrounding the most luminous members of the QC are prominent at mid-IR wavelengths. The Central Cluster, the Quintuplet Cluster, and the Arches Cluster in the Galactic center region have ages between 6 and 1 million years, indicating a series of astronomically recent star formation bursts.
Upcoming Science Fairs

For information on the county science fairs below, or the March 23 Udvar-Hazy Girl Scout event, email Jay Miller at rigel1@starpower.net

Mar. 9 - Prince George's Community College, Largo, MD (PG County)

Mar. 14 – Tuscarora High School (Loudon County)

Mar. 16 – Robinson Secondary School (Fairfax County)

Mar. 16 - Food and Drug Administration White Oak Campus, 10903 New Hampshire Avenue, Silver Spring, MD 20993 (Montgomery County)

Mar. 23 – Wilson High School (District of Columbia)

On 23 March, the Girl Scouts will have their annual science event at the Air & Space Museum's Udvar-Hazy Center near Dulles. This is from 10 AM to 3 PM and there will be many organizations present. We could use some people to help at the table or you could bring a telescope for indoor or solar viewing.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Tuesdays Mar. 5, 12, 19, 26 and Fridays Mar. 1, 8, 15, 22, 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.). Details: www.astro.umd.edu/openhouse

Dinner: Saturday, Mar. 9 at 5:30 pm, preceding the meeting, at Mulligan’s Grill and Pub at the University of Maryland Golf Course.

Owens Science Center Planetarium: “Before the Equinox: A Percy Jackson Adventure” Fri. Mar. 15 at 7:30 pm; $5/adult; $3/students/senior/teachers/military; children under 3 free. Doors open 7:00 for pre-show activities. www1.pgcps.org/howardbows


Mid Atlantic Senior Physicists Group: “The Analysis of Past (Pliocene) Global Climate as an Aid in Understanding Future Climate Change” Wed. Mar. 20 at 1:00pm. American Center for Physics, College Park, MD. See page 3.

Upcoming NCA Meetings at the University of Maryland Observatory:
Mar 09: Paul Ray (NRL), X-ray Pulsars
Apr 13: Holly Gilbert (GSFC), Results from the Solar Dynamics Observatory
May 11: Nancy Chabot (APL) MESSENGER’s Surprising Images of Mercury

National Capital Astronomers Membership Form

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Address: ______________________________________________________ ZIP Code: ______

Home Phone: ____-____-____ E-mail: ___________________________ Print / E-mail Star Dust (circle one)

Membership (circle one): Student….. $ 5 Individual / Family…..$10 Optional Contribution…..$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy
- Making scientific astronomical observations
- Observing astronomical objects for personal pleasure at relatively dark sites
- Attending large regional star parties
- Doing outreach events to educate the public, such as Exploring the Sky
- Building or modifying telescopes
- Participating in travel/expeditions to view eclipses or occultations
- Combating light pollution

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to National Capital Astronomers to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

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