# Star Dust

National Capital Astronomers, Inc.

*May 2012*

*Volume 70, Issue 9*

http://capitalastronomers.org

## *Next Meeting*

**When:** Sat. May 12, 2012

**Time:** 7:30 pm

**Where:** UMD Observatory

**Speaker:** Soebur Razzaque, GMU

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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 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.

### *Observing after the Meeting*

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

May 2012: Soebur Razzaque
George Mason University

## Neutrino Astronomy

***Abstract:*** Giant kilometer-scale telescopes in places like Antarctica and the Mediterranean Sea are currently operating or being built to catch neutrinos, one of the most elusive known particles in nature. Because neutrinos interact so feebly with matter, neutrino telescopes need to be big to catch neutrinos from galactic and extragalactic astrophysical objects. Neutrino astronomy is still in its infancy: the Sun and Supernova 1987A are the only sources that have been detected so far. But the detections from those two sources have already revealed much about the inner working of the Sun's core and about the mechanism of supernova explosions, information that is inaccessible to optical telescopes.

High-energy neutrinos are produced by the interactions of cosmic rays. Cosmic rays are charged particles, so they are deflected by the galactic and extragalactic magnetic fields. Their directions of arrival tell us nothing about the directions of their source objects. Thus the sources of cosmic rays still have not been identified. In contrast, neutrinos are rarely deflected, so they point directly back to their sources. The detection of high-energy neutrinos, together with electromagnetic observations, can identify the sources of cosmic rays. I will give an overview of the neutrino telescopes, the candidate astrophysical sources of neutrinos, and the current status of the field.

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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.

Continued from Page 1

***Biography:*** Dr. Soebur Razzaque is on the research faculty at the George Mason University, and is a resident at the US Naval Research Laboratory. His research interests span topics in high-energy neutrino physics and astrophysics, gamma-ray astrophysics, and cosmic-ray astrophysics. As a graduate student at the University of Kansas, Dr. Razzaque worked on the theoretical modeling of radio signals from charged particle showers triggered by high-energy neutrinos, for the Radio Ice Cherenkov Experiment at the South Pole. While he was a postdoctoral fellow at the Pennsylvania State University, his research shifted to the study of astrophysical sources, such as gamma-ray bursts and Active Galactic Nuclei. He was also a member of the IceCube Neutrino Observatory at the South Pole.

During his tenure as a National Research Council Research Associate at the US Naval Research Laboratory, Dr. Razzaque continued modeling high-energy emission from astrophysical sources, as well as interpreting astrophysical clues about the basic nature of neutrinos. He is still working on those topics. Dr. Razzaque is currently a member of the Large Area Telescope Collaboration of NASA's Fermi Gamma-Ray Space Telescope.

## MASPG Talk
## Wednesday, May 16

Dr. James J. Carroll
US Army Research Laboratory
"Ups and Downs of Nuclear Isomers"

Mid-Atlantic Senior Physicists Group talk starts at 1:00 pm with Q&A to follow. It will be held in one of the first floor conference rooms at the American Center for Physics (www.acp.org), One Physics Ellipse, College Park, MD. This is located off River Road, between Kenilworth Ave. and Paint Branch Parkway.

Biography - James J. (Jeff) Carroll is a physicist with the US Army Research Laboratory (ARL), Adelphi, MD, and leads a research team within its Power and Energy Division. He has published nearly 90 peer-reviewed journal articles related to nuclear physics and nuclear isomers, and has given plenary and invited talks around the world.

Prior to coming to ARL in January 2011, he was a Professor in the Department of Physics and Astronomy, Youngstown State University, where he was recognized seven times as Distinguished Professor in Teaching or Research during his fifteen years. James received his Ph. D. from the University of Texas at Dallas in 1991 for nuclear isomer studies with photon sources. He is a co-discoverer of induced depletion (de-excitation) of three of the five nuclear isomers for which this process has been experimentally demonstrated.

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## Open House at Hopewell Observatory Saturday, May 19

NCA members, families and guests are invited to view the spring sky at Hopewell Observatory in the Bull Run Mountains. See Venus as a spectacular thin crescent, Mars and Saturn and numerous deep-sky objects, and possibly comet Garradd. The Sun sets at 20:20 and twilight ends at 22:10. Come any time after sunset.

Directions:

(1) From the Beltway (I-495) go west on I-66 25 miles to Exit 40 at Haymarket onto U.S. 15.

(2) Turn left on U.S. 15 at the traffic light at the end of the exit ramp.

(3) Go 0.3 mile to traffic light, turn right onto Va. 55.

(4) Go 0.8 mile to Antioch Road (Rt. 681) and turn right.

(5) Go 3.2 miles to the end of Antioch Rd. and turn left onto Waterfall Road (601).

(6) Go one mile and bear right onto Bull Run Mountain Rd. (Rt. 629).

(7) Go 0.9 mile on 629 to narrow paved road at right with an orange pipe gate (Directly across from an entrance gate with stone facing).

(8) Turn right through pipe gates, go 0.3 mile to top of ridge, and around the concrete building and towers.

(9) Continue on dirt road through the white gate and woods a few hundred feet to the observatory. Park along the road short of the buildings or at the tower station.

If it is raining or hopelessly cloudy the event will be canceled. For further information call (703) 960-9126. Observatory phone: (703) 754-2317.

# Exploring the Sky

| | | |
|---|---|---|
| 5/19 | 9:00 PM | Venus, Mars, and Saturn; the Beehive in Cancer |
| 6/05 | **6:00 PM** | Transit of Venus (solar observing) Location TBD |
| 6/16 | 9:00 PM | Solstice 6/20; Mars and Saturn |
| 7/21 | 9:00 PM | Summer Triangle; Moon passing near Regulus |
| 8/18 | 8:30 PM | Mars and Saturn near Spica; Andromeda rising |
| 9/15 | 8:00 PM | Cassiopeia level with Polaris; equinox next week |
| 10/20 | 7:30 PM | Astronomy Day; Orionid meteor shower |
| 11/03 | 7:00 PM | Pleiades and Winter constellations appear |

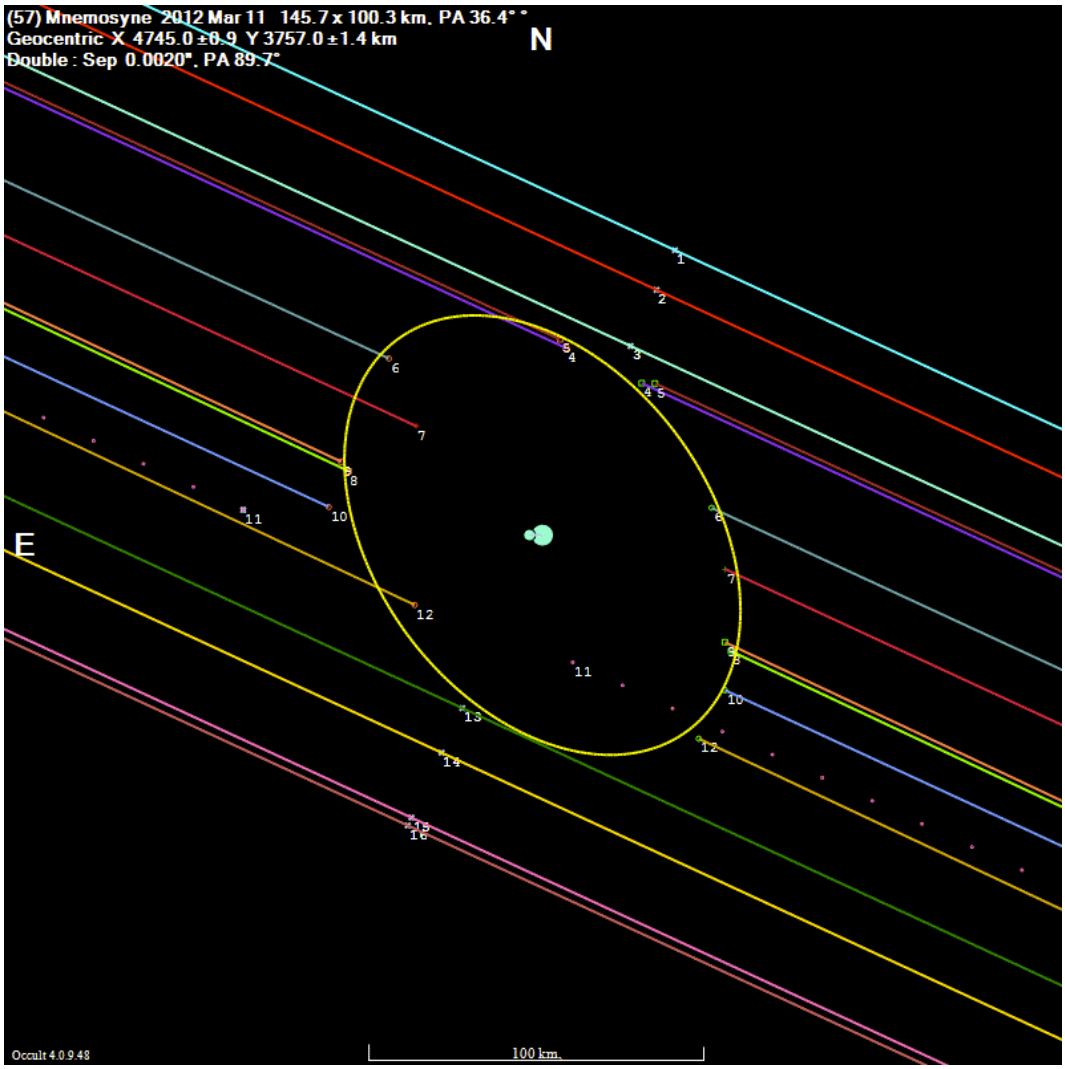
Questions? Call the Nature Center at (202) 895-6070
or check the Internet sites:

http://www.nps.gov/rocr/planyourvisit/expsky.htm
http://www.capitalastronomers.org

A presentation of the National Park Service and National Capital Astronomers

# March 11 Occultation of Asteroid (57) Mnemosyne

(Updated from April 2011 Star Dust to Reflect all Observations)




RMS fit -1.8 ±6.1 km

| | | |
|---|---|---|
| 1 | (M) | T Lipka,Uniontown, M |
| 2 | (M) | S Conard,Gamber, MD |
| 3 | (M) | J Brooks,Winchester, |
| 4 | | S Conard,Dayton, MD |
| 5 | | S Conard,Dayton, MD |
| 6 | | W Warren/J Dunham,Gr |
| 7 | | J Wisniewski, The Pl |
| 8 | | R Jones,Salton City, |
| 9 | | R Jones,Salton City, |
| 10 | | D Dunham,Hawthorne, |
| 11 | (P) | Predicted Centerline |
| 12 | | W Thomas, Phoenix, A |
| 13 | (M) | D Dunham,Port Conway |
| 14 | (M) | D Dunham,Bowling Gre |
| 15 | (M) | D Dunham,Doswell, VA |
| 16 | (M) | D Dunham,Doswell, VA |

Continued on Bottom of Page 5

## Occultation Notes

D following the time denotes a disappearance, while R indicates that the event is a reappearance.

When a power (x; actually, zoom factor) is given in the notes, the event can probably be recorded directly with a camcorder of that power with no telescope needed.

The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.

Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.

Mag is the star's magnitude.

% is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50.

Cusp Angle is described more fully at the main IOTA Web site.

Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.

Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl".

Sometimes the Watts angle (WA) is given; it is aligned with the Moon's rotation axis and can be used to estimate where a star will reappear relative to lunar features. The selenographic latitude is WA -270. For example, WA 305 - 310 is near Mare Crisium.

# Mid-Atlantic Occultations and Expeditions

*David Dunham*

### Asteroidal and Planetary Occultations

| Date | Day | EDT | Star | Mag. | Asteroid | dmag | dur. s | Ap. " | Location |
|---|---|---|---|---|---|---|---|---|---|
| May 14 | Mon | 1:35 | SAO 183075 | 8.9 | Osiris | 7.5 | 1 | 3 | VA, WV, s Ohio |
| May 15 | Tue | 22:23 | ZC 1250 | 5.8 | Steshenko | 12.6 | 0.8 | 2 | PA,sNJ;MD,DE? |
| May 16 | Wed | 23:02 | 2UC35015172 | 11.8 | Aline | 2.9 | 3 | 8 | NC; VA or SC? |
| May 25 | Fri | 22:14 | TYC56821007 | 10.4 | Oppolzer | 4.6 | 2 | 5 | DC,MD,nVA;alt. 8 |
| Jun 9 | Sat | 4:56 | 2UC27870726 | 11.3 | Tauntonia | 3.1 | 4 | 7 | MD,nVA,WV;sPA? |
| Jun 10 | Sun | 4:54 | TYC58030981 | 10.2 | Eleonora | 1.7 | 22 | 5 | sWV,w&sVA,neNC |

### Lunar Grazing Occultations (*, Dunham plans no expedition)

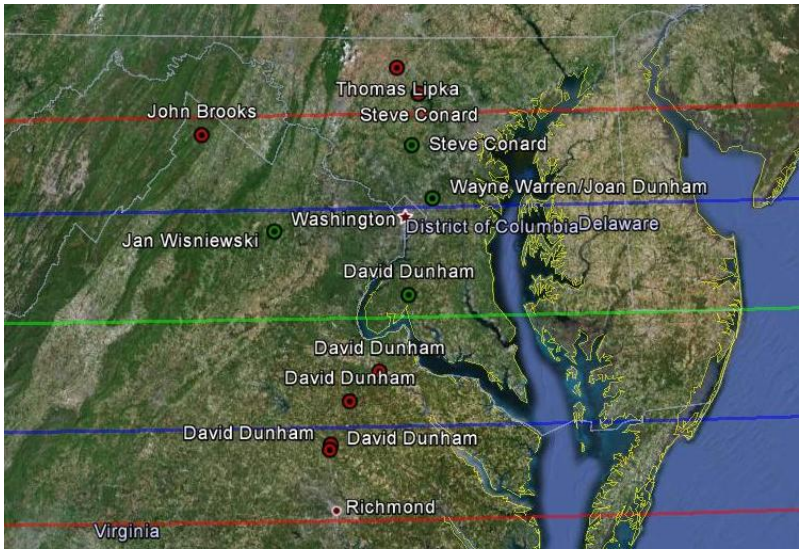
| Date | Day | EDT | Star | Mag. | % | alt | CA | Location |
|---|---|---|---|---|---|---|---|---|
| May 23 | Wed | 21:24 | X 9048 | 9.7 | 8+ | 12 | 7N | *n VA, s MD |
| May 23 | Wed | 21:25 | X 9047 | 9.8 | 8+ | 12 | 7N | *sw VA, ne NC |

Interactive detailed maps at http://www.timerson.net/IOTA/

### Total Lunar Occultations

| DATE | Day | EDT | Ph | Star | Mag. | % | alt | CA | Sp. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| May 14 | Mon | 3:27 | R | ZC 3326 | 6.4 | 36- | 11 | 88S | F6 | Az. 104, close double |
| May 14 | Mon | 4:10 | R | SAO 146252 | 7.2 | 35- | 19 | 74S | A0 | |
| May 14 | Mon | 4:10 | R | SAO 146252 | 7.2 | 35- | 19 | 74S | A0 | |
| May 15 | Tue | 3:34 | R | kappa Psc | 5.0 | 26- | 7 | 40N | A0 | Az94,ZC3453,mg2 10,177" |
| May 15 | Tue | 3:48 | R | 9 Piscium | 6.3 | 26- | 10 | 82N | G7 | Az. 96,ZC3455,spec.bin. |
| May 15 | Tue | 5:00 | R | SAO 128208 | 8.0 | 26- | 23 | 35S | G5 | Sun altitude -10 deg. |
| May 16 | Wed | 4:56 | R | SAO 109089 | 8.4 | 18- | 17 | 49S | F8 | Sun -10 |
| May 16 | Wed | 5:37 | R | ZC 29 | 7.0 | 18- | 25 | 88S | K0 | Sun -4 |
| May 24 | Thu | 22:27 | D | SAO 96791 | 7.8 | 15+ | 9 | 51N | K0 | Az 286, close double? |
| May 24 | Thu | 22:33 | D | SAO 96794 | 8.0 | 15+ | 8 | 44N | A0 | Az 287, close double? |
| May 25 | Fri | 21:09 | D | SAO 97586 | 8.3 | 22+ | 31 | 51S | F0 | Sun -9 |
| May 25 | Fri | 22:29 | D | ZC 1234 | 6.2 | 22+ | 15 | 59S | A1 | Az 277, close double? |
| May 29 | Tue | 20:44 | D | 87 Leonis | 4.8 | 63+ | 47 | 78S | K4 | Sun alt. -4, ZC 1670 |
| May 30 | Wed | 23:27 | D | ZC 1788 | 6.8 | 75+ | 31 | 84S | G0 | |
| May 30 | Wed | 23:27 | D | SAO 138786 | 7.9 | 75+ | 31 | 23S | F2 | |
| Jun 3 | Sun | 1:16 | D | ZC 2212 | 6.2 | 98+ | 27 | 67N | A3 | |
| Jun 5 | Tue | 4:02 | R | ZC 2549 | 6.6 | 99- | 22 | 75N | F0 | AA278,TmD18",spec.bin. |
| Jun 5 | Tue | 23:02 | R | ZC 2708 | 5.9 | 96- | 10 | 77S | G5 | Az.128, AA 250,double? |
| Jun 6 | Wed | 1:29 | R | ZC 2717 | 7.4 | 95- | 27 | 81S | K0 | AA 255 |
| Jun 6 | Wed | 1:59 | R | SAO 187214 | 7.3 | 95- | 29 | 60S | K2 | AA 234 |
| Jun 6 | Wed | 2:14 | R | ZC 2720 | 6.4 | 95- | 30 | 45S | F5 | AA 219 |
| Jun 6 | Wed | 4:54 | R | 29 Sgr | 5.2 | 95- | 25 | 43N | K2 | Sun -9,AA 311, ZC 2734 |
| Jun 8 | Fri | 3:35 | R | ZC 3027 | 6.9 | 81- | 35 | 32S | M2 | |
| Jun 10 | Sun | 3:17 | R | ZC 3290 | 7.3 | 61- | 29 | 39S | F0 | close double? |

Explanations & more information is at http://iota.jhuapl.edu/exped.htm. David Dunham, dunham@starpower.net, phone 301-526-5590. Information on timing occultations is at: http://iota.jhuapl.edu/timng920.htm.



Owens Science Center
Planetarium Shows
9601 Greenbelt Road,
Lanham, MD
(301) 918-8750
howardb.owens@pgcps.org

**South Sea Skies**
**May 18, 2012***
**7:30-8:30 pm**

May is Asian/Pacific American Heritage Month. In observance of this occasion, the Owens Science Center planetarium presents a show on the astronomical lore of the people of Polynesia & Micronesia and how they used their knowledge of the sky to voyage across the Pacific long before the development of modern navigation.
Doors open by 7:15 pm . Program begins at 7:30 pm. Cost 5:00 for adults; 3:00 for students/seniors/teachers. Children 3 and under are free.
***Note: this is the 3rd Friday of the month***

**Celebrate Venus!**
**June 1, 2012**
**7:00 pm for pre planetarium show activities, 7:30-8:30 show time**

Where were you on June 8, 2004? Where will you be on June 5, 2012? This is literally the chance of a lifetime! Venus passes directly between the Earth and the Sun this day, visible as a small dot gliding slowly across the face of the Sun. Historically, this rare alignment is how we measured the size of our Solar System. The next such alignment happens in 2117, so come prepare for this exciting rare event here at the Owens Science Center, joined by some of our friends at NASA's Goddard Space Flight Center and the Space Telescope Science Institute! Doors open at 7:00 pm for pre-planetarium activities.

*Thank you Nancy Grace Roman for finding these articles.*

## One Black Hole Won't Ruin Your Day

Based on article by
Ken Croswell
*Science,* 22 March, 2012

A black hole hitting Earth sounds like the ultimate doomsday scenario. But it probably won't hurt much, say researchers who created computer simulations to see what would happen if a puny primordial black hole, born just after the Big Bang, struck our planet. If they exist, such black holes constitute some of the galaxy's dark matter; they're much smaller than the black holes we know about, having the masses of asteroids but the diameters of atomic nuclei. As the scientists will report in *The Astrophysical Journal*, the hypothetical black hole would zip through Earth in about a minute, barely shaking the world's surface the way a very weak earthquake would.

Larger primordial black holes would shake the ground more but are thought to be much rarer. Don't stay up waiting for those tremors, however: Even collisions with the smallest and most common primordial black holes should happen no more than once every few million years. That's good news for everyone, except those who'd like to see whether these exotic objects really exist.

## NASA's Chandra Finds Fastest Wind from Stellar-mass Black Hole

Megan Watzke
Chandra X-ray Center
Feb. 21, 2012

Astronomers using NASA's Chandra X-ray Observatory have clocked the fastest wind yet discovered blowing off a disk around a stellar-mass black hole. The record-breaking wind is moving about 20 million mph, or about 3 percent of the speed of light. This is nearly 10 times faster than had ever been seen from a stellar-mass black hole.

Stellar-mass black holes are born when extremely massive stars collapse. They typically weigh between five and 10 times the mass of the Sun. The stellar-mass black hole powering this super wind is known as IGR J17091-3624, a binary system in which a Sun-like star orbits the black hole. "We weren't expecting to see such powerful winds from a black hole like this." said King, the leader of the study. This wind speed matches some of the fastest winds generated by supermassive black holes, objects millions or billions of times more massive.

Another unanticipated finding is that the wind, which comes from a disk of gas surrounding the black hole, may be carrying away more material than the black hole is capturing. "We estimate up to 95 percent of the matter in the disk around IGR J17091-3624 is expelled by the wind," King said.

Simultaneous observations made with the National Radio Astronomy Observatory's Expanded Very Large Array showed a radio jet from the black hole was not present when the ultra-fast wind, blowing in all directions, was seen, although a radio jet is seen at other times. This agrees with observations of other stellar-mass black holes, providing further evidence that the production of winds can stifle jets.

## The NCA Needs Volunteers

As a volunteer organization, the NCA can exist only if people are willing to serve as its officers. Typically, a person serves in a particular position for a few years, and then someone else takes over. Our excellent and long-serving Treasurer and Secretary have indicated that they would like other people to take over next year. NCA can continue only if a few people are willing to step forward, to take these roles next year. The duties are not onerous, and the present officers are each willing to bring their replacements up to speed. Please send me an email (jshgwave@yahoo.com) or see me during the May meeting if you are willing to help keep us going.

John Hornstein

*Editor's Note: I'm also looking for a replacement, but not right away. I'm willing to continue editing Star Dust until someone else is ready to take over.*

## Calendar of Events

**NCA Mirror- and Telescope-making Classes:** Tuesdays May 1, 8, 15, 22, 29 and Fridays, May 4, 11, 18, 25, 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, May 12 at 5:30 pm, preceding the meeting, at the *Garden Restaurant* in the University of Maryland University College Inn and Conference Center.

**Montgomery College Planetarium:** Tuesday, June 5 at 5 pm. 7621 Fenton Street, Takoma Park, MD (240) 567-1463. Transit of Venus across the disk of the Sun from the roof of the King Street Parking Garage. If it is hopelessly cloudy and predicted to continue that way well past the event then we will have a show in the planetarium watching web cams of this event. The real thing is better! http://www.montgomerycollege.edu/Departments/planet/planet/VenusTransit.html

**Philosophical Society of Washington:** Monday, May 25 at 8:30 pm. Powell Auditorium adjacent to the Cosmos Club, 2170 Florida Avenue NW, Washington DC 20008. Lee Cronin, Gardiner Professor of Chemistry, University of Glasgow. "Synthesizing Life"

**Upcoming NCA Meetings** at the University of Maryland Observatory:

May 12, 2012 **Soebur Razzaque** (GMU) - Neutrino Astronomy
June 9, 2012 **Science Fair winners** and Election

## National Capital Astronomers Membership Form

**Name:** _____ **Date:** ____/____/____

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**Academic Degrees:** _____ **Field(s) of Specialization:** _____

**Employer or Educational Institution:** _____

**Student Membership:** ..... **$ 5**

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**Optional additional contribution to NCA:** ..... **$**_____

**Total Payment (circle applicable membership category above):** ..... **$**_____

*Members receive* Stardust*, the monthly newsletter announcing NCA activities, by e-mail. If you would like to receive a paper copy of Stardust via regular mail, please check here:* _____

Please mail this form with check payable to National Capital Astronomers to:
Michael L. Brabanski, NCA Treasurer; 10610 Bucknell Drive; Silver Spring, MD 20902

National Capital Astronomers, Inc.

**If undeliverable, return to**
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10610 Bucknell Dr.
Silver Spring, MD 20902-4254

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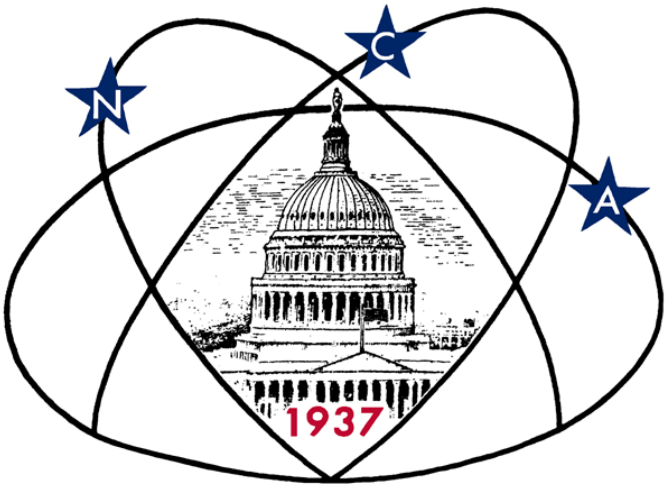
**Dated Material**




Next NCA Mtg:

May 12

7:30 pm

@ UMD Obs

Dr. Soebur Razzaque

# Inside This Issue