

# Star Dust

National Capital Astronomers, Inc.

April 2012

Volume 70, Issue 8

<http://capitlastronomers.org>

## Next Meeting

**When:** Sat. Apr. 14, 2012  
**Time:** 7:30 pm  
**Where:** UMD Observatory  
**Speaker:** Stella Kafka,  
CIW-DTM

## Table of Contents

Preview of Apr. 2012 Talk.....	1
Conjunction and ATREX.....	2
Mnemosyne Occultation.....	4
Occultations.....	5
NASA News.....	6
Phil. Soc. Talk Apr. 20.....	6
Calendar.....	7

## 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 Metzert 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](mailto: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.

April 2012: Stella Kafka  
Carnegie Institution of Washington  
Department of Terrestrial Magnetism  
**Cataclysmic Variables as Supernova 1a Progenitors**



**Star Dust** is published ten times yearly September through June, by the National Capital Astronomers, Inc. (NCA).

ISSN: 0898-7548

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## 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) and also save some trees. If you can switch from paper to digital, please contact Michael L. Brabanski, the NCA Sec-Treasurer, at [mlbrabanski@verizon.net](mailto:mlbrabanski@verizon.net) or 301-649-4328 (h).

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

**Abstract:** Although the identification of the progenitors of type 1a supernovae (SNe 1a) remains controversial, it is generally accepted that they originate from binary star systems in which at least one component is a carbon-oxygen white dwarf (WD). Those systems are grouped under the wide umbrella of cataclysmic variables (CVs). Current theories for SNe1a progenitors hold that, either via Roche lobe overflow of the companion or via a wind, the WD accumulates Hydrogen- or Helium-rich material, which is then burned on the WD's surface to C and O. But the specifics of this scenario are far from being identified or understood, allowing for a wealth of theories fighting for attention, and a dearth of observations to support them. I discuss the latest attempts to identify and study those controversial SNe1a progenitors. I also introduce the most promising progenitor identified so far, and I present observational diagnostics that can reveal more members of the category.

**Biography:** Stella Kafka is a NASA Astrobiology Institute Postdoctoral Fellow at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington. Her research interests bear primarily on exploring the properties of variable (periodic, aperiodic and transient), detached, and semi-detached binary star systems in optical and infrared wavelengths, using long- and short-term time-resolved photometric and spectroscopic data sets. She is particularly interested in identifying and understanding the progenitors of Type 1a Supernovae, whose properties bear heavily on cosmology and on the astrophysical distance ladder. Stella received a BSc. in Physics from the University of Athens (Greece) and a Ph.D. in astronomy from Indiana University. She has worked as a research fellow at the Cerro Tololo Inter-American Observatory in Chile, and as a postdoctoral scholar at Caltech.

## Conjunction and ATREX

*Michael Chesnes*

On the night of March 26/27, I had an unusual opportunity to take simple astrophotos of two short-lived phenomena which were easily visible to the naked eye. One was a conjunction of the Moon and Venus around sunset, part of a series of conjunctions involving Venus and Jupiter this past Month.

In the early hours of the morning on the 27<sup>th</sup>, I followed via webcast the preparations at NASA Wallops leading up to the launch of a salvo of rockets designed to create a short-lived cloud to measure high-altitude wind currents. This launch was postponed many times over the preceding days, since it required a clear calm night. The launch window was from 2:00 to 5:00 AM, and the rockets finally launched only minutes before the end of the window.

The photographs on the following page were taken without a tripod, and with a basic digital camera that is several years old – the Nikon Coolpix 3200. With patience, preparation, and luck, sometimes humble cameras (and unskilled photographers such as myself) can take interesting astrophotos.

Continued on Page 3

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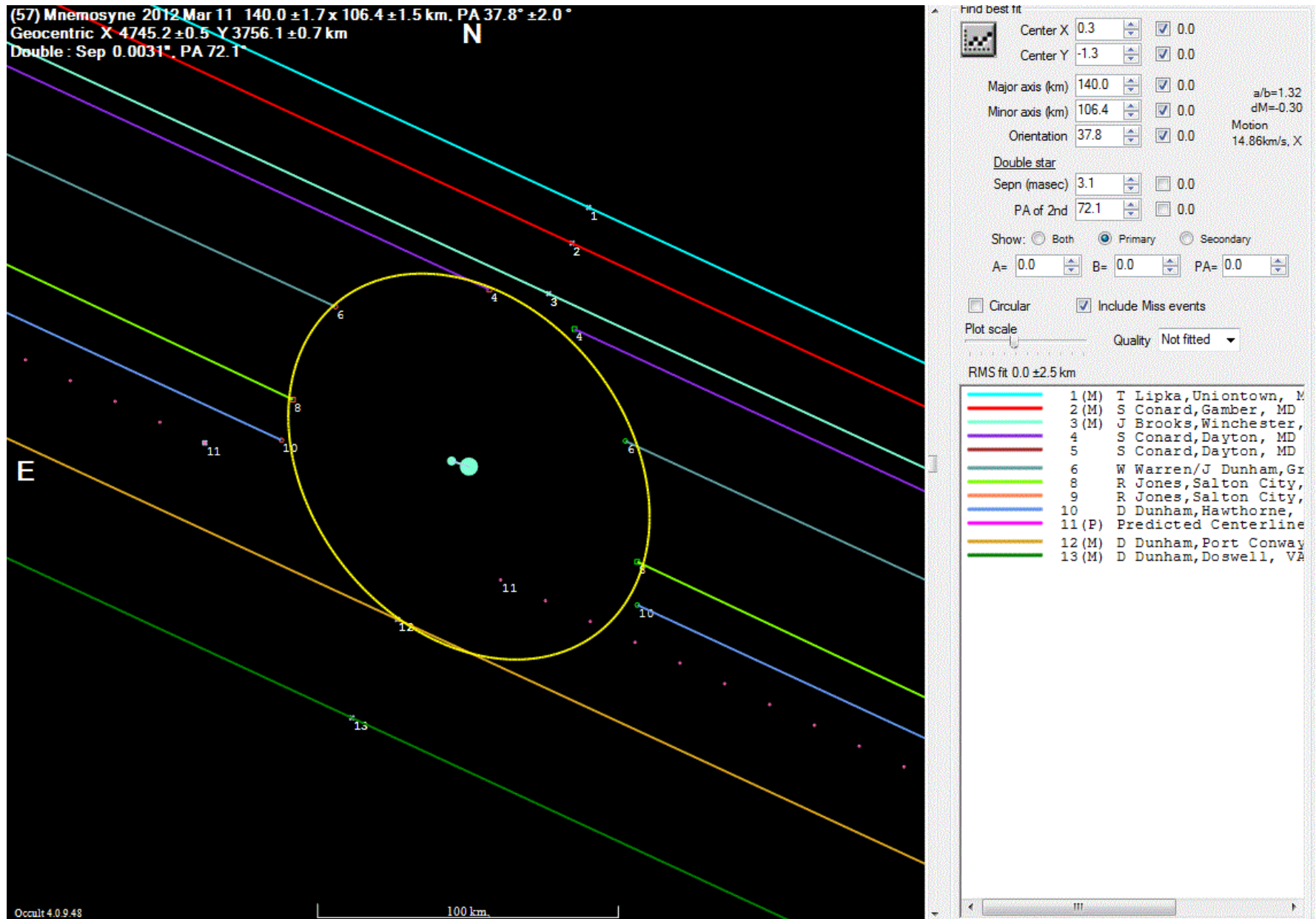
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### March 11 Occultation of Double Star TYC 0126-00781-1 by Asteroid 57 Mnemosyne

S. Conard (1+, 1m), R. Jones (2+), J. Wisniewski, J. Brooks (m), T. Lipke (m), D. Dunham (1+, 2m), W. Warren/J. Dunham, W. Thomas



## 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	dur.	Ap.	Location
May 5	Sat	23:55	SAO 97530	7.9	Ilsebill	9.0	1 2	NJ, PA; MD?
May 14	Mon	1:35	SAO 183075	8.9	Osiris	7.5	1 3	VA, WV, s Ohio

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

Date	Day	EDT	Star	Mag.	% alt	CA	Location
Apr 25	Wed	22:24	SAO 77596	7.3	19+ 15	11N	*swVA;RockyMt.&Greenville,NC
Apr 30	Mon	22:29	ZC 1482	6.2	68+ 47	12N	*New Freedom, PA;Bel Air, MD
May 3	Thu	23:44	ZC 1845	6.5	94+ 41	14N	*Morgantown, WV; Doswell, VA

Interactive detailed maps at <http://www.timerson.net/IOTA/> Under Location, if two numbers are given, the first is the distance of the northern (for cusp angles, or CA, with N) or southern (for CA with S) limit (the graze line) from Greenbelt, MD and the second number is the bearing (azimuth) of that distance in deg.

### Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag.	% alt	CA	Sp.	Notes
Apr 13	Fri	4:36	R	ZC 2863	6.1	51- 21	18S	F0	
Apr 13	Fri	5:03	R	X 46470	8.0	51- 24	38S	F	
Apr 14	Sat	5:42	R	ZC 2995	6.1	40- 26	81N	K1	Sun-10, close double
Apr 15	Sun	4:46	R	ZC 3121	8.1	30- 14	42S	K0	Az 117
Apr 18	Wed	5:24	R	SAO 128329	7.5	8- 6	75N	K2	Az. 92
Apr 25	Wed	14:32	D	zeta Tauri	3.0	17+ 59	55S	B4	Sun +58, spec. binary
Apr 25	Wed	15:48	R	zeta Tauri	3.0	17+ 70	-56S	B4	Sun +46, ZC 847, AA 240
Apr 25	Wed	21:06	D	ZC 879	7.4	18+ 30	83S		maybe close double
Apr 25	Wed	21:24	D	SAO 77574	8.3	19+ 27	63N	K0	
Apr 25	Wed	21:30	D	ZC 881	6.3	19+ 26	75S	B9	close pair & C-comp.
Apr 25	Wed	21:32	D	SAO 77579	8.3	19+ 26	71S	B9	C-comp. of ZC881
Apr 25	Wed	22:45	D	SAO 77624	7.8	19+ 12	56S	K0	Azimuth 287 deg.
Apr 26	Wed	13:56	D	nu Gem	4.1	25+ 43	90N	B6	Sun +62; close double
Apr 26	Thu	20:56	D	SAO 95943	8.4	27+ 41	62S	F0	Sun alt. -12 deg.
Apr 26	Thu	21:24	D	ZC 1025	7.3	27+ 36	89N	K0	
Apr 26	Thu	22:54	D	SAO 96023	8.4	27+ 19	58N	K0	
Apr 27	Fri	20:23	D	SAO 96950	8.4	36+ 54	51S	A2	Sun alt. -6
Apr 27	Fri	21:58	D	ZC 1141	5.5	36+ 37	24S	K2	
Apr 27	Fri	23:10	D	SAO 97030	7.8	37+ 23	55S	G5	
Apr 28	Sat	0:19	D	BN Gem	6.9	37+ 10	87N	O8	Az. 283, SAO 97083
Apr 28	Sat	20:33	D	SAO 97756	7.9	46+ 58	85S	K0	Sun -7
Apr 29	Sun	20:47	D	ZC 1372	7.8	56+ 58	88S	K0	Sun -10
Apr 30	Mon	22:21	D	14 Sex	6.2	68+ 49	27N	K1	ZC1482, close double??
May 1	Tue	1:47	D	19 Sex	5.8	69+ 13	83N	K0	Az. 265, ZC 1495
May 1	Tue	19:47	D	55 Leonis	5.9	77+ 46	84S	F2	Sun+1, ZC1587, double?
May 1	Tue	20:32	D	57 Leonis	6.7	77+ 50	39S	K0	Sun -7,ZC1590, double?
May 1	Tue	23:28	D	SAO 118620	7.3	78+ 42	70N	A2	
May 2	Wed	0:27	D	SAO 118629	7.6	78+ 33	54N	F5	
May 9	Wed	4:18	R	14 Sgr	5.5	86- 29	86N	K2	ZC 2635
May 10	Thu	1:19	R	ZC 2798	6.1	77- 11	83S	K1	Az. 127, close double
May 10	Thu	4:02	R	ZC 2810	7.7	77- 29	25S	A5	
May 10	Thu	5:19	R	R Sgr	6.7	76- 32	63N	M2	Sun-8,SAO 162394,min.13
May 12	Sat	2:46	R	SAO 164080	7.1	56- 14	63N	K4	Az. 119, close double??
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	

Explanations & more information is at <http://iota.jhuapl.edu/exped.htm>.  
David Dunham, [dunham@starpower.net](mailto:dunham@starpower.net), phone 011-7-916-0929487

Equipment and even telescopes can be loaned for most expeditions that we actually undertake; we are always shortest of observers who can fit these events into their schedules, so we hope that you might be able to.

Information on timing occultations is at: <http://iota.jhuapl.edu/timmg920.htm>.

## NASA News from Frank Reddy

### NASA's RXTE Captures Thermonuclear Behavior of Unique Neutron Star

<http://www.nasa.gov/topics/universe/features/rxte-thermo.html>

A neutron star is the closest thing to a black hole that astronomers can observe directly, crushing half a million times more mass than Earth into a sphere no larger than a city. In October 2010, a neutron star near the center of our galaxy erupted with hundreds of X-ray bursts that were powered by a barrage of thermonuclear explosions on the star's surface. NASA's Rossi X-ray Timing Explorer (RXTE) captured the month-long fusillade in extreme detail. Using this data, an international team of astronomers has been able to bridge a long-standing gap between theory and observation.

### NASA's Goddard, Glenn Centers Look to Lift Space Astronomy out of the Fog

<http://www.nasa.gov/topics/solarsystem/features/about-next.html>

A fog bank is the least useful location for a telescope, yet today's space observatories effectively operate inside one. That's because Venus, Earth and Mars orbit within a vast dust cloud produced by comets and occasional collisions among asteroids. After the sun, this so-called zodiacal cloud is the solar system's most luminous feature, and its light has interfered with infrared, optical and ultraviolet observations made by every astronomical space mission to date.

### NASA's Swift Narrows Down Origin of Important Supernova Class

[http://www.nasa.gov/mission\\_pages/swift/bursts/supernova-narrowing.html](http://www.nasa.gov/mission_pages/swift/bursts/supernova-narrowing.html)

Studies using X-ray and ultraviolet observations from NASA's Swift satellite provide new insights into the elusive origins of an important class of exploding star called Type Ia supernovae.

## Philosophical Society of Washington April 20 Talk

The John Wesley Powell Auditorium is adjacent to the [Cosmos Club](#), 2170 Florida Avenue NW, Washington DC 20008. Entrance is through the club gate, the first right-hand entrance on Florida Avenue north of the intersection with Massachusetts Avenue NW. The auditorium entrance is to the left of the gate.

Please see <http://www.philsoc.org/> for more information.

# Cosmic Dawn: The First Stars and Galaxies

**Massimo Stiavelli**

**Acting Mission Director, James  
Webb Space Telescope,  
Space Telescope Science Institute  
2300<sup>th</sup> Meeting Friday, April 20, 2012 8:15 PM**

**Abstract:** This talk will briefly review the early evolution of the Universe, from the epoch when ionized hydrogen recombined - and the cosmic background radiation was released - to the epoch when hydrogen reionized. This is a very important period in cosmic history. It was when the first stars formed from the gas generated by the Big Bang. These early stars were formed by processes quite different from that of subsequent star formation, because the cosmic gas from the Big Bang was extremely poor of metals. In addition, the galaxies formed from the first few generations of these early stars had very low masses because, during their formation, the predominance of neutral hydrogen in the intergalactic medium shielded them from energetic ultraviolet radiation that otherwise would have ionized their gas content. Subsequently, ultraviolet emissions from these first stars and galaxies built up a cosmological ultraviolet background radiation that reionized hydrogen. As a result, the shield protecting low mass proto-galaxies from energetic radiation disappeared. Thereafter the formation of these ultra-low mass galaxies was no longer possible and eventually gave rise to the formation of the type of galaxies that predominate now. The talk will describe theoretical considerations underpinning the model of cosmic evolution during this period and the experimental results that support it.

**About the Author:** MASSIMO STIAVELLI earned his PhD at the Scuola Normale Superiore of Pisa. He did postdoctoral work at Rutgers University and was a fellow at the European Southern Observatory in Garching. After a stint at the Scuola Normale Superiore of Pisa he joined the Space Telescope Science Institute in Baltimore, where he is currently an Astronomer and Acting Mission Head for the James Webb Space Telescope. His main scientific interest is the formation and evolution of galaxies both from the point of view of theory and observations. He was the team lead for the Hubble Ultra Deep Field, and he has authored or coauthored 109 research papers in professional journals, 161 technical reports and other publications, and three books. He has served on and chaired numerous NASA committees, and he is Interdisciplinary Scientist on the Science Working Group of the James Webb Space Telescope. He is a member of the American Astronomical Society, American Association for the Advancement of Science, American Institute of Aeronautics and Astronautics and International Astronomical Union.

# Owens Science Center Planetarium Show

*April 13, 2012  
April Showers Bring  
Meteor Showers*

April 21-22 sees the peak of the annual Lyrid meteor shower. Your planetarium guide will show you where and when to look for these enchanting celestial visitors. Find out what meteors are and where they come from. This April is also a fine month to see dazzling Venus, ruddy Mars and the ringed world Saturn. This program will be a tour of the night sky as seen by the unaided eye, but will include telescopic and spacecraft images of Venus, Mars and Saturn. Did we mention it's Friday the 13<sup>th</sup>? There *is* a sky connection to this superstitious day. Come find out what it is!

Howard B. Owens Science Center,  
9601 Greenbelt Road, Lanham, MD  
(301) 918-8750  
[howardb.owens@pgcps.org](mailto:howardb.owens@pgcps.org)

Friday, Apr 13 • 7:30 p.m. to 9:00 p.m.

# Calendar of Events

**NCA Mirror- and Telescope-making Classes:** Tuesdays Apr. 3, 10, 17, 24 and Fridays, Apr. 6, 13, 20, 27, 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 [gbrandenburg@yahoo.com](mailto:gbrandenburg@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, Apr. 14 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:** Saturday, Apr. 21 at 7 pm. 7621 Fenton Street, Takoma Park, MD (240) 567-1463. "Time-Space Invariance and Quantum Gravity: or how c, G, and h create the fabric of Reality!" <http://www.montgomerycollege.edu/Departments/planet/>

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

Apr. 14, 2012 **Stella Kafka** (CIW-DTM) - Cataclysmic Variables as Supernova 1a Progenitors

May 12, 2012 **Soebur Razzaque** (GMU) - Neutrino Astronomy

Jun. 9, 2012 **Science Fair Winners**

## National Capital Astronomers Membership Form

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**Standard Individual or Family Membership:** ..... \$10

**Optional additional contribution to NCA:** ..... \$\_\_

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

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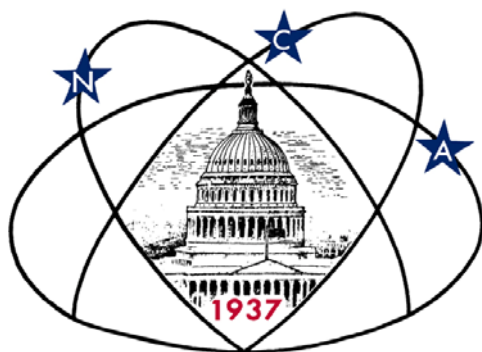
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**First Class**

**Dated Material**



Next NCA Mtg:

**Apr. 14**

**7:30 pm**

**@ UMD Obs**

**Dr. Stella Kafka**

## **Inside This Issue**

Preview of Apr. 2012 Talk.....	1
Conjunction and ATREX.....	2
Mnemosyne Occultation.....	4
Occultations.....	5
NASA News.....	6
Phil. Soc. Talk Apr. 20.....	6
Calendar.....	7