Star Dust

Newsletter of National Capital Astronomers, Inc.
capitalastronomers.org

April 2014 ***Volume 72, Issue 8***

Next Meeting

When: Sat. Apr. 12th, 2014

Time: 7:30 pm

Where: UMD Observatory

Speaker: Henrique Schmitt

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Directions to Dinner/Meeting

Our time and location for dinner with the speaker before each meeting is 5:30 pm 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 http://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 @ observatory. Please try to let him know in advance by e-mail at rigel1@starpower.net.

Using Optical Interferometry to Study the Structure of Stars, Active Galactic Nuclei and Geostationary Satellites

Henrique R. Schmitt
Naval Research Laboratory

Abstract: With a few notable exceptions, resolving stars and their disks requires the use of optical interferometry and cannot be done with single telescopes. Dr. Schmitt will present recent results on the structure of stars, circumstellar disks and binaries, which were obtained with the Navy Precision Optical Interferometer (NPOI) and other optical interferometers.

He will also present results on the observations of the tori around the nuclei of Active Galactic Nuclei.

Dr. Schmitt will also discuss some of the current developments at the NPOI, which include the commissioning of a 437-m baseline, and shorter baselines, which will allow us to resolve stars as small as 0.2 milli-arcseconds and do detailed studies of the structure of large stars. As a final subject, he will discuss the observations of geostationary satellites and the challenges involved in this work.

NPOI
cc attribution: Spaceblanket

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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.

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.

Directions to Hopewell Observatory

(1) From the Beltway, take I-66 west about 25 miles to US 15 (Exit 40) at Haymarket. At the light at the end of the ramp, turn left/south onto US 15. (Exit is at approximately latitude 38deg49'00"N, longitude 77d38'15"W.)

(2) Go 0.25 mi, at the second light turn right/west onto VA Rt. 55. There is a Sheetz gas station & convenience store at this intersection; this is a good place to stop for restrooms or supplies. (Haymarket and Gainesville tend to have relatively cheap gas.)

(3) After 0.7 mi turn right onto Antioch Rd., Rt. 681. Look for the signs for the BSA Camp Snyder and the Winery at La Grange.(38d49'12"N, 77d39'29"W)

(4) Follow Antioch Rd. to its end (3.2 mi), then turn left onto Waterfall Rd. (Rt. 601), which will become Hopewell Rd. (38d51'32"N, 77d41'10"W)

(5) After 1.0 mi, bear right onto Bull Run Mountain Rd., Rt. 629 (this is beyond Mountain Rd.). This will be the third road on the right, after Mountain Rd. and Donna Marie Ct. (38d52'00"N, 77d42'08"W) Please note that Google Earth and Google Maps show a non-existent road, actually a power line, in between Donna Marie Ct. and Bull Run Mtn. Rd.

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Using Optical Interferometry – continued from page 1

Biographical Sketch:
Henrique Schmitt did his PhD in Porto Alegre, Brazil, on issues related to the Unified Model of Seyfert galaxies. During his PhD, Henrique spent 2 years as a graduate student at the Space Telescope Science Institute. Upon concluding his doctorate, Henrique went back to the institute as a post-doc, then was awarded a Jansky Fellowship at the National Radio Astronomy Observatory. He is currently an astronomer at the Remote Sensing Division of the Naval Research Laboratory, working on optical interferometric observations and the imaging of stars and circumstellar disks with the Navy Precision Optical Interferometer.

Open House & Star Party

HOPEWELL OBSERVATORY

Guy Brandenburg

You, your family and friends are invited to join us for an Open House and Star Party at Hopewell Astronomical Observatory on Saturday evening, May 3, 2014.

Hopewell is a private, independent observatory association, located on about 4 acres atop a ridge in the Bull Run Mountains, about 6 miles northwest of Haymarket, Virginia, which is about 35 miles west of DC via I-66.

We'll open the observatory before sunset (which is at about 8 pm), and will stay open until everyone leaves. Come whenever you like, and stay

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Directions to Hopewell Observatory

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(6) In 0.9 mi, enter the driveway on the right, with the orange pipe gate. There is a stone gate on the left, opposite the entrance. We'll probably have some signs up. (38d52'36"N, 77d41'55"W)

(7) Follow the narrow road up the ridge to the former microwave relay station. You can park here (but PLEASE don't block the driveway behind the towers!) and proceed the remaining few hundred feet to the observatory on foot, or...

(8) Take the grassy track around to the right of the station, and continue through (or around) the white gate behind it. Park among the trees near our operations building, the small house-like structure in the woods. Please watch out for pedestrians, especially children! The observatory itself is in the clearing a short distance ahead.

Exploring the Sky

resumes this month!

"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!

For more information, check:

National Capital Astronomers, Inc:
http://capitalastronomers.org/

Rock Creek Park:
http://www.nps.gov/rocr/planyourvisit/expsky.htm

Sky Watchers

Spring Schedule

April

5	8:30 pm EDT- **Exploring the Sky**, Local. Features: *Winter Constellations: Jupiter in Gemini* *1st event of the 2014 season!*
15	3:06-4:24 am EDT – **Lunar Eclipse** [*Blood Moon*], the Americas, New Zealand, E. Australia, Pacific Ocean. Features: *First total lunar eclipse since Dec. 2011* *Full eclipse progression: 12:37 am -6:37 am* 3:42 am EDT – **Full Moon**, Global. Other Moon Names: *Full Sprouting Grass Moon, Egg Moon, Full Pink Moon (wild phlox), Full Fish Moon*
16-25	Evening – Dawn – **Meteors**, Local. Features: *Lyrid Meteor Shower (4/22 peak)*
27	All Day – Astronomers Without Borders, Global. Features: **Sun Day**
29	2:04 am EDT – **Solar Eclipse**, Antarctica, Australia, Indian Ocean

May

3	9:00 pm EDT- **Exploring the Sky**, Local. Features: *Saturn Rising*
10	 **Astronomy Day!** Local & National.

Times EDT

Effort to Observe the Occultation of Regulus by Erigone from Bermuda

David Dunham

Note – Unfortunately, the entire path of the occultation of Regulus by asteroid (163) Erigone the morning of March 20th across southeastern Canada and the northeastern USA was clouded out, as was most of the Mid-Atlantic region, so we also were not able to check for occultations by possible satellites of Erigone in this area, either. At least, IOTA obtained much media exposure, and generated much interest in these events among amateur astronomical societies in New York and surrounding states. Also, a special cell phone app, "Occultations 1.0", was developed for timing and reporting this event, and it will be useful for future occultations; see http://iota.jhuapl.edu/AppAbsTiming.htm for more about it (besides the iPhone/iPad version described there, an Android version has also been developed, although that doesn't have the automatic

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Occultation of Regulus by Erigone – continued from page 3

reporting feature of the iPhone version). Below is the account of my efforts that obtained the only observations (negative, = no occultation) of Regulus from within the predicted occultation path, as far as I know.

Tim Haymes, from the UK, spent some time researching his location in Bermuda, selecting to stay at a cottage on Pompano Beach Road that is on a hill with a good view to the west, and meeting those constraints, was closest to the path center on the southwest side of the island (it was 49.0 km northeast (ne) of the predicted central line, according to Occult Watcher (OW)). I booked a room, with Sabrina Kirby, who owns the Bermuda Connections cottage where Tim Haymes stayed. With much help from Sabrina and other Bermudans, I ran 4 stations across Bermuda, 3 of them mighty mini's but the one at Pompano Beach, near Tim's system, was a maxi (120mm refractor) with an integrating camera to try to record Erigone during the occultation (to maybe detect an event with Regulus' companion, in case it were bright enough). We had mostly clear skies during the 5 hours preceding the event, allowing time to set up and pre-point all of my systems at the various locations spread across Bermuda: at Larry Mussenden's house on Bostock Hill (57.1 km ne of center), at Dennie Bernews' house in St. David's near the ne end of Bermuda (farthest from center at about 72 km --very close to the 1-sigma north line), and at my attended mobile site overlooking Horseshoe Bay (51.8 km ne of center). At the attended site, I didn't pre-point, but just acquired Regulus about 15 minutes before the event, when Leo was in a clear area, and made small adjustments to follow the star until 10 minutes after the event.

Shortly after acquiring the star, clouds moved in, but the bright star only faded a little in those clouds and never disappeared; there was no occultation at that location, 2 km inside the predicted ne limit, and 3 km ne of Pompano Beach relative to the center. When I returned to Pompano Beach, Tim Haymes said that the clouds were quite thick there so that Regulus was not visible with his equipment around the time of the occultation; however, he had turned on my equipment on the pre-pointed maxi. Review of that tape showed Regulus entering the field of view, and fading substantially in the clouds, but never disappearing during the minute around the predicted central time. So based on that, it looks like there was no occultation to be seen anywhere from Bermuda; the Pompano Beach negative observation shows that the path shifted at least 4.6 km to the southwest. My maxi recording does show that the clouds finally became thick enough to completely blot out Regulus about a minute after the closest approach time, but only for about 2 seconds, then the star gradually became visible again during the several more seconds before it drifted out of the field of view. Unfortunately, the two mighty mini stations farther to the northeast both failed. The one at Bostock Hill was clouded out at the critical time (the thick cloud completely hid Regulus, but the star was faintly visible about a minute before and after). The one at St.

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Editor: CA Brooks

Editorial Advisors:

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

PDF Distributor: Jay Miller

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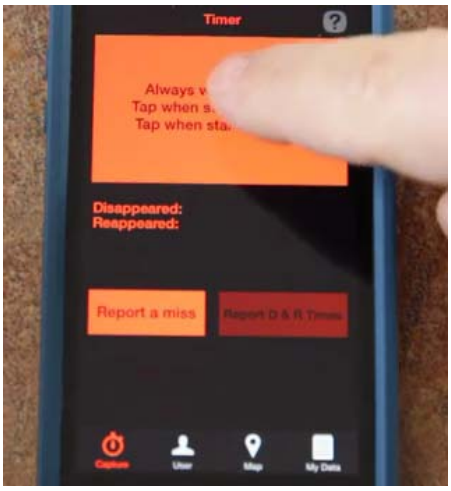
Thank you!

Occultations 1.0 App



(for iphone and Android devices)

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

2014 Date	Day	EDT	Star	mag.	Asteroid	dmag	dur. s	Ap. "	Location
Apr 12	Sat	2:50	4U393099867	12.4	Laetitia	0.3	17	8	e USA, e Canada
Apr 13	Sun	23:47	SAO 81691	9.7	1999 XR13	5.9	6	4	sePA,MD,nVA;DC?
Apr 15	Tue	5:54	TYC68780508	12.2	Pompeja	2.1	9	8	OH,WV;DC Sun -7
Apr 19	Sat	21:09	2UC37862723	12.4	Alfaterna	4.1	2	9	s Virginia;ne NC
Apr 29	Tue	22:08	2UC38577000	12.7	Aguntina	3.5	1.6	8	OH,WV,MD,nVA;DC?

Lunar Grazing Occultations

2014 Date	Day	EDT	Star	Mag	% alt	CA	Location & Remarks
May 2	Fri	21:04	ZC 871	6.7	14+ 24	5N	Danvil,VA;Oxfrd&RockyMount,NC
May 2	Fri	21:16	SAO 94837	8.1	14+ 22	5N	Wodstck,Stafrd,&ChstnutHil,VA
May 3	Sat	23:47	26 Gem	5.2	23+ 3	3N	Cleveland, OH; Indiana, PA
May 5	Mon	0:18	SAO 97008	7.9	31+ 4	3N	Rileyvill,Staford,&Dahlgrn,VA
May 6	Tue	0:34	ZC 1256	7.3	41+ 8	3N	sCulpepr,sFrdrksbg,&PtRoyl,VA

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

*, no expedition planned from DC area

Total Lunar Occultations

2014 Date	Day	EDT	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Apr 15	Tue	2:37	D	SAO 157963	8.4	42E	36	83U	F2	Partial phase
Apr 15	Tue	3:45	R	SAO 157963	8.4	0E	28	67U	F2	Total lunar eclipse
Apr 16	Wed	23:14	R	ZC 2170	6.7	96-	17	16N	K1	AA 340,TermD 6",double?
Apr 18	Fri	0:03	R	ZC 2316	6.4	90-	15	41N	F3	Azimuth 129 degrees
Apr 18	Fri	2:30	R	ZC 2331	6.3	90-	30	16N	K1	Close dbl? needs obs.
Apr 18	Fri	5:59	R	ZC 2345	7.1	89-	24	65N	A1	Sun altitude -6 degrees
Apr 19	Sat	0:57	R	ZC 2463	6.9	82-	13	55N	B8	Az.129, mg2 8.7,sep ".2
Apr 20	Sun	2:15	R	SAO 161172	7.2	72-	16	85S	B3	
Apr 20	Sun	5:09	R	SAO 161265	7.7	72-	31	67S	F5	
Apr 21	Mon	3:39	R	SAO 162349	8.0	61-	21	83N	G8	
Apr 21	Mon	5:27	R	SAO 162414	8.1	61-	32	70S	F0	Sun alt. -11 deg.
Apr 21	Mon	7:36	R	rho1 Sgr	3.9	60-	31	31S	F0	Sun alt. +13, ZC 2826
Apr 22	Tue	5:53	R	ZC 2958	7.7	49-	32	89S	K1	Sun alt. -6 deg.
Apr 22	Tue	8:35	R	DabihMajor	3.1	48-	34	80N	A5	Sun +25,ZC2969,double
Apr 23	Wed	4:12	R	SAO 164196	8.0	38-	15	54N	K2	Azimuth 118 deg.
Apr 24	Thu	6:00	R	ZC 3248	6.5	27-	27	87S	G0	Sun alt. -4 deg.
May 2	Fri	22:19	D	SAO 94874	7.3	15+	10	75S	F2	Azimuth 285 deg.
May 3	Sat	21:54	D	SAO 95941	8.4	22+	24	39N	G5	close double??
May 3	Sat	22:05	D	SAO 95953	8.3	22+	21	75S	A0	
May 3	Sat	22:36	D	SAO 95985	7.9	22+	16	57N	F8	Mag2 10,sep. 5",PA 175
May 3	Sat	23:42	D	26 Gem	5.2	23+	4	17N	A2	Az290,ZC1029,SpBin,PAg
May 4	Sun	14:06	D	lambda Gem	3.6	29+	39	65S	A3	Sun +63, close double?
May 4	Sun	15:19	R	= ZC 1106	3.6	29+	53	-57S	A3	Sun +53, AA 240
May 4	Sun	22:05	D	ZC 1136	8.1	31+	30	45N	A2	
May 5	Mon	0:07	D	67 Gem	6.6	31+	6	73S	K0	Az. 285, ZC 1145
May 5	Mon	0:11	D	68 Gem	5.3	31+	6	61N	A1	Az.286,ZC1147,double?
May 6	Tue	20:47	D	SAO 98332	8.0	49+	55	53N	G8	Sun altitude -8 deg.
May 6	Tue	21:21	D	SAO 98338	7.6	49+	50	75S	K2	
May 6	Tue	23:25	D	kappa Cnc	5.2	50+	28	71N	B8	ZC 1359, close double?
May 9	Fri	20:00	D	ZC 1649	6.1	77+	47	68N	K3	Sun alt. 0
May 10	Sat	0:33	D	SAO 138220	7.1	78+	31	20S	A0	
May 10	Sat	0:54	D	SAO 138233	7.0	78+	28	75S	K4	
May 12	Mon	1:44	D	ZC 1886	5.6	92+	28	82N	K3	close double??

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

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

Occultation of Regulus by Erigone – continued from page 4

David's somehow was not correctly pointed. Harold Povenmire and Darrell Faulkner went to West Whale Bay Fort, at the point of Bermuda closest to the central line (about 500m closer than Pompano Beach), but they also had only a small telephoto lens system (the equipment fit in the

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2013-2014 Officers

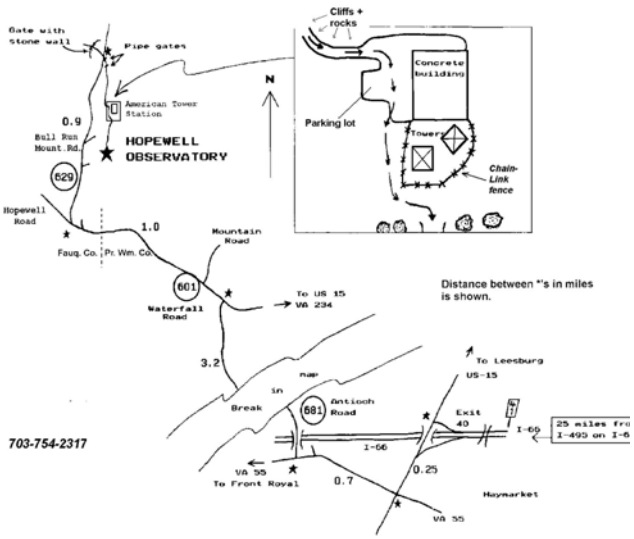
Occultation of Regulus by Erigone – continued from page 5

basket of the moped they rented to travel there) and were less than a km from Pompano Bay; so, I suppose that the same clouds that defeated Tim Haymes also ruined their effort. My attempts to travel southwest from Bermuda by plane or boat were unsuccessful; and, in retrospect, I doubt that the mighty mini systems would have worked under those conditions. The minis were hard enough to point while on tripods on stable land (a wider-field telephoto system would work for at least airborne efforts, like the one used by Dan Durda and Alan Stern for the Polyxo occultation several years ago). The Bermuda airport closes at 11 pm and no planes could be found for hire, anyway. The seas around Bermuda were very rough, with high winds, Wednesday afternoon and early evening; so no boat owners wanted to try a night foray. The winds did die down late in the evening and the sea seemed quite calm by event time.

Hopewell Open House & Star Party – continued from page 2

as late as you want, all night, if you like! The Moon will be at first quarter and will set around midnight. Mars will transit around 10 pm (it's close to opposition) and Jupiter will set near midnight, when Saturn will transit. It will be a fine night for viewing objects inside our Solar System, since even Venus will rise around 4 am! There are plenty of other spring deep-sky wonders as well, many of which become easier to see after the Moon sets. *(If the weather is bad, we will still open up the facility but not the observatory roof…)*

Telescopes permanently installed in Hopewell's roll-off roof observatory building include a 12" homemade Wright-Newtonian, a 14" Celestron Schmidt-Cassegrain, and a 6" refractor. We also have a 14" Dobsonian reflector built and donated by Alan Bromborsky! If you have a scope as well, by all means bring it along! There is a grassy field with plenty of room to set up, and electricity is available (bring your own extension cord).



Map to Observatory

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Hopewell Open House & Star Party – continued from page 6

You are welcome to bring a picnic dinner or snacks, but there's no running water (bring your own), and sanitary facilities are a composting outhouse or the bushes. We will provide hot water, instant coffee, tea, and cocoa. Dress warmly, because it can be chilly outside on top of the mountain. We do have a heated operations building in which to warm up. The site is a clearing in the woods, so sturdy shoes are recommended. Also, you'll probably want a flashlight, but please put a RED filter over it. If you can't find any red filter material, we have some red plastic, rubber bands, and sticky tape on hand in the operations cabin. We hope to see you there!

The submission deadline for the May issue of Star Dust is April 27th

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

Mid-Atlantic Senior Physicists Group: "Why is the Solar Corona so Hot?" with James A. Klimchuk (GSFC), Wed. Apr. 16, at 1 pm at the American Center for Physics (1st floor conference room). http://www.aps.org/units/maspg/

International Dark Skies Week: April 20-26.

Owens Science Center Planetarium: "Pioneer – Journey to the Outer Worlds," Fri. Apr. 25, 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/howardbowens

Open House and observing at the Hopewell Astronomical Observatory in Haymarket, VA, Sat. May 3, at 8 pm until --- (Venus rises at 4 am…). Dress warmly! (For more information: see p. 2 of Star Dust or call 703.754.2317)

Upcoming NCA Meetings at the University of Maryland Observatory:
10 May: Craig Markwardt (GSFC), *What NuSTAR Has Found So Far*
14 June: Election; Science Fair Winners

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:

2014 April 12th

7:30 pm

@ UMD Observatory

Dr. Henrique R. Schmitt

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