

Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

May 2016

Volume 74, Issue 9

Next Meeting

When: Sat. May 14th, 2016

Time: 7:30 pm

Where: UMD Observatory

Speakers: Chryssa Kouveliotou

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Directions to Dinner/Meeting

Our time and location for dinner with the speaker before this meeting is 5:30 pm at "The Common," the restaurant in the UMD University College building located at 3501 University Blvd.

The meeting is held at the UMD Astronomy Observatory on Metzger 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 @ 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 through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

Magnetars: the Extremes of Nature

Chryssa Kouveliotou,
The George Washington University

Abstract: Magnetars are neutron stars (NSs) with extreme magnetic fields ($B \approx 10^{14} - 10^{15}$ gauss [G]). The existence of these types of stars was theoretically predicted in 1992 and was observationally confirmed in 1998. Magnetars are very rare; only 28 sources are confirmed to date. They occur in several classes of neutron stars, but are mostly Soft Gamma Repeaters (SGRs) and Anomalous X-ray Pulsars (AXPs).

The population of Magnetars seems to be rather diverse. In 2008, PSR J1846 – 0258 [a young, rotation-powered, X-ray pulsar ($B = 4.9 \times 10^{13}$ G)] was found to emit SGR-like outbursts. SGR J0418+5729 has a much weaker inferred dipole magnetic field ($B = 6 \times 10^{12}$ G); and, PSR J1622-4950 was found to have the strongest magnetic field among radio pulsars ($B \approx 3 \times 10^{14}$ G). Magnetars are permanent X-ray sources that undergo random outbursts, during which they emit from tens to thousands of very brief (0.1 – 1.0 s), soft (3.0 – 50.0 keV) gamma-ray bursts in short periods lasting days to months. On rare occasions, magnetars emit extremely energetic giant flares (only three have been observed). This talk will address how magnetars were discovered, their characteristic properties, and how understanding magnetars can provide unique insights about the properties of matter at extreme densities and in extreme magnetic fields.

Biographical Sketch:

Chryssa Kouveliotou is an Astrophysics Professor at The George Washington University in Washington, DC, where she leads a multi-wavelength team in Time Domain Astronomy under the Astronomy, Physics, Statistics Institute of Sciences (APSIS). Prior to joining GWU, she was a Senior Technologist at NASA's Marshall Space Flight Center, from where she retired in 2015. Chryssa has been a member of the science teams of the ISEE-3, SMM, CGRO, Fermi, Swift, NuSTAR space missions, and is a Co-Investigator in new proposals (PRAXyS, ISS-Lobster). She earned her PhD at the Technical

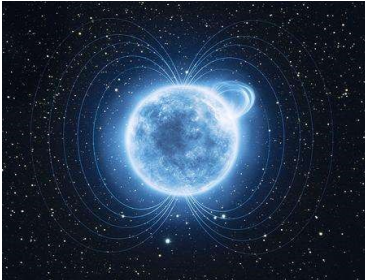


continued on page 2

Reminder

After the meeting, everyone is invited to join us at ... (Plato's Diner is temporarily closed.) We will announce the alternate location at the meeting.

Relative Magnetic Fields



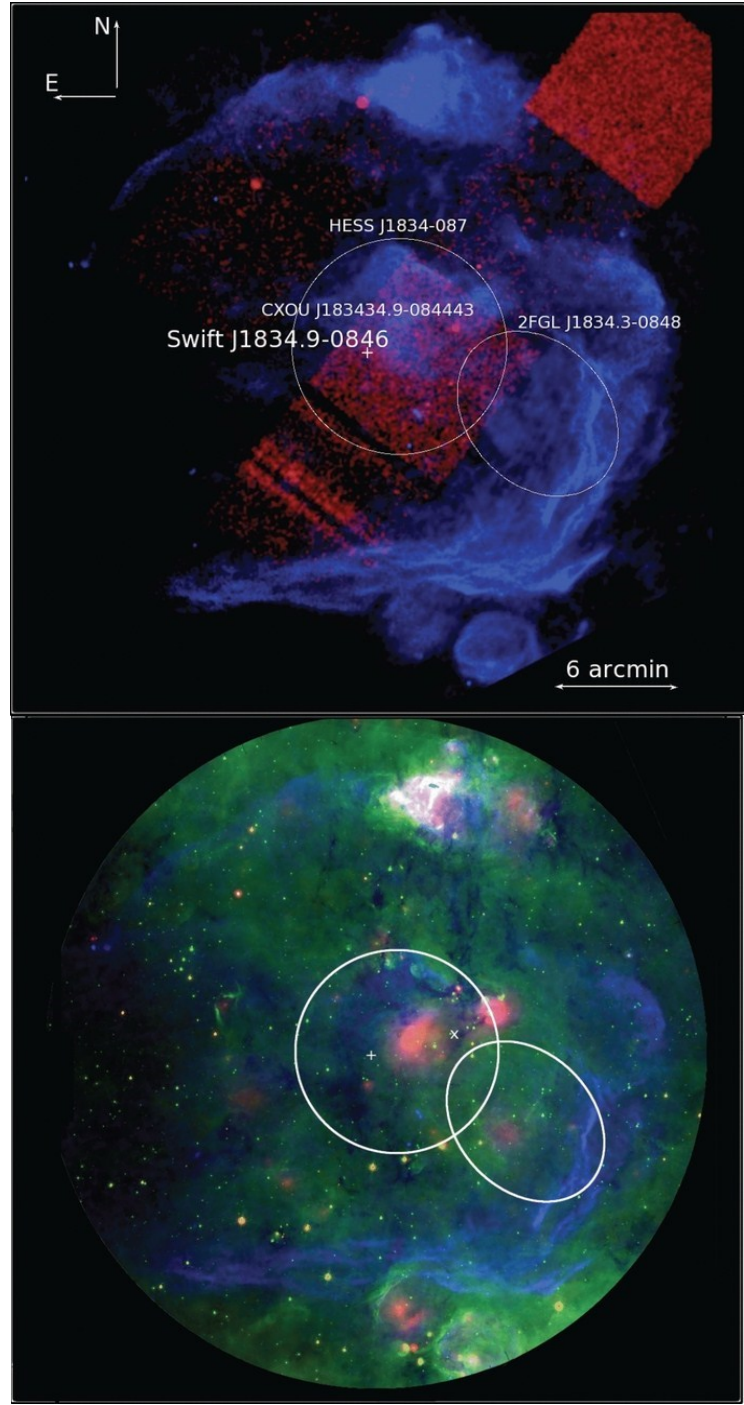
Courtesy ESA/ATG Medialab
Artist's rendering of a Magnetar

Magnetic fields around a magnetar can be more than 1,000 trillion gauss (vs. 400,000 gauss that has been created by humans in labs). Just to put it all in perspective, here's a sample of magnetic field measurements:

- **Galactic magnetic field**
(0.00001 G)
- **Solar Wind**
(0.00005 G)
- **Interstellar molecular cloud**
(0.001 G)
- **Earth's field (ground level)**
(1 G)
- **Solar surface field**
(5 G)
- **Massive star (pre-supernova) field**
(100 G)
- **Toy refrigerator magnet**
(100 G)
- **Sun spot field**
(1000 G)
- **Jupiter magnetic field**
(1000 G)
- **Magnetic Stars** (e.g., BD+54 2846)
(12,000 G)
- **White Dwarf star surfaces**
(1,000,000 G)
- **Neutron star surface field**
(1,000,000,000,000 G)
- **Magnetar field**
(1,000,000,000,000,000 G)

Source: Dr. Sten Odenwald,
[The Astronomy Cafe](#)

Magnetars – continued from page 1



Courtesy C. Kouveliotou

Multi-wavelength images from the region where magnetar Swift J1834.9-0846 is located (white cross) show a field rich in high-energy sources: Supernova Remnant W41, HESS J1834-087 (TeV source), 2FGL J1834.3-0848 (GeV source), and XMMU J183435.3-84443/CXOU J183434.9-084443 (PSR/pulsar wind nebula). The top panel shows the CXO ACIS image (0.3–8 keV; red) and the Very Large Array (VLA) 20 cm image (blue) from the MAGPIS database (<http://third.ucllnl.org/gps/>). In the bottom panel, the 20 cm VLA image is shown in blue, the Spitzer IRAC 8 μ m image is shown in green, and the Spitzer MIPS 24 μ m image is shown in red. The $r = 5^\circ.4$ circle shows the extent of HESS J1834-087; the ellipse shows the position of 2FGL J1834.3-0848 at the 95% confidence level (from Kargaltsev et al. 2012, *The Astrophysical Journal*, 748, 12).

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Seasonal Blue Moons

In recent years, people have been using the name *Blue Moon* to denote the second of two full moons in a single calendar month. An older definition refers to a Blue Moon as the third of four full moons in a single season, which is defined as the period between a solstice and an equinox. Therefore, May 21st is a *Seasonal Blue Moon*:

Equinox: March 20, 2016

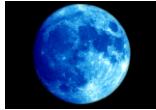
Full moon 1: Mar 23, 2016

Full moon 2: Apr 22, 2016

Full Moon 3: **May 21, 2016 (Blue Moon)**

Full moon 4: Jun 20, 2016 (11:02 Universal Time)

Solstice: June 20, 2016 (23:34 Universal Time)



This rare calendar event only happens once every few years (an average of 2.7 years), giving rise to the term, “once in a blue moon.” There are normally only three full moons in each season of the year. But since full moons occur every 29.53 days, occasionally a season will contain 4 full moons.

The next 7 Seasonal Blue Moons:

- 1) May 18, 2019
- 2) August 22, 2021
- 3) August 19, 2024
- 4) May 20, 2027
- 5) August 24, 2029
- 6) August 21, 2032
- 7) May 22, 2035

The Great North American Eclipse



Aug 21st 2017

www.greatamericaneclipse.com/

Magnetars – continued from page 2

University of Munich/Max Planck Institute for Extraterrestrial Physics, on high-energy transient phenomena, such as gamma-ray bursts (GRBs) and solar flares. She then joined the University of Athens, Greece, as an Assistant Professor until 1994, when she moved to MSFC in Huntsville, Alabama, to work on the Burst And Transient Source Experiment onboard the Compton Gamma Ray Observatory. She has made major discoveries in the transient Universe. Among her many discoveries are: the establishment of two distinct classes of gamma-ray bursts (GRBs) in 1993, the discovery of the Bursting Pulsar (GRO J1744-28) in 1996, the discovery of magnetars in 1998, the establishment of a single component synchrotron afterglow origin from late optical to multi-GeV wavelengths for one GRB in 2013. She is also a member of the National Academy of Sciences and of the American Academy of Arts and Sciences.

Sky Watchers

Spring Schedule

May

May 15	6 am – Planets , N. Hemisphere. Jupiter 2° north of Moon.
May 21	5:14 pm – Full Moon, Seasonal Blue Moon , Global. Other Moon Names: Full Flower Moon (abundance of flowers), Full Corn-planting Moon, Full Milk Moon.

Times EDT

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Exploring the Sky

“Exploring the Sky” is an informal program that, for over 60 years, has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia.



Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November, Beginners (including children) and experienced stargazers are all welcome—and it’s free!

2016 Observation Dates for Spring and Summer

- 4 June (9:00 pm) – Vega & 3 planets
- 9 July (9:00 pm) – Summer Triangle, Moon & Jupiter
- 6 August (8:30 pm) – Andromeda & Mercury

Hosted by: [National Capital Astronomers, Inc](#) and [Rock Creek Park](#)

June Election Information

*John Hornstein,
Reporting for the Nominating Committee*

Following is a list of candidates and appointments for consideration before the June meeting.

Executive Officers

Position	Current	Candidate(s)
President	Joseph Morris	Joseph Morris
Vice President	John Hornstein	John Hornstein
Secretary-Treasurer	Henry Bofinger	Henry Bofinger
Assistant Secretary-Treasurer	Jeff Norman	Jeff Norman

Trustees

Current	Candidate(s)*
Harold Williams (to June 2016)	Harold Williams (to June 2020)
Benson Simon (to June 2017)	N/A
Joe Morris (to June 2018)	N/A
Wayne Warren (to June 2019)	N/A

* Note: Only one Trusteeship opening occurs each year.

Appointed Officers and Committee Heads

Committee	Officer/Head	Contact Information
Exploring the Sky	Jay Miller	jhmiller@me.com
Telescope Making	Guy Brandenburg	gbrandenburg@yahoo.com 202-635-1860
NCA Webmaster	Elizabeth Warner	warnere@astro.umd.edu
Star Dust Editor	CA Brooks	NCAstardust@gmail.com

Sky Watchers Spring Schedule – continued from page 3

May/June

May 22	7 am – Planets , N. Hemisphere. Mars in opposition to Sun (mag = -2.1, brighter than any other time this year).
May 29 – June 7	Evening – Globe at Night , Global. Features: <i>Constellations Boötes</i> (N. Hemisphere) and <i>Crux</i> (S. Hemisphere).
June 3	3 am – Planets , N. Hemisphere. Saturn in opposition to Sun.

Times EDT

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• **Star Dust** is published ten times yearly
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• Editor: CA Brooks

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- John D. Gaffey, Jr.
- Alex Klein
- Jeffrey Norman
- Elizabeth Warner
- Wayne Warren
- Marjorie Weissberg
- Harold Williams

• Electronic Distributor: Jay Miller



Please Get Star Dust Electronically

• NCA members able to receive Star Dust,
• the newsletter of the NCA, via e-mail as a
• PDF file attachment, instead of hardcopy via
• U.S. Mail, can save NCA a considerable
• amount of money on the printing and
• postage in the production of Star Dust (the
• NCA's single largest expense), save some
• trees and have one-click access to all the
• embedded links in the document. If you can
• switch from paper to digital, please contact
• Henry Bofinger, the NCA Secretary-
• Treasurer, at hbofinger@earthlink.net

Thank you!

ALCon - Washington DC



August 10 – 13, 2016

• *The Annual Astronomical League
• Convention includes space exploration
• & astronomy talks, special tours, an
• awards banquet, "Star-B-Que" and
• more!*

**Hosted by NOVAC and the
Astronomical League**

Alcon2016.astroleague.org

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

David Dunham

Asteroidal and Planetary Occultations

Date	Day	EDT	Star	mag.	Asteroid	dmag	s	"	Location, Notes
May 25	wed	21:55	TYC08451172	12.1	Prymno	1.7	2	8	PA,DE;NJ,MD,DC?
Jun 1	wed	4:40	SAO 209207	9.8	Vindobona	3.2	10	4	PA,WMD,WV;DC,VA?

Lunar Grazing Occultations

Date	Day	EDT	Star	Mag	% alt	CA	Location & Remarks
May 12	Thu	21:45	SAO 98343*	7.4	43+ 43	4N	Hyattstown, Olney, sLaurel,MD
Jun 8	wed	21:02	SAO 98068	7.9	19+ 28	1S	*sDoswell,WestPt,Ark,VA;Sun-7
Jun 11	Sat	21:36	SAO 118753	8.3	47+ 41	3N	Potomac&sUpperMarlboro, MD;DC

*** No expedition from the DC region expected ***

* The star is in the Kepler 2 exoplanet search program so lightcurves of the occultation are desired to check for close stellar duplicity.

Interactive detailed maps at <http://www.iota.timerson.net/>

Total Lunar Occultations

Date	Day	EDT	Ph Star	Mag	% alt	CA	Sp. Notes
May 14	Sat	22:58	D 37 Sex	6.4	64+ 42	70N	K1 ZC 1567;actually in Leo
May 14	Sat	23:54	D 38 Sex/Leo	7.1	64+ 32	40N	A2 ZC 1573, spec. binary
May 15	Sun	23:34	D SAO118918*	8.0	73+ 40	86S	A0
May 15	Sun	23:41	D ZC 1676	6.5	73+ 39	81N	K5
May 17	Tue	23:20	D PX Vir	7.7	88+ 44	50S	G5 ZC 1874, close double?
May 18	wed	3:23	D Apami-Atsa	4.4	89+ 10	72N	A1 Az255,ZC1891=thtvir,dbl
May 20	Fri	3:11	D ZC 2097	6.8	98+ 22	60N	K0
May 24	Tue	23:51	R ZC 2733	6.8	89- 10	71S	A1 Az. 125, close double??
May 25	wed	4:58	R ZC 2758	7.0	89- 30	55S	B2 Sun altitude -9 degrees
May 27	Fri	4:51	R ZC 3029	7.0	72- 35	46S	F2 Sun -10, close double??
Jun 2	Thu	4:28	R 64 Ceti	5.6	11- 4	72N	G0 Azimuth 82, ZC 322
Jun 2	Thu	5:08	R xi1 Ceti	4.4	11- 12	42N	G8 Sun -7,Az.88,ZC327,dbl?
Jun 4	Sat	15:41	D Aldebaran=	0.9	0- 47	-13S	K5 Sun+53, ZC 692, only
Jun 4	Sat	16:42	R alpha Tau	0.9	0- 35	61N	K5 Sun+41, 7 deg. from Sun
Jun 8	wed	20:48	D SAO 98068*	7.9	19+ 30	20S	G5 Sun altitude -4 degrees
Jun 8	wed	21:52	D ZC 1314	8.0	19+ 18	75S	A2
Jun 10	Fri	22:07	D SAO 118327	8.4	37+ 30	82N	K0
Jun 12	Sun	21:28	D SAO 119176	8.0	57+ 45	36N	K2 Sun alt. -10 deg.
Jun 12	Sun	22:05	D ZC 1737	7.8	57+ 39	5S	A2 mag2 8 sep 72" PA 177dg
Jun 12	Sun	22:24	D SAO 119179	8.2	57+ 36	12S	K0
Jun 14	Tue	1:40	D ZC 1850	6.5	67+ 7	53S	K0 Az. 259, close double?

* The star is in the Kepler 2 exoplanet search program so lightcurves of the occultation are desired to check for close stellar duplicity.

Further explanations & more information is at iota.jhuapl.edu/exped.htm.
David Dunham, dunham@starpower.net

Sky Watchers Spring Schedule – continued from page 4

June

June 4	9:00 pm – Exploring the Sky , Features: <i>Vega & 3 Planets</i> .
June 5	5 am – Planets , N. Hemisphere. Mercury at greatest western elongation (24° from Sun, best time for viewing is eastern sky before sunrise).

Times EDT

2015-2016 Officers

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- Harold Williams (2016)
- Benson Simon (2017)
- Andrew Seacord (2018)
- Wayne Warren (2019)

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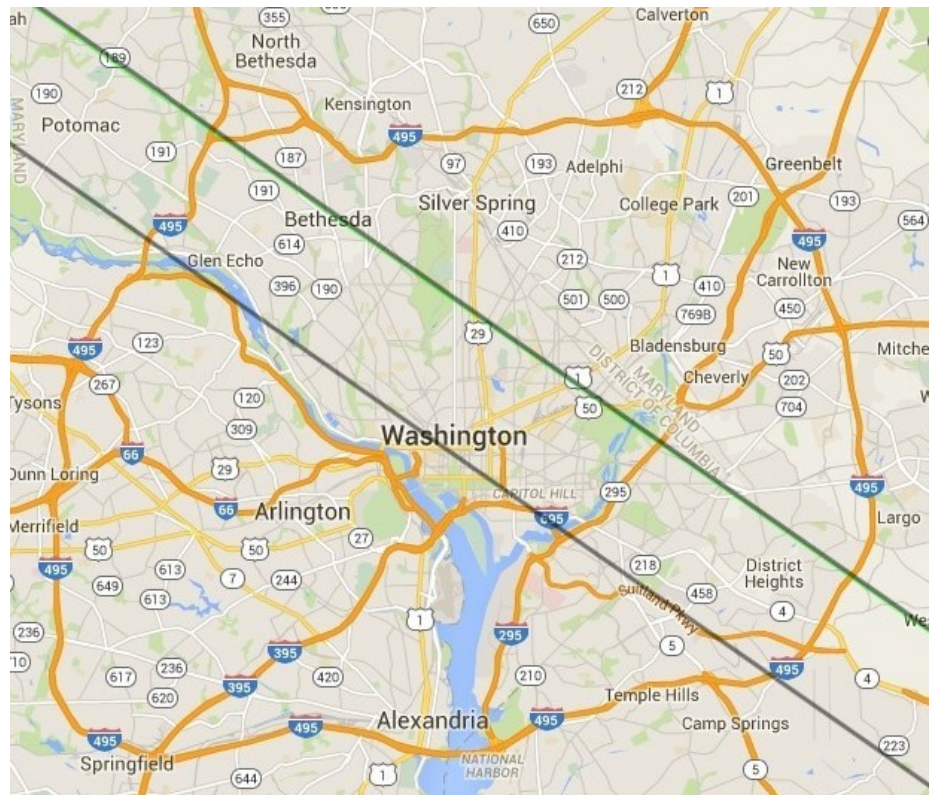
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SAO 118753

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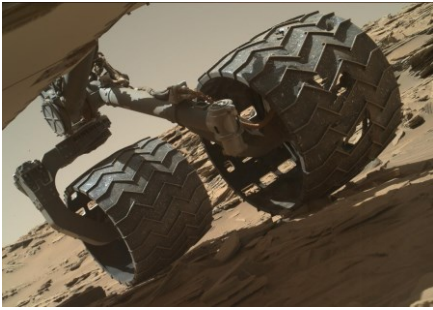
A grazing occultation of 8.3-mag. SAO 118753 will occur on June 11th across the Washington, DC region. In the 5-km-wide zone (between the two dark gray lines in the image), there will be at least two occultations of the star by lunar features, visible with six-inch or larger telescopes and occurring between 9:42 and 9:48 pm EDT. North of the zone, there will be no occultation of the star (only a close miss), while south of the zone, a total occultation can be seen, with the star disappearing on the dark side around 9:30 pm EDT. In those southern areas, the reappearance won't be visible since it will occur on the sunlit side of the Moon. The event will occur near the start of astronomical twilight, with the Sun 11° below the horizon; so, the sky will be a rather dark blue, not interfering with telescopic views of the graze. Although the event occurs near the end of NCA's monthly meeting, unfortunately, no occultation will occur at UMD's observatory in College Park.



May 14th, 2016

Astronomical League

5-Wheelin'



Courtesy NASA/JPL-Caltech/MSSS

Rover Curiosity has been exploring the lower part of Mars' Mount Sharp (3 miles/5 kilometers high), but the rugged terrain is taking its toll on the rover's six wheels. NASA, however, feels confident that Curiosity should be able to continue to ascend the mountain and collect more data.

The submission deadline for the June issue of Star Dust is May 28th.

Clear Skies!

Calendar of Events

- **NCA Mirror- or Telescope-making Classes:** Tuesdays and Fridays, from 6:30 to 9:45 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg@yahoo.com.
- **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
- **Owens Science Center Planetarium (Family Night):** "Astin's Sky Adventure," Fri. May 13, 7:30 pm; \$5/adult; \$3/students/senior/teachers/military; children under 3 free. www1.pgcps.org/howardbowens
- **International Astronomy Day:** "Bringing Astronomy to the People," Sat. May 14th.
- **Mid-Atlantic Senior Physicists Group:** "Tuning Electronic Structure and the Search for New Quantum States" with Johnpierre Paglione (UMD) Wed. May 18th, at 1 pm at the American Center for Physics (1st floor conference room). <http://www.aps.org/units/maspg/>
- **Towel Day,** annual tribute to author Douglas Adams ("*Hitchhiker's Guide to the Galaxy*") by all of the "hoopy froods," Wed. May 25th. <http://www.towelday.org/>
- **Upcoming NCA Meetings** at the University of Maryland Observatory:
11 June: Science Fair Winners' presentations, Elections, Astrophotos!

National Capital Astronomers Membership Form

Name: _____ Date: ___/___/___

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.?

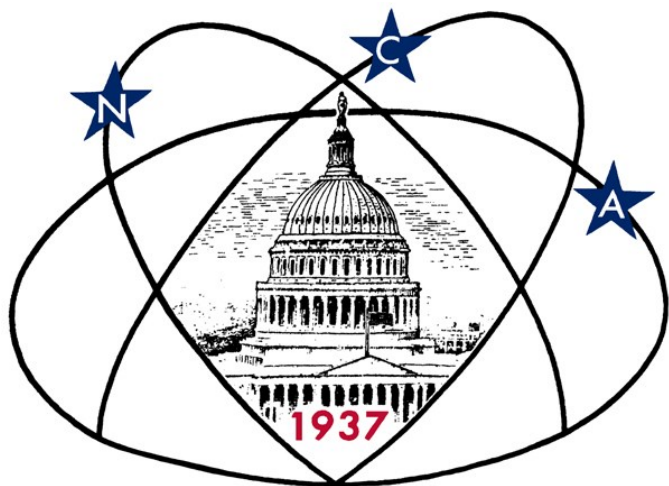
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

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

National Capital Astronomers, Inc.

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Next NCA Meeting:

2016 May 14th

7:30 pm

@ UMD Observatory

Dr. Chryssa
Kouveliotou

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