

Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

January 2014

Volume 72, Issue 5

Next Meeting

When: Sat. Jan. 11th, 2014

Time: 5:30 pm

Where: Lobby, Energy Research Facility, Bldg. 223 (UMD)

Speaker: Daniel Lathrop

Table of Contents

Preview of Jan. 2014 Talk.....	1
Sky Watchers.....	3
High Redshift Poetry.....	4
Occultations.....	5
Unlocking the Solar System.....	6
Calendar.....	7

Directions to Dinner/Meeting

Since the meeting is at 5:30 pm, there will be no dinner scheduled. There may be limited food service on campus available.

Directions to the meeting are on pages 2-3 of this newsletter.

Transportation to Meeting

For this special location, please travel by subway (Green Line: College Park /UMD Metro stop) or by personal vehicle. See other transportation information (e.g. MARC trains) at www.umd.edu.

Parking information is on page 3 of this newsletter.

Observing after the Meeting

There will be no astronomical observations after this meeting.

Laboratory Simulation and Planetary Dynamos

Daniel Lathrop, University of Maryland

NOTE the Special Time and Location: 5:30 PM in the Lobby of the Energy Research Facility
(Building 223 at the University of Maryland)

Directions and parking info follow the abstract and biographical sketch.

Abstract: During the current solar maximum, we have seen a host of x-class flares and coronal mass ejections from the Sun. The fact that we saw little danger from them on Earth is due in part to our planetary magnetic field, which shields us from the Sun's charged particle radiation. That field has weakened throughout recorded history. The origin and dynamics of the magnetic fields of the Earth, Sun, gas giants, and nearly every massive astrophysical object raise numerous questions not resolved by existing theoretical, computational and experimental work.

By using liquid sodium models of the Earth's core, we hope to better understand what determines the Earth's magnetic field strength, pattern and dynamics by probing the effects of turbulence, Lorentz forces and rotation on core dynamics. While it is not possible to match every aspect of core dynamics in the lab, the experiments described in this proposal seek a comparable force balance among rotation, magnetic fields and advection. It is possible using these experiments to match important parameters thought to occur in the Earth's outer core.



Turbulent, rotating fluid

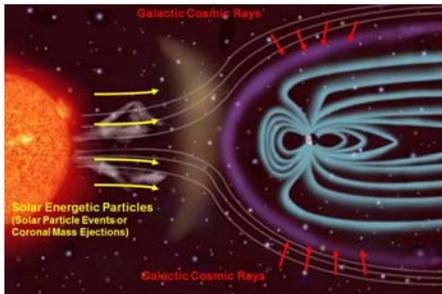
continued on page 2



Courtesy D. Lathrop

3-meter Turbulence Apparatus, a giant spinning sphere of liquid sodium used to study the natural dynamos that produce the ever-changing magnetic fields of the Earth, the Sun, and of other stars

The evolution of a Lab Dynamo



Courtesy NASA/JPL-Caltech/SwRI

Earth's protective magnetosphere

Which way is north?



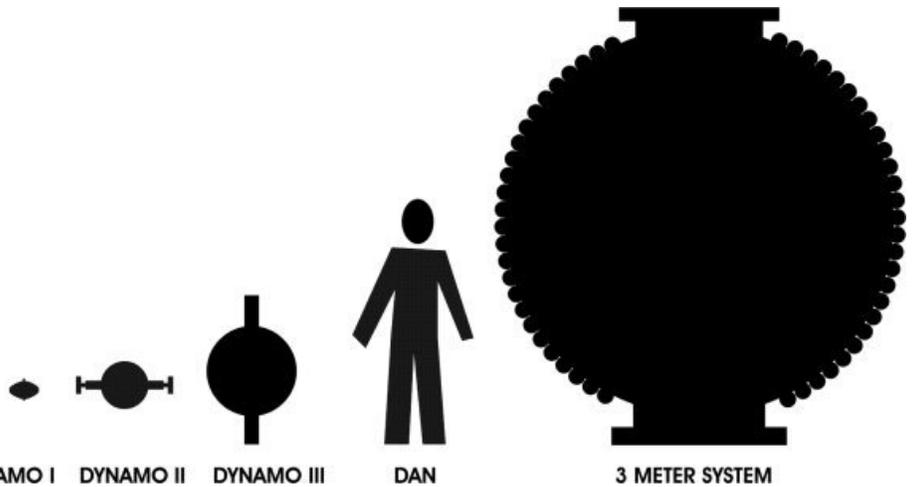
Courtesy NOAA

Depends. The map shows magnetic pole migrations from 1590-2010 CE based on geomagnetic models.

Planetary Dynamos – continued from page 1



Biographical Sketch: Daniel Lathrop received a B.A. in physics from the University of California at Berkeley in 1987, and a Ph.D. in physics from the University of Texas at Austin in 1991. He then served at Yale University as a postdoctoral fellow, research affiliate, and lecturer. Next, he became an Assistant Professor at Emory University. He



joined the University of Maryland in 1997, the year he received a Presidential Early Career Award from the National Science Foundation. Daniel Lathrop is now Professor of Physics and Professor of Geology, and a Fellow of the American Physical Society. His research in the Nonlinear Dynamics group at Maryland focuses on turbulent fluid flows, geomagnetism, and experiments on superfluid helium. Dr. Lathrop is also currently Associate Dean for Research for the College of Computer, Mathematical and Natural Sciences, and served as the Director of the Institute for Research in Electronics and Applied Physics from 2006 to 2012. He received the Stanley Corrsin Award in 2012 from the American Physical Society for this work in quantum fluids.

Dan Lathrop is also the father of John Lathrop, one of last year's Science Fair winners.

Special Meeting Location Directions:

The meeting will begin at **5:30 PM** on Saturday, January 11, in the **lobby of the Energy Research Facility** (Building 223) on the main campus of the University of Maryland. It will be a tour of Dan Lathrop's lab where he will explain what we know at present about how natural dynamos work, how the experiment works, and the puzzles that it is helping to solve.

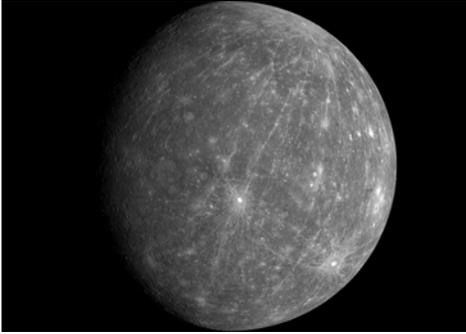
A map of the Campus is available at

http://www.transportation.umd.edu/parking/maps/map_campus.pdf .

You will probably have to enlarge the map several times to see the details that are of interest here. The locations of interest are near the bottom of the map. The Energy Research Facility is near F6 on the map. It is fairly

continued on page 3

Mercury after Sunset



Courtesy NASA/Johns Hopkins APL/Carnegie Institution of Washington

Mercury, the planet with a year (88 Earth days) that is shorter than a day (176 Earth days), will be visible just above the horizon about an hour after sunset this month.

Exploring the Sky
will resume in April 2014!

“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!

Do Pulsars Groove?



Tour the “Sounds from Space” with Paul Hombach, January 6th at 8 pm, Takoma Park Planetarium.

Here is his tribute to the transit of Venus: <http://bit.ly/1elhxm9>

<http://www.montgomerycollege.edu/Departments/planet/>

Sky Watchers

Winter Schedule

January

3-4 (peak)	Midnight - dawn – Quadrantid Meteor Shower , Northern Hemisphere. http://solarsystem.nasa.gov/planets/quadrantids.cfm
4	7:00 am – Earth Perihelion , Everywhere. (91.4 million miles from Sun)
5-6	4:51 pm – 12:12 am – Planets , S Sky, Northern Hemisphere. Features: <i>Jupiter</i> (brightest mag: -2.7)
15	11:52 pm – Full Moon , Global. Other Moon Names: <i>Wolf Moon, Old Moon</i> Also, Moon at apogee (“Micro Moon”)
19-31	3/4 – 1.5 hours past sunset – Planets , SW Sky, Northern Hemisphere. Features: <i>Mercury</i>

All times EST

Special Meeting Directions – continued from page 2

close to Baltimore Avenue (Route 1), but it faces Paint Branch Drive, so it can also be reached from the Paint Branch Drive entrance to the campus. That entrance is right across University Boulevard from the University Boulevard entrance to Metzert Road, which is the road that runs by the Observatory, where we usually meet.

Parking: Park only in **Lot XX II** or in **Lot XX I**.

Lot XX II is right next to the Energy Research Facility (building 223). Lot XX I is much larger, and runs behind and to the east of the much taller A. V. Williams Building (E6), which is just east of the Energy Research Building.

Do NOT park in the pay lot that is right across the road from the Energy Research Facility, unless you pay. Parking enforcement at the University of Maryland is zealous, and if you park without paying in a lot that is not **designated** as free on evenings and weekends, you are likely to find a ticket on your windshield. Parking enforcement will be unmoved by arguments based on common sense.

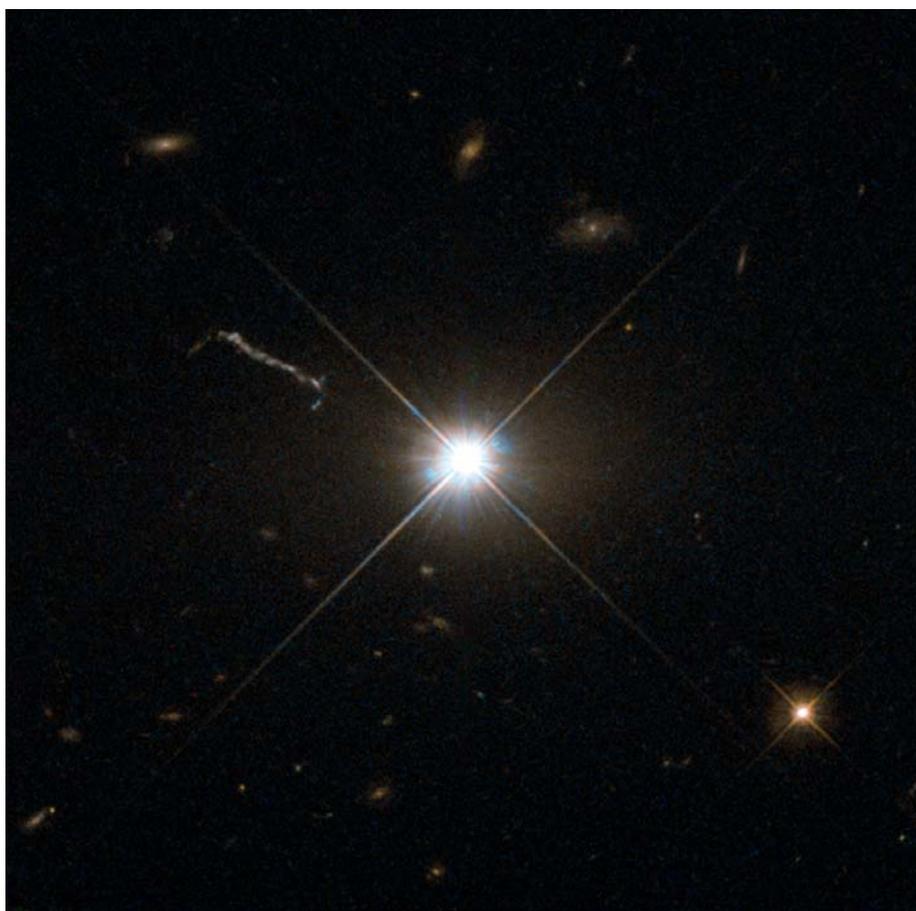
For logistical reasons, the meeting will not include any activity at the Observatory.

Also, there is no dinner associated with this meeting, because the meeting starts early; and, it is not possible to predict how long it will take.

High Redshift Poetry

“Quasar, quasar, burning bright
in the depths of cosmic night,
what supernal alchemy
fuels thy luminosity?
Is a black hole, is a spinar,
is a supernova winner?
Measuring, on a scale galactic,
radio quiet, radioactive?”

Excerpt from Mark R. Chartrand's article, "Quasars, Blazars & Spinars"
© Omni Magazine (1979). Used with permission.



Courtesy ESA/Hubble & NASA

Hubble Telescope's view of Quasar ("quasi-stellar radio source") 3C 273 in Virgo. It was the first quasar to be identified (in the 1960s CE) and is among the closest ones (at 2.5 billion light years) to Earth. Drawing energy from particles surrounding the black-hole center of an active galaxy, this quasar is luminous and has emitted material, a "jet" (the cloudy string in the upper left portion of the image) that is about 200,000 light years long.

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• Editor: CA Brooks

• Editorial Advisors:

- ■ Michael Chesnes
- ■ John D. Gaffey, Jr.
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Thank you!



<http://youtu.be/NbLY1e6YkU8>

• "...when I look up into infinity, I find solace in
• the stars and I am free."

• -- from the song, "The Astronomer" by the
• musical group, Oh, The Story

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	EST	Star	mag.	Asteroid	dmag	dur. s	Ap. "	Location
•	Jan 11	Sat	2:04	TYC49550550	12.2	Meriones	4.9	8	8	PA, MD, DE, NJ; DC?
•	Jan 16	Thu	22:03	TYC19740566	9.5	SAO 81213	11.4	15	3	TNO, miss; eN. Amer?
•	Jan 25	Sat	3:33	TYC02800332	11.1	Cunningham	5.0	19	7	e&nVA, MD, wPA; DC?
•	Jan 27	Mon	1:45	SAO 119848	9.1	Armenia	5.8	10	4	wVA, WV, eOH, wPA
•	Jan 28	Tue	22:52	TYC19890626	12.0	Merapi	2.3	18	8	VA, sMD, DC, WV, nKY
•	Jan 29	Wed	2:30	HIP 53388	9.3	Azalea	6.3	1	4	sNJ, nDE, se&nwPA
•	Jan 29	Wed	20:57	SAO 80116	9.2	Iguassu	6.3	2	4	DE, sMD, DC, nVA, WV
•	Feb 2	Sun	21:18	2UC42566855	12.4	Hel	2.2	6	8	seMD, c&swVA; DC?
•	Feb 7	Fri	4:17	SAO 80238	8.5	Tama	5.4	2	2	FLkeys, LA, nTX, OR
•	Feb 8	Sat	19:20	2UC39481875	12.3	Kirkwood	2.9	6	8	WV, nVA, DC, sMD, DE

Lunar Grazing Occultations

2014	Date	Day	EST	Star	Mag	% alt	CA	Location & Remarks
•	Jan 23	Thu	1:26	SAO 139285	8.1	59- 17	2S	*Noksvi & Dal eCty, VA; LaPlata, MD
•	Jan 24	Fri	2:07	EV Vir	6.8	48- 14	3S	*sPetersburg & sChesapeake, VA
•	Jan 26	Sun	5:31	Jabbah	4.1	26- 19	2S	Ithaca, Walden, Garrison, NY
•	Jan 27	Mon	6:08	ZC 2477	8.4	16- 19	0N	*sFrdrck, APL, Sauge, FtMead, MD
•	Feb 1	Sat	18:59	X 52487	9.6	6+ 10	6N	Mnass, BrkLk, Al xda, VA; UpM, MD
•	Feb 5	Wed	22:07	SAO 92933	9.2	42+ 24	8N	StrInrg&GtFls, VA; DC; sBowi, MD
•	Feb 6	Thu	18:06	SAO 93318	7.9	51+ 66	8N	*nHgrstwn, MD; Getysbg&York, PA
•	Feb 6	Thu	19:38	SAO 93337	9.5	52+ 61	3N	*nMnass, Burk, Al xda, VA; UpM, MD
•	Feb 6	Thu	21:13	SAO 93358	8.4	52+ 45	7N	*StrInrg, VA; Bthda, CP, &Gbl t, MD
•	Feb 10	Mon	2:47	ZC 904	7.1	81+ 11	13N	Woodstk, nStaFrD, ChstntHil, VA

Interactive detailed maps at <http://www.timerson.net/IOTA/>
 *, no expedition planned from DC area

Total Lunar Occultations

2014	Date	Day	EST	Ph Star	Mag	% alt	CA	Sp. Notes
•	Jan 11	Sat	18:04	D ZC 629	7.5	85+ 47	79S	G5 Sun -11, spec. binary
•	Jan 11	Sat	20:30	D ZC 643	6.8	85+ 68	75S	F6
•	Jan 14	Tue	3:05	D ZC 943	6.6	97+ 31	89S	B8
•	Jan 14	Tue	4:29	D ZC 951	6.6	97+ 15	18S	K2 Az. 282, TmD6", close dbl?
•	Jan 16	Thu	23:02	R ZC 1281	6.3	99- 54	56S	K0 AA 261, TmD14", cl se dbl?
•	Jan 18	Sat	4:42	R omega Leo	5.5	96- 40	17S	F9 AA 208, ZC1397, dbl, TmD7"
•	Jan 19	Sun	0:16	R 16 Sex	6.6	92- 47	42S	K0 ZC 1489
•	Jan 22	Wed	0:53	R ZC 1792	7.4	69- 22	47S	F2 mg2 13, 3", PA 276 deg.
•	Jan 23	Thu	1:34	R SAO 139285	8.1	59- 18	16S	K0 nVA & sMD graze
•	Jan 23	Thu	2:13	R ZC 1917	7.2	59- 25	88N	G5 maybe close double
•	Jan 24	Fri	2:24	R EV Vir	6.8	48- 16	30S	M3 ZC 2034, s. VA graze
•	Jan 24	Fri	2:34	R SAO 158435	8.2	48- 18	49S	K0
•	Jan 24	Fri	6:32	R MZ Vir	7.4	47- 37	55S	M2 Sun alt. -9, SAO 158493
•	Jan 25	Sat	2:05	R 22 Librae	6.4	38- 2	79N	A1 Azimuth 114, ZC 2160
•	Jan 26	Sun	4:22	R SAO 159731	7.8	27- 14	87S	A0 Az. 129; close double?
•	Jan 26	Sun	5:56	R SAO 159767	8.0	26- 25	70N	B9
•	Jan 27	Mon	6:12	R ZC 2477	8.4	16- 20	7N	M1 central MD graze
•	Jan 28	Tue	6:09	R SAO 161265	7.7	9- 11	28N	F5 Az. 127; nPA, nNJ graze
•	Jan 28	Tue	6:34	R SAO 161273	7.6	9- 15	78N	B1 Sun -9, Az. 131, close dbl
•	Jan 29	Wed	6:43	R rho1 Sgr	3.9	3- 8	67N	F0 Sun-7, Az121, ZC2826, dbl?
•	Feb 2	Sun	18:12	D ZC 3489	7.4	13+ 31	15S	K3 Sun-9, mg2 10 sp4", PA167
•	Feb 3	Mon	19:29	D ZC 78	8.2	22+ 30	54S	F8
•	Feb 4	Tue	20:57	D SAO 109947	7.8	32+ 26	70N	K0
•	Feb 6	Thu	17:51	D SAO 93318	7.9	51+ 67	17N	A5 Sun -4, nwMD, PA graze
•	Feb 9	Sun	1:54	D 104 Tauri	4.9	73+ 12	70S	G4 Az. 284, ZC764, close dbl

Explanations & more information is at <http://iota.jhuapl.edu/exped.htm>.
 David Dunham, dunham@starpower.net, phone 301-526-5590



The Reflector, the quarterly publication of the Astronomical League, is available electronically at: <http://www.astroleague.org/reflector>

2013-2014 Officers

President:

Alexander Klein
alexander_klein@virtualhomespaces.com
 301-233-8406 (c)

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ishgwave@yahoo.com
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Exploring the Sky
 Joseph C. Morris
j.c.morris@verizon.net

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 Guy Brandenburg
gfbandenburg@yahoo.com
 202-635-1860

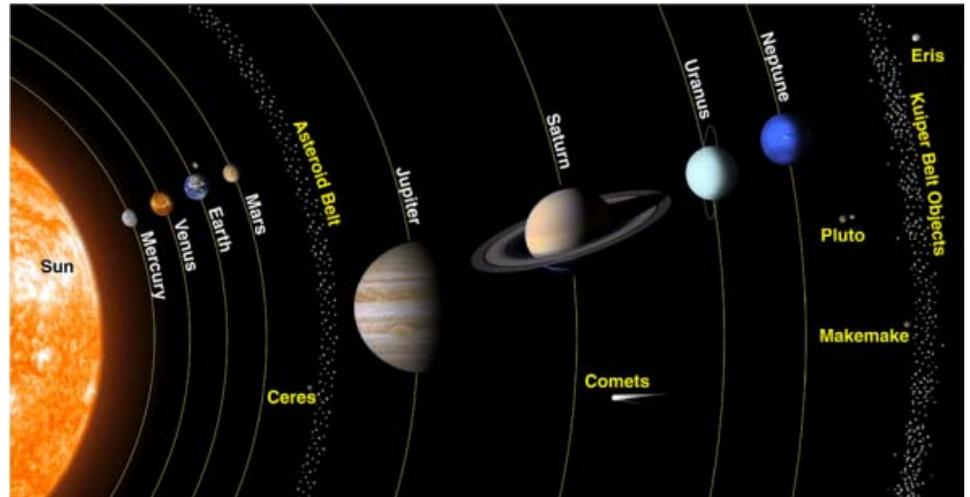
NCA Webmaster
 Harold Williams
Harold.Williams@montgomerycollege.edu
 240-567-1463 (w)
 301-565-3709 (h)

Meeting Facilities
 Jay H. Miller
rigel1@starpower.net
 240-401-8693

Star Dust Editor
 CA Brooks
NCAStardust@gmail.com
 301-860-3266

• Clyde is bored. He is stuck with his sister, Gilraen, for the summer while
 • their parents are off on an excavation on Mars. Nothing could possibly be
 • interesting until he discovers he has been locked out of data files about
 • Pluto. He and Gilraen begin a quest to discover as much as they can
 • about Pluto to find out just why these files have been locked...

Unlocking the Solar System

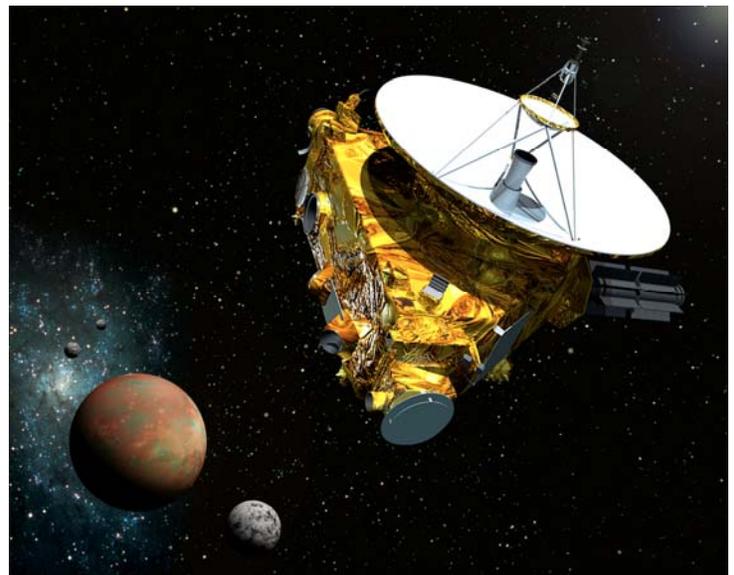


Friday, January 10, 2014 • 7:30 pm

Howard B. Owens Science Center Planetarium, 9601 Greenbelt Road,
 Lanham MD 20706

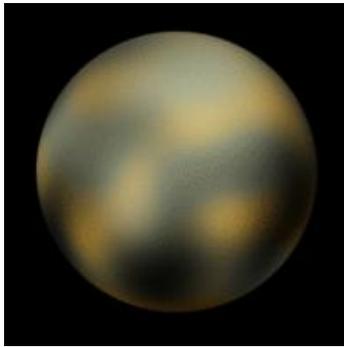
• *Unlocking the Solar System* was written in support of the Johns Hopkins
 • University Applied Physics Lab's [New Horizons](#) mission to Pluto and the
 • Kuiper Belt (the craft will reach its destination in July 2015). The program
 • is followed by a tour of the night sky and a look at where the craft is on its
 • journey to the edge of the Solar System.

The New Horizons spacecraft will be able to investigate the geology, surface compositions & temperatures of Pluto and Charon, as well as examine Pluto's atmosphere in detail. The craft also has a 2.1-meter (≈7-foot) parabolic antenna that can be used to communicate with Earth from as far as 4.7 billion miles away.



Courtesy Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute (JHUAPL/SwRI)

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Courtesy NASA

A true-color composite of Hubble Telescope images of Pluto (there is difficulty getting high resolution at such a distance – NASA equates trying to get better surface detail of Pluto with “trying to see the markings on a soccer ball from 40 miles away.”).

Submission deadline for the February issue of Star Dust is January 26th

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: “Unlocking the Solar System” Fri. Jan. 13, 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
- Mid-Atlantic Senior Physicists Group: “Neutrons at NIST,” with Dan Neumann (NIST), Wed. Jan. 15 at 1 pm at the American Center for Physics (1st floor conference room). <http://www.aps.org/units/maspg/>
- UMD Obs. New Telescope Owner Nights: Wed., Jan. 22 and Sat., Jan. 25, from 6:00 pm to 9:00 pm. Registration REQUIRED. Details at www.astro.umd.edu/openhouse/2programs/new-telescope-owners-nights.html
- Monthly Model Rocket Launch: Sun, Feb. 2 from 12:45 to 3:30 pm. NASA-Goddard Visitors Center on ICESat Road. <http://visitorcenterevents.gsfc.nasa.gov/> “BYOR” (bring your own rocket!)
- Upcoming NCA Meetings at the University of Maryland Observatory:
 - 8 Feb: Holly Gilbert (GSFC), *Results from the Solar Dynamics Observatory*
 - 8 Mar: Elizabeth Hays (GSFC), *Cosmic Ray Protons from Supernova Remnants*

Clear Skies!

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.?

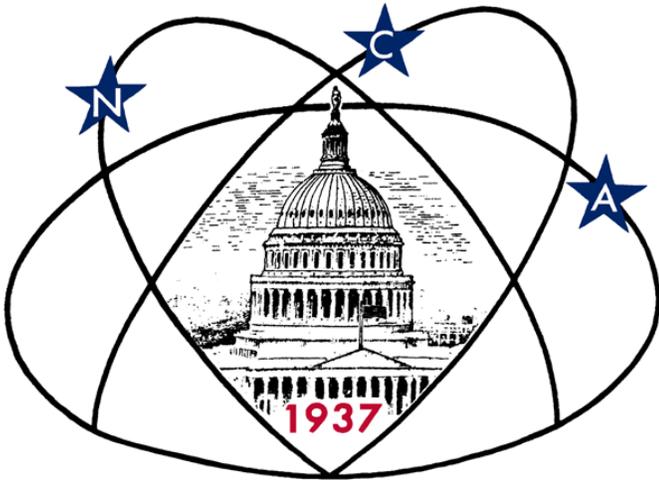
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

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

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Next NCA Meeting:

2014 January 11th

5:30 pm

@ Energy Research
Facility Lobby, Bldg. 223,
UMD

Dr. Daniel Lathrop

Inside This Issue

Preview of Jan. 2014 Talk.....	1
Sky Watchers.....	3
High Redshift Poetry.....	4
Occultations.....	5
Unlocking the Solar System.....	6
Calendar.....	7