

Star Dust

National Capital Astronomers, Inc.
June 2013 Volume 71, Issue 10

capitalastronomers.org



Celebrating 75 years 1937-2012

Next Meeting

When: Sat. June 8, 2013
Time: 7:30 pm
Where: UMD Observatory
Speaker: Science Fair
Winners

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Directions to Dinner/Meeting

The June pre-meeting dinner, to which the winners and their parents are invited, will be held at Three Brothers Pizza in Beltsville, MD.

The address is 10961 Baltimore Avenue (aka Route 1), just south of Powder Mill Road. We've reserved the back room; everyone is welcome (no additional reservations are required) so please plan to arrive before about 5:30.

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.

June 2013:

Science Fair Winners

John Hornstein

The five winners of NCA awards during the Spring 2013 Science Fair season will all be presenting their projects at the June 8 meeting. Their projects were all first presented at the Montgomery County Science Fair on March 16. The winning projects this year were particularly interesting and impressive. The winners and their projects are:

- **Peter Maldonado and Riley Wilburn** (Roberto Clemente Middle School), "Asteroid Impact Fatalities"
- **John Lathrop** (Takoma Park Middle School), "Analysis of Solar Flare X-ray Data from the GOES 15 Satellite"
- **Foteine Dimitracopoulos** (Poolesville High School), "Observing Solar Events Through the Use of the ARTEMIS-IV/HECATE Multichannel Radio Spectrograph and the Gerostathopoulou Observatory of the University of Athens, Greece"
- **Jinhie Skarda** (Montgomery Blair High School), "Analysis of Jovian Decametric Emission using the Long Wavelength Array Station 1"

In addition to presenting their projects at the June 8 meeting of the NCA, the winners will each receive a one year membership in the NCA, and a one year subscription to Sky & Telescope.

NCA Candidates and Trustees

President	Alexander Klein
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One Trusteeship opening occurs each year. The continuing Trustees are:

- Andrew Seacord (thru Spring 2014)
- Wayne Warren (thru Spring 2015)
- Harold Williams (thru Spring 2016)

The NCA also seeks an editor for Star Dust, or an under-study for the editor. (See page 7 for more information.)

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.

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

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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 Manjunath Rao, the NCA Secretary, at kurchi@hotmail.com.

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.

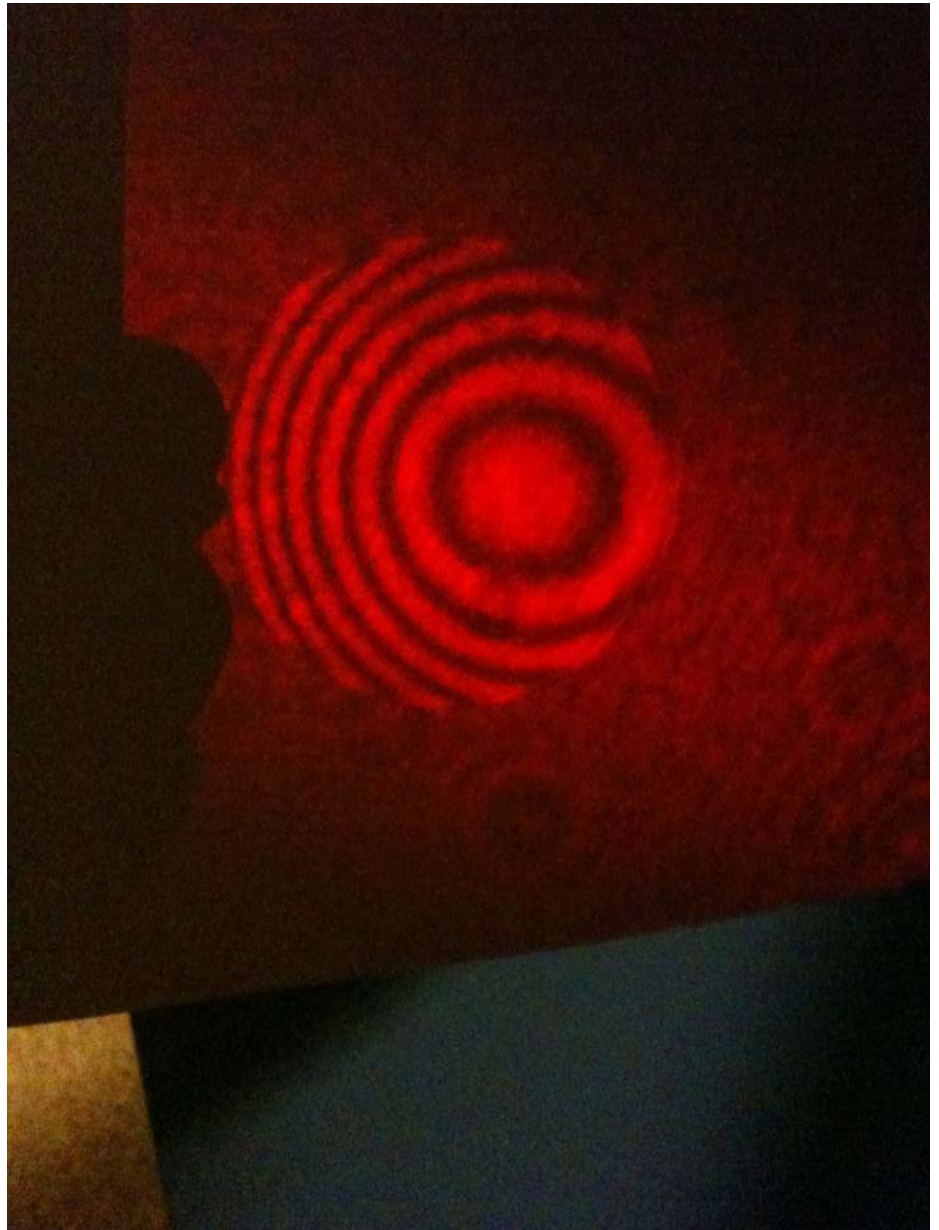
ATM Class Update

Michael Chesnes

As last month's *Star Dust* was going to press, Guy Brandenburg received help in returning the vacuum coating machine to regular service. The machine is a great asset to NCA's Amateur Telescope Making class, since it allows us to coat mirrors up to 12 inches in diameter.

More recently at the class, Alan Tarica and Bill Rohrer constructed a Bath interferometer for testing telescope mirrors. Interferometric tests have the potential to yield greater accuracy than the Ronchi and Foucault tests we have been using, although many types of interferometers are highly sensitive to alignment. In fact, we suspect that this interferometer was detecting one of the class participant's heartbeat. This interferometer has a lot of potential for our class. Expect to read more about it in upcoming issues.

Photo credit: Guy Brandenburg



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Exploring the Sky

<u>Date</u>	<u>Time</u>	<u>Things of interest in the month:</u>
7/13	9:00 PM	Summer Triangle; 5-day-old Moon near Virgo
8/10	8:30 PM	Andromeda rising; Perseid meteor shower
9/7	8:00 PM	Andromeda Galaxy rising; equinox 9/22
10/5	7:30 PM	Astronomy Day 10/12; Orionid meteor shower
11/2	7:00 PM	Pleiades and Winter constellations appear

Exploring the Sky is an informal program that for over sixty 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.

Sessions are held in Rock Creek Park once each month on a Saturday night from April through November, starting shortly after sunset. We meet in the field just south of the intersection of Military and Glover Roads NW, near the Nature Center. A parking lot is located next to the field.

Beginners (including children) and experienced stargazers are all welcome -- and it's free!
 Questions? Call the Nature Center at (202) 895-6070
 or check the Internet sites:

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

A presentation of the National Park Service and
 National Capital Astronomers

Doug Love Remembered

Michael Chesnes

Here is a brief personal note about someone whom many NCA members knew. Among his many contributions to the city of Greenbelt, Doug Love was the primary custodian of the city observatory, which the Astronomical Society of Greenbelt operates on behalf of the city. Among my memories of Doug was one evening two or three years ago when he helped David Dunham and me search in vain for an asteroidal occultation we were trying to videotape.

My favorite time with Doug was during a lunar eclipse when the two of us sat in the observatory dome under pre-dawn skies watching the eclipse progress. Everything was peaceful and calm around us, and I went back to bed when it was still dark, ready for the workday ahead. Doug did so much for so many people, with such goodwill, that he leaves behind him large but humble shoes to fill. May his example for astronomy outreach lead others to fill them.

Be careful about your height above sea level when using Kaguya graze profiles: The lesson learned during the 2013 May 12/13 graze of ZC 846

During the grazing occultation of ZC 846 Sunday evening, I learned more about the topography of Maryland than about the topography of the Moon.

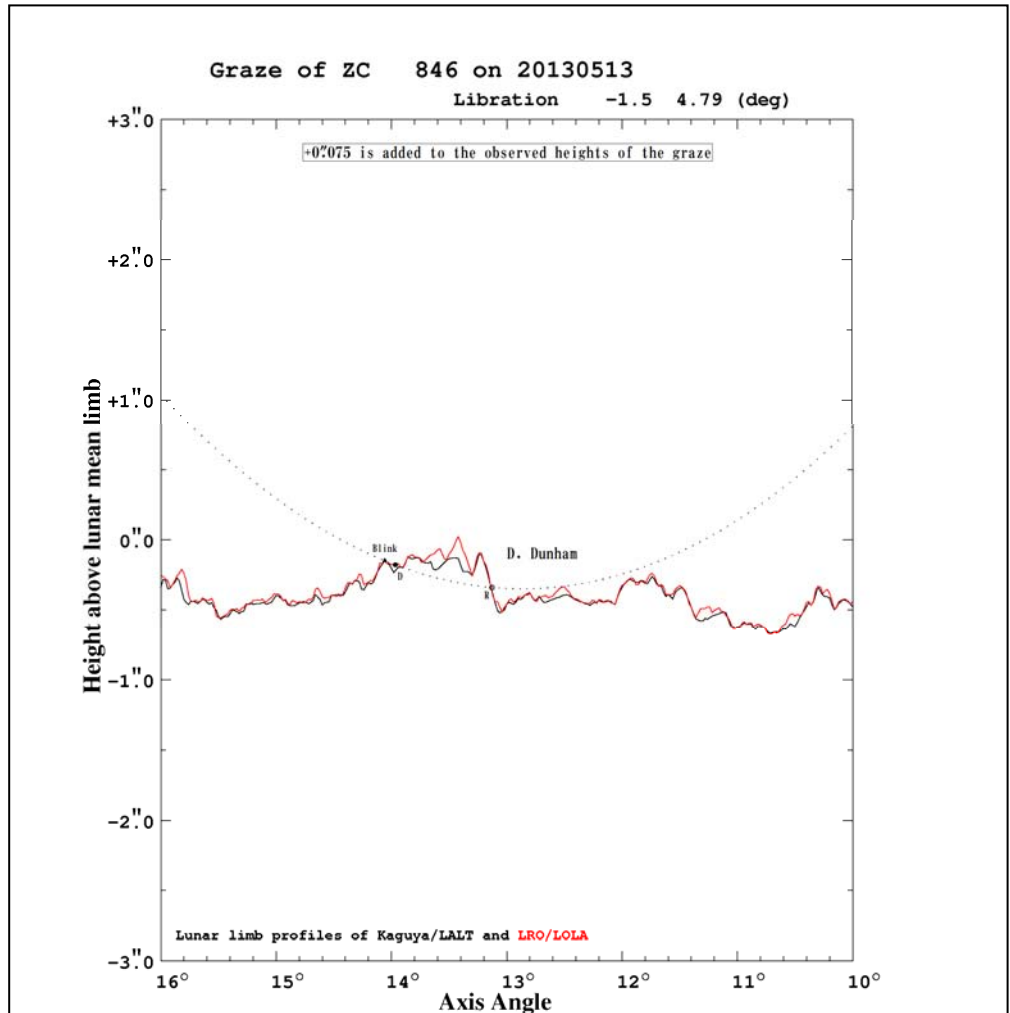
I observed the northern-limit graze from a site in Finksburg, Maryland. The graze was rated as marginal, not even in the usual graze predictions, since the star is mag. 8.9, the Sun altitude was -8 deg., and the star's altitude was 17 deg.; the graze took place 6 deg. from the northern cusp of the 8% sunlit waxing crescent Moon. But the graze was easy to record with a PC164CEX2 camera on a 20cm SCT loaned by Wayne Warren. The lunar profile was entirely below the mean lunar limb, but consisted of a relatively short (20-second) top plateau and a longer "bottom" plateau; I aimed for the latter, since it promised many multiple events for about 50 seconds. From the profile that I had computed for longitude 76.5 deg., the "bottom" plateau should produce multiple events in a range from 0.9 to 1.2 km south of the predicted northern limit, so I used those values with a Google map (that Brad Timerson provided on his graze Web site) to define the graze zone. I aimed for the lower part of this zone, and in fact, the Google map showed that my site was 1.144 km south of the northern limit.

However, only the "top" plateau occulted the star for one occultation that lasted 27 seconds; about 3 seconds before the "D", there was a brief blink. I expected to be deep in the "bottom" plateau, but instead there was no occultation at all after the R from the "top" plateau (which I was too deep in to obtain any flashes in its small valley bottoms), except for one possible dimming (partial blink), I'll have to examine that more later.

If I had lined up properly with the "bottom" plateau, I should have had at least five occultations (at least 10 events) rather than the two occultations that I had. The observation seemed to imply at least a 200m south shift, or about 0.10 arc second, large but possible in this "post-Hipparcos" age of degrading accuracy with proper motion error accumulating since the 1991 Hipparcos epoch [and in this case, there was an error in the star's proper motion that had accumulated to 0.075", as Dr. Sôma's analysis of my observations shown in the figure demonstrate].

But after returning home, I checked the situation more carefully. First, I computed a profile for longitude -77.0 deg., closer to the -76.9096 deg. of my observing site. That profile was virtually identical to the -76.5 deg. profile, but showed that the "bottom" plateau should have been between 1.0 and 1.2 km south of the n. limit, a little narrower. At 1.144 km south, I still should have been in a good position for multiple events.

Maryland is not noted for high mountains, and is rather flat in the Piedmont area where I observed dozens of miles east of the Blue Ridge, and not much more distant from the Chesapeake Bay than my house is from the Potomac River. So I thought it was safe to just use the 50m height above sea level of my home for the graze path calculation. However, my IOTA VTI showed that the actual height above sea level for my Finksburg site was 200m, 150m greater than the height I used for the path prediction. So I computed a path prediction (but now a "post"dition) for 200m, and found that it was 5 arc seconds of latitude south of the 50m path that I had used; working out the geometry, that showed that my location was 135m farther north on the profile than I thought. So instead of a south shift of about 150m, the actual south shift was perhaps no more than about 10m. Dr. Mitsuru Sôma at the National Observatory in Japan has generated a reduction profile of my observations shown in the next column.



I learned that there's a difference between the Piedmont geological regime where Finksburg is located, and the Coastal Plain regime where my home in Greenbelt is located; between them is the "fall line", with a substantial increase in height above sea level west of it (the "fall line" crosses the Potomac River at Great Falls, where there is about a 78-foot drop in the bottom of the river). The bottom line is to be very careful, to use the height above sea level of the actual area where you plan to observe, when aiming for the narrow multiple-events range of the Kaguya profiles. That can be very rewarding, as the good success with the expedition for another northern-limit graze in northern California last month led by Richard Nolthenius and Derek Breit showed. They were fortunate to observe in the lower parts of California's Central Valley, an area much flatter than the gradual hilly parts of Piedmont Maryland. I had wanted to observe from the parking lot of an athletic field of the Gerstell Academy, a nice wide-open area that would have afforded a good view. But shortly before leaving, I used Google Earth streetview and found that there was an imposing gate at one of the entrances to the day school.

Continued on Page 5

So I printed a map of some alternate sites a little to the west. When I arrived there, sure enough, all entrances to the campus had large shut gates and ominous signs about video monitoring for trespassers. So I set up instead on a narrow strip of public land between (the rather busy 4-lane) MD highway 140 and Old Westminster Pike (essentially a frontage road for local houses in that area) near Spencer Lane at what I thought was the correct distance from the northern limit. But as noted above, I should have been another 150m farther south, on Old Westminster Pike a little southeast of Brown Rd. would have been better, except that thick trees blocked the view in that area; I would have had to find a location in the suburban area farther west.

For a little over an hour after the graze, I tried to record total occultations. During that time, over half a dozen faint stars approached the lunar limb, and although a rogue cloud wiped out a couple of them, I was able to observe some events down to 11th mag. But those should be easier in the next few nights as the Earthshine diminishes. But the last one, of 7.6-mag. SAO 94739, the brightest star occulted that evening, was disappointing. I had almost considered trying to observe its graze, too (or instead); its path was about 60 km north of Finksburg, over Shrewsbury, PA, but at only 4 deg. altitude, chances for a successful observation I thought were too small. In retrospect, at that altitude with the clear conditions that we had, it might have provided a higher S/N graze than ZC 846, if I had been able to find a location both in the graze zone and with a view at that low altitude above the horizon. At Finksburg, I was only concerned about being able to observe at the 17 deg. altitude of the ZC 846 graze. But by the time SAO 94739 disappeared at Finksburg, at an altitude of 5 deg., the Moon just started to set behind the trees across Route 140 from my location, and those trees now have leaves; although it was rather chilly, it's no longer winter. So the star was occulted by the tree leaves just before it was occulted by the Moon.

Another note about heights in Maryland. Several years ago, some oriental snakehead fish infested a small lake (I think less than 100m across) near Bowie, less than 20 miles from my home; they have been found in other places since then, including the Potomac River. Shortly after the initial news, a film company in British Columbia marketed a grade-B horror movie about snakeheads infesting a large lake (about 10 miles long) in Maryland and grown to enormous size with human growth hormone which someone dumped in the lake. The movie took place in the summer, to show people in swimsuits getting attacked in the lake. But in the background were soaring mountains with snow on the tops, obviously filmed in British Columbia where the mountains are much higher than any in Maryland; even in the western part, the highest Maryland mountains are only about 900m high and never have snow in the summer.

David Dunham, 2013 May 20
 e-mail: dunham@starpower.net

Mid-Atlantic Occultations and Expeditions

David Dunham

Asteroidal and Planetary Occultations

Date	Day	EDT	Star	Mag.	Asteroid	dur.	Ap.	Location
						dmag	s "	
2013								
Jun 9	Sun	0:08	TYC21420649	10.1	Alvarez	4.7	1 5	DE, MD, PA; DC, NJ?
Jun 19	Tue	4:32	ZUC31933105	11.6C	Elektra	0.3	25 9	NJ, DE, MD, DC, VA
Jul 5	Fri	1:17	ZUC22508011	12.7C	Suleika	0.7	4 10	sMD, e&sVA, wNC
Jul 13	Sat	3:00	TYC06170407	10.4	Urhixidur	3.8	4 5	eNC, eVA, DC, MD
Jul 13	Sat	4:21	SAO 213796	9.9	Asta	5.0	7 4	cPA, wMD, cVA, NC
Jul 26	Fri	3:12	PPM 720027	9.8	Aquitania	0.8	11 4	ON, seMI, IN, TX
Jul 28	Sun	1:14	TYC06360073	12.2	Eurykleia	2.4	6 8	wNC, VA, DC, MD, NJ
Aug 1	Thu	3:48	TYC17321826	11.7	Cheruskia	2.5	10 7	eNC, cVA, wMD, wPA
Aug 2	Fri	3:14	TYC57150408	11.3	Bilkis	3.1	6 7	DE, sMD, VA; DC?
Aug 3	Sat	0:40	SAO 185777	9.5	Viipuri	6.9	6 4	VA, TN; DC, MD?
Aug 21	Wed	21:34	TYC56933502	11.5	Austria	1.7	7 7	ePA, MD, DC, eVA
Sep 6	Fri	21:55	SAO 187505	9.5	America	5.0	5 4	eNC, eVA, NJ; MD?
Sep 9	Mon	3:51	TYC24800357	10.0	Abastumani	5.9	3 5	eNC, eVA, sMD, DE

Lunar Grazing Occultations (*, Dunham plans no expedition)

Date	Day	EDT	Star	Mag.	% alt	CA	Location
Jun 13	Thu	21:04	ZC 1397	5.5	24+ 30	0N	*Fincastle, VA; RoanokR&Avon, NC
Jul 21	Sun	23:59	ZC 2846	6.7	99+ 32	30S	*nWestminstr, MD; NewFreedom, PA
Aug 2	Fri	4:53	ZC 798	6.2	17- 25	1N	Richmond, VA; RodobCh&Hebron, MD
Aug 28	Wed	5:06	SAO 93825	8.1	50- 59	3N	*sSpgfld&Alxndra, VA; sBowie, MD

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

Total Lunar Occultations

DATE	Day	EST	Ph	Star	Mag.	% alt	CA	Sp.	Notes
Jun 17	Mon	0:22	D	ZC 1726	6.7	54+ 9	36S	F5	Azimuth 257 deg.
Jun 20	Thu	23:21	D	41 Librae	5.5	92+ 31	73N	G8	ZC2233, mg2 9, ".3, PA127
Jun 21	Fri	1:20	D	kappa Lib	4.8	92+ 22	45S	K5	ZC2241, spect. binary
Jul 13	Sat	20:40	D	ZC 1688	6.4	28+ 28	50N	G9	Sun -2, mg2 9, 5", PA280
Jul 15	Mon	21:49	D	62 Vir	6.7	49+ 25	81N	K0	ZC 1914, spec. binary
Jul 18	Thu	17:48	D	Acraab =	2.6	80+ 12	84N	B0	Sun+29, Az. 128, ZC2302
Jul 18	Thu	18:56	R	beta Sco	2.6	80+ 22	-79N	B0	Sun+16, AA280, close dbl
Jul 19	Fri	0:14	D	ZC 2338	6.4	82+ 20	52N	G8	
Jul 19	Fri	1:14	D	ZC 2343	6.3	82+ 12	76N	K0	Azimuth 231 degrees
Jul 20	Sat	0:36	D	xi Oph	4.4	90+ 24	53S	F2	ZC2498, mg2 9, 5", PA 29d
Jul 27	Sat	3:43	R	ZC 30	7.1	74- 51	59S	A0	
Jul 30	Tue	2:31	R	omicrn Ari	5.8	44- 23	58N	B9	ZC 403
Jul 30	Tue	3:56	R	SAO 93108	7.5	44- 39	39S	G5	
Jul 30	Tue	4:35	R	ZC 413	6.7	44- 46	85N	K0	
Aug 1	Thu	2:29	R	SAO 93915	7.4	26- 7	73N	B8	Azimuth 72 degrees
Aug 1	Thu	2:29	R	ZC 654	6.0	26- 7	40N	F4	Az. 71, close double??
Aug 1	Thu	3:32	D	Ain =	3.5	26- 19	-50N	K0	AA 50, ZC 668
Aug 1	Thu	4:23	R	epsilon Tau	3.5	25- 29	54N	K0	maybe close double?
Aug 2	Fri	5:04	R	ZC 796	6.7	17- 27	80N	A0	Sun altitude -12 deg.
Aug 4	Sun	6:02	R	NP Gem	6.0	6- 20	89N	M1	Sun-2, ZC1072, close dbl?
Aug 10	Sat	21:07	D	SAO 138688	7.4	16+ 8	89S	K2	Sun alt. -11, Azimuth256
Aug 14	Wed	22:53	D	47 Librae	6.0	57+ 15	76N	B2	Az. 230, ZC2275, mg2 8, ".6
Aug 15	Thu	21:54	D	ZC 2425	5.9	68+ 27	41N	G5	Mag2 11, ".4, PA 167d?
Aug 17	Sat	0:09	D	ZC 2591	6.2	79+ 20	74N	K0	close double??
Aug 17	Sat	22:32	D	ZC 2763	6.5	87+ 32	45S	M3	Mag2 10, sep. ".08 ?
Aug 18	Sun	2:35	D	ZC 2787	6.3	88+ 9	55S	B8	Az. 238, mg2 9, ".7, PA104
Aug 24	Sat	3:55	R	60 Piscium	6.0	87- 58	13S	G8	ZC 98
Aug 24	Sat	5:28	R	62 Piscium	5.9	87- 51	59N	G8	Sun alt. -12, ZC 103
Aug 28	Wed	3:18	R	ZC 617	6.6	50- 40	86S	F6	
Aug 31	Sat	6:01	R	SAO 96110	7.3	23- 43	52N	A2	Sun -7, mg2 11, ".3, PA53
Aug 31	Sat	6:12	R	ZC 1040	6.4	22- 45	84N	A2	Sun-5, mg2 8, ".2, PA159?
Sep 9	Mon	21:10	D	KU Librae	7.2	21+ 5	63S	G6	Az. 245, SAO 158720
Sep 13	Fri	19:20	D	SAO 161619	7.2	64+ 30	56S	K1	Sun alt. -1 deg.
Sep 14	Sat	0:03	D	ZC 2715	6.3	66+ 12	73S	M4	Az. 233, close dbl?

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 locating this article.

Birth of a Planet

By Sid Perkins
Science Now
February 28, 2013

Observations of a nearby star at infrared wavelengths may capture the ongoing birth of a planet.

The star, known as HD 100546, lies about 335 light-years from Earth in the southern constellation Musca ("The Fly") and is surrounded by a thick disk of gas and dust. Structures in the disk indicate that the purported protoplanet hasn't cleared its neighborhood of gas and dust, making the new observations the first of such an object so early in its formation.

Previous analyses of the star's spectra suggest the object, which is about 2.5 times the mass of our Sun, formed only a few million years ago. The protoplanet, which orbits about 10 billion kilometers from its parent star—about 68 times the distance between Earth and our Sun—shows up as a bright spot embedded in the much-cooler gas in its neighborhood. The protoplanet is now between one-half and three times the mass of Jupiter but will undoubtedly continue to grow as it accumulates dust and gas from the disk.

It's possible, but not likely, that the bright spot represents an object located far beyond but directly behind the disc surrounding HD 100546, researchers report online in *The Astrophysical Journal Letters*. It's also possible but unlikely that the protoplanet is an object recently ejected from a closer orbit around its star, the researchers say. Further observations of the object—which, if really a protoplanet, orbits its parent star about once every 360 years—will reveal its true nature.

APS Mid-Atlantic Senior Physicists Group

www.aps.org/units/maspg/

June 2013 Event

Date: Wednesday, June 19, 2013

Speaker: Betsy Beise, University of Maryland

Topic: The Matter of our Matter: Tales from Nuclear Science

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: Astrophysical observations seem to tell us that only a small fraction of the matter of the universe is visible, the rest identified as either “dark matter” or “dark energy.” Yet that small sliver that we can see, estimated to be about 4%, is responsible for all of the stars, planets, and the atoms that make up us. This “matter of our matter” is the primary focus of nuclear science, spanning the creation of chemical elements in stars to the first emergence of their basic building blocks, the protons and neutrons inside atomic nuclei. Even these basic building blocks have a complex structure, composed of point-like quarks popping in and out of existence and bound together by force-carrying particles called gluons. How they assemble themselves to produce the characteristics that we can measure very precisely, such as charge and magnetism, is still a mystery. This talk will be a broad overview of some of the major open questions of nuclear science and the tools used to address them. Some examples of the benefits of nuclear science to society will also be given. I will draw heavily from the most recent National Academies decadal survey of nuclear science, “Exploring the Heart of Matter”, published in 2012.

Biography: Betsy Beise is a Professor of Physics and the Associate Provost for Academic Planning and Programs at the University of Maryland College Park. Her current responsibilities include oversight of the development and implementation of new academic programs and oversight of graduate and undergraduate curriculum changes across the campus. She came to the University of Maryland in 1993 as an assistant professor after working as a research scientist in the Kellogg Radiation Lab at the California Institute of Technology. Her research in experimental nuclear physics focuses on the use of electromagnetic and weak probes of the internal structure of protons, neutrons and light nuclei, and on the use of nuclear physics techniques to test fundamental symmetries of nature. In 1998, she received the Maria Goeppert-Mayer Award from the American Physical Society (APS), which recognizes outstanding achievement by a woman physicist in the early years of her career. From 2004 to 2006, she was a Program Director for Nuclear Physics at the National Science Foundation. In 2008, she received the Physics department's George Snow Award for helping to advance the representation of women in the field physics and she is currently a co-PI on UMD's NSF-ADVANCE grant to support retention and recruitment of women faculty. In 2012 she was recognized as a UMD Distinguished Scholar Teacher. Dr. Beise earned her B.A. in Physics from Carleton College, and her Ph.D. in Physics from the Massachusetts Institute of Technology. She is a Fellow of the American Physical Society and of the American Association for the Advancement of Science.

Do You Want to Edit Star Dust?

Michael Chesnes

Editing this newsletter has been a great way for me, as a relatively recent member, to learn about NCA and all the activities our members undertake. It has also alerted me to the many astronomical events available to the public in the metropolitan Washington, D.C. region.

The articles which appear here share their author's enthusiasm for the projects they undertake. The projects often involve observation, travel, and public outreach, amongst other things. This Newsletter allows these projects to be shared with both members and non-members of the NCA.

Please consider volunteering as a Star Dust editor. It makes NCA stronger to have a group of experienced editors among the membership who can be called upon to fill vacancies, and it will help this publication evolve by incorporating fresh perspectives. If you are interested in serving as an editor, I am willing to assist you during your first year.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Tuesdays June 4, 11, 18, 25 and Fridays, June 7, 14, 21, 28, 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. 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, June 8 at 5:30 pm, preceding the meeting, at Three Brothers Pizza in Beltsville, MD. 10961 Baltimore Avenue (aka Route 1), just south of Powder Mill Road.

Mid Atlantic Senior Physicists Group: Betsy Beise, University of Maryland. "The Matter of our Matter: Tales from Nuclear Science" Wed. June 19 at 1:00pm. American Center for Physics, College Park, MD. See page 6 for details.

Upcoming NCA Meetings at the University of Maryland Observatory

Jun. 8 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.

If undeliverable, return to

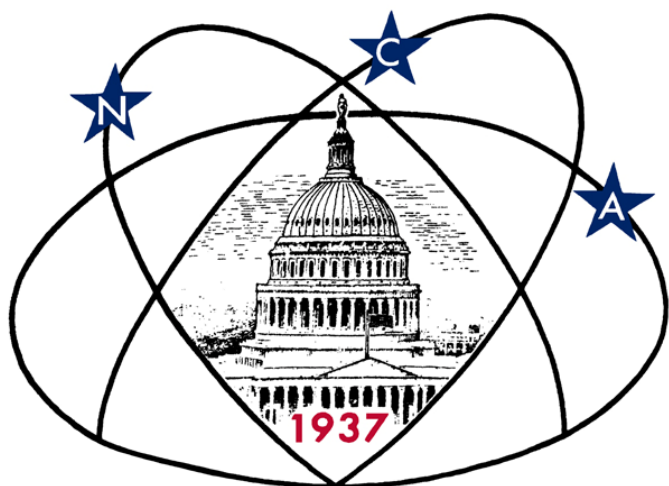
NCA c/o Elizabeth Warner

400 Madison St #2208

Alexandria, VA 22314

First Class

Dated Material



Next NCA Mtg:

June 8

7:30 pm

@ UMD Obs

Science Fair

Winners

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