

# Star Dust

National Capital Astronomers, Inc.

November 2011

Volume 70, Issue 3

<http://capitlastronomers.org>

## Next Meeting

**When:** Sat. Nov. 12, 2011  
**Time:** 7:30 pm  
**Where:** UM Observatory  
**Speaker:** Dan Wik, GSFC

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## 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 UM 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.

## November 2011: Dr. Dan Wik NASA Goddard Space Flight Center The Capitalist Cosmos: How Mergers and Acquisitions have built our Universe

**Abstract:** The original view of galaxies as 'island universes,' separated by insurmountable gulfs, has been replaced by a more exciting and dynamic picture of galaxies forming and evolving through interactions and mergers with each other. Only recently, however, has the underlying framework crystallized, with the Nobel Prize-winning discovery that the universal expansion is accelerating, and with the precision measurements made possible by the WMAP satellite. I will briefly introduce this paradigm, and how we think structures like galaxies, galaxy groups, and massive clusters of galaxies are created and evolve through cosmic time. A particular focus will be the observations of the hot, X-ray emitting gas that fills the space in between the galaxies in clusters, and what these observations tell us about events that are the most energetic in the Universe, apart from the Big Bang itself. Lastly, I will discuss the NuSTAR hard X-ray telescope, which is on track to be launched next February, and how NuSTAR will shed new light on this emerging picture.

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Editor: Michael Chesnes

Editorial Advisors:

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

PDF Distributor: Jay Miller

## Please Get Star Dust Electronically

NCA members able to receive Star Dust, the newsletter of the NCA, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of Star Dust (the NCA's single largest expense) 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

**Biography:** Dan Wik has just finished his first year as a NASA Postdoctoral Fellow at GSFC, in the X-ray Astrophysics Laboratory, where he has been fortunate to join the science and optics calibration teams for NASA's Nuclear Spectroscopic Telescope ARray (NuSTAR) mission. The majority of his time is spent exploring the physics of galaxy clusters with data from the XMM-Newton, Suzaku, ROSAT, and Chandra X-ray observatories. He recently acquired a Ph.D. from the University of Virginia, where he investigated the effect of mergers on inverse Compton processes in the gas of galaxy clusters. Less recently, he emerged with the first undergraduate Astrophysics degree awarded by Ohio University, where he was lucky enough get an early start on research that led to summer internships at the National Optical Astronomy Observatory and the Harvard-Smithsonian Center for Astrophysics.

## Proposed update to the constitution and by-laws of National Capital Astronomers

The board of Directors of the National Capital Astronomers recommends that the constitution and bylaws of National Capital Astronomers be amended by the adoption of the proposed text as the entire document. In addition to correcting typographical errors and making non- substantive changes to improve readability and organization of the material, the following significant changes (in order of their appearance in the constitution and by-laws) are proposed, many of which represent current practice:

- The amendment process explicitly lists email as an acceptable method of both notification and voting. The meeting where proposed amendments are discussed is at least 14 calendar days after the proposed changes are issued, and the references to separating the member's signature from the voting choice is deleted as unrealistic for email-based voting. The voting period is extended to permit voting in most cases until just before the meeting following the start of voting.
- Because the changes in some cases reflect current practice that conflicts with the formal requirements of the current constitution and bylaws, previous good-faith actions that the changes officially authorize are ratified.
- References to the Sky and Telescope subscription are deleted, the payment of annual dues in September is reinforced, and provisions for new members who join at times other than September call for their membership to expire in the following September if they join prior to March 1, or in September of the following year if they join on or after March 1.
- Term limits for NCA officers and trustees are deleted. The unfortunate fact is that there is a very small number of people willing to perform the duties of officers and trustees, and a term limit restriction makes it overly difficult to fill those positions.
- The optional combining of the positions of Secretary and Treasurer is explicitly permitted.

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**2010-2011 Officers**

**President:**

Joseph C. Morris  
[j.c.morris@verizon.net](mailto:j.c.morris@verizon.net)  
703-620-0996 (h)  
703-983-5672 (w)

**Vice-President:**

John Hornstein  
[jshgwave@yahoo.com](mailto:jshgwave@yahoo.com)  
301-593-1095 (h)

**Secretary-Treasurer:**

Michael L. Brabanski  
[mlbrabanski@verizon.net](mailto:mlbrabanski@verizon.net)  
301-649-4328 (h)

**Asst. Secretary-Treasurer:**

Jeffrey B. Norman  
[jeffreynorman@comcast.net](mailto:jeffreynorman@comcast.net)

**Trustees:**

- Walter Faust (2012)
- Benson Simon (2013)
- Andrew Seacord (2014)
- Wayne Warren (2015)

**Appointed Officers and Committee Heads:**

*Exploring the Sky*  
Joseph C. Morris  
[j.c.morris@verizon.net](mailto:j.c.morris@verizon.net)

*Telescope Making*  
Guy Brandenburg  
[gbrandenburg@yahoo.com](mailto:gbrandenburg@yahoo.com)  
202-635-1860

*NCA Webmaster*  
Harold Williams  
[Harold.Williams@montgomerycollege.edu](mailto:Harold.Williams@montgomerycollege.edu)  
240-567-1463 (w)  
301-565-3709 (h)

*Meeting Facilities*  
Jay H. Miller  
[rigel1@starpower.net](mailto:rigel1@starpower.net)  
240-401-8693

*Star Dust Editor*  
Michael Chesnes  
[m.chesnes@verizon.net](mailto:m.chesnes@verizon.net)  
301-313-0588

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**Voting Procedure**

The new constitution and bylaws will be adopted if two-thirds of the votes favor adoption, and the total number of votes represents no less than fifteen percent of the NCA members eligible to vote.

Beginning with the November meeting where the changes will be discussed and continuing for the following 20 days (ending on Friday, December 2) ballots may be submitted to the NCA Secretary by hand at the meeting, by postal mail, or by email. Printed ballots may be mailed to Michael L. Brabanski, 10610 Bucknell Drive, Silver Spring MD 20902-4254.

Email ballots should be sent to [mlbrabanski@verizon.net](mailto:mlbrabanski@verizon.net), and should include "NCA Constitution Amendment" in the subject line. The body must clearly state that the vote is for or against adoption of the changed constitution and bylaws, and must also include the name of the member voting. Each member voting by email must send a separate message.

**BALLOT**

National Capital Astronomers has before it a proposal to amend its constitution and bylaws as discussed at its meeting in November 2011. Please mark one of the following choices:

- I vote FOR the adoption of the proposed changes
- I vote AGAINST the adoption of the proposed changes

\_\_\_\_\_  
Please PRINT your name here

\_\_\_\_\_  
Please SIGN your name here

\_\_\_\_\_ Today's date (month-day-year)

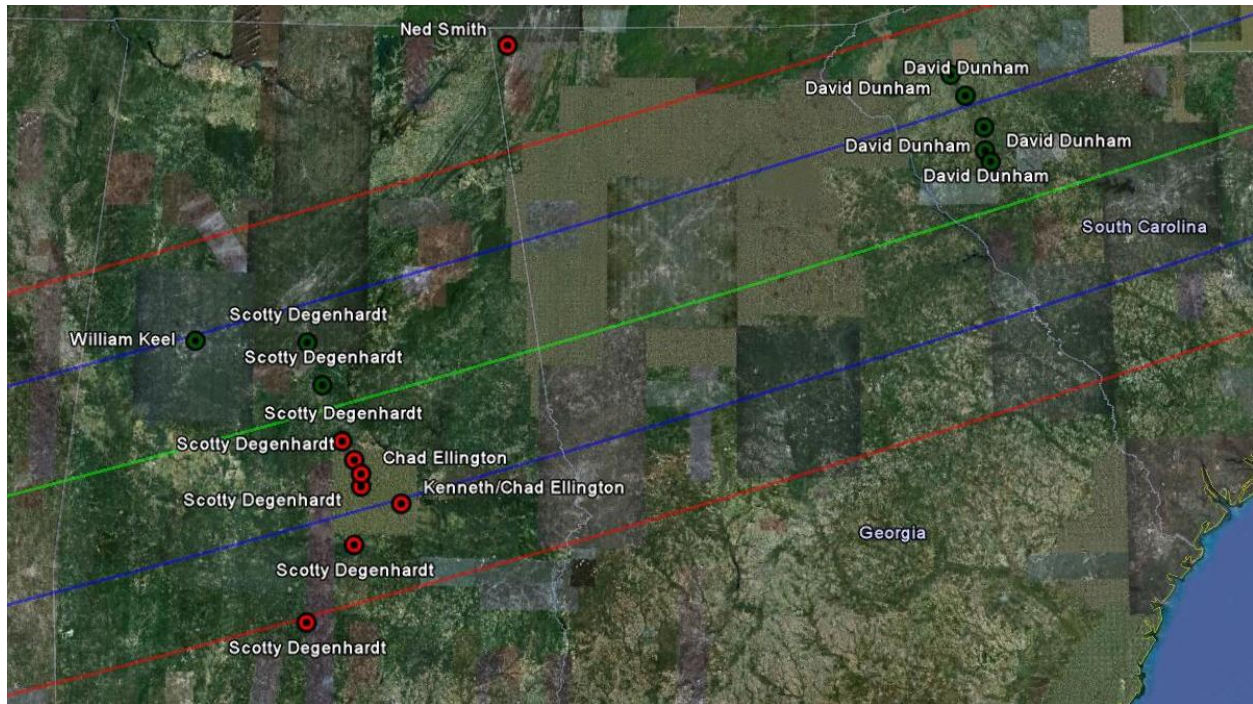
If you do not choose to vote by email (see the "Voting Procedure" instructions), deliver this ballot by hand (there will be a box for it at the November meeting) or mail it to:

Michael L. Brabanski  
10610 Bucknell Drive  
Silver Spring, MD 20902-4254

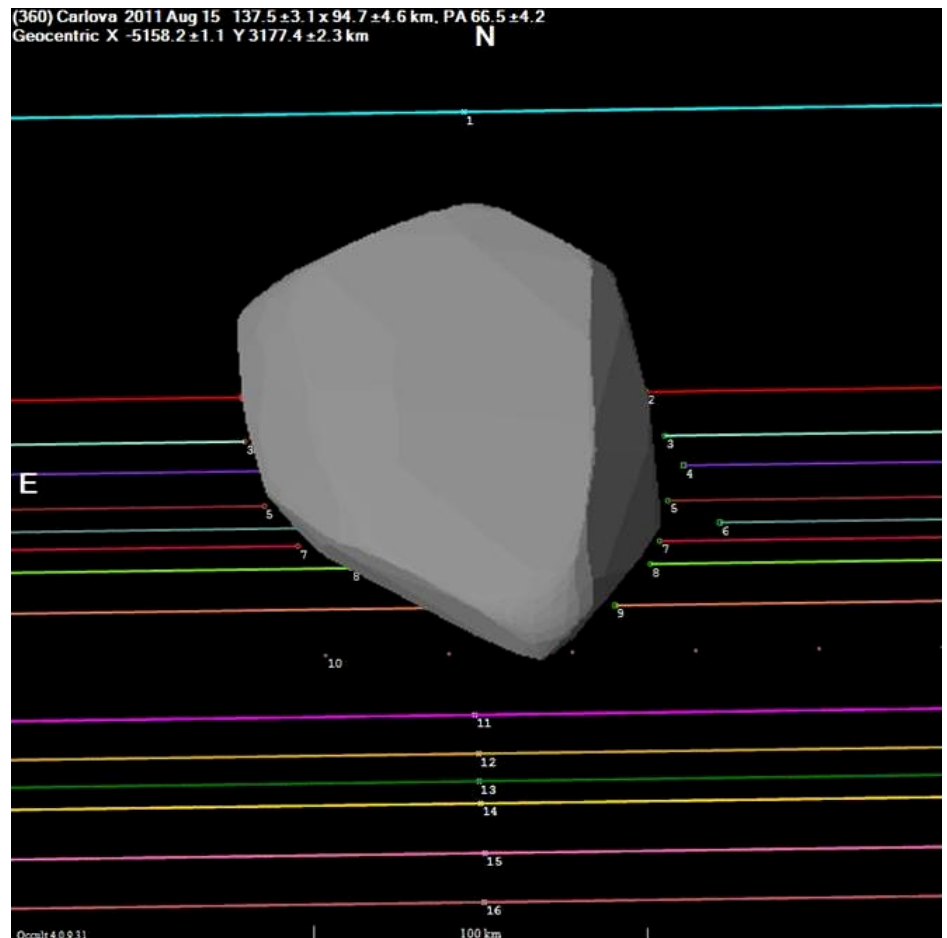


## Carlova Occultation

David Dunham



On August 15, 2011 NCA member David Dunham took part in an expedition to observe an occultation of the star SAO 95144 by the asteroid 360 Carlova. He and the expedition's other observers set up observation stations which consisted of automated telescopes that created time-stamped video recordings of the star as its light was briefly blocked by the asteroid. David's observation stations were spread roughly NW-SE near US 25 in South Carolina, while most of the other observers' stations were set up in Alabama. The three-dimensional shape model of Carlova (right) was created



## 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 Occultations

Date	Day	EDT	Star	Mag.	Asteroid	dur.	Ap.	Location
						dmag	s "	
Nov 10	Thu	2:03	SAO 76864	8.9	Bulgaria	7.4	2 3	cenNJ,sPA, cenOH
Nov 11	Fri	18:24	2UC22095884	12.2	C Hertha	0.5	3 10	nwSC,wNC, VA, sMD
Nov 15	Tue	4:24	HIP 17308	9.4	Baucis	2.6	6 4	sMD, DC, nVA, WV, OH
Nov 20	Sun	21:12	TYC06440335	9.4	C Harmonia	0.2	12 7	sNJ, DE, sMD, DC, VA
Nov 22	Tue	5:38	TYC13790179	10.3	Knopfia	6.1	2 5	sON, PA, sNJ; neMD?
Nov 25	Fri	2:24	TYC18110638	10.3	C Ausonia	0.8	8 7	sNJ, DE, MD, DC, nVA
Nov 27	Sun	19:25	PPM 147574	9.4	Fitzgerald	6.2	1 4	NJ, sPA, sOH; MD?
Nov 28	Mon	22:26	TYC18010686	9.5	C Matteredania	5.5	1 4	NJ, ePA, MD, VA; DC?
Nov 29	Tue	6:18	SAO 77380	9.4	Stebbins	6.2	1 4	MD, DC, nVA, sPA, OH
Nov 29	Tue	21:12	TYC33302126	10.1	Scottrober	5.7	1 5	NJ, DE, eMD, eVA, NC
Dec 3	Sat	4:19	2UC38058310	12.3	C Sapiientia	0.6	20 10	VA, WV, sOH; MD?
Dec 3	Sat	21:52	2UC38927910	12.1	C Fiducia	1.0	8 9	sNJ, DE, MD, DC, nVA
Dec 7	Wed	18:58	TYC28471058	9.6	Thyra	0.2	12 7	eNY, NJ; DE, eMD?
Dec 10	Sat	18:49	2UC40968695	13.0	C Brouwer	2.3	8 10	NJ, ePA, MD, DC, eVA
Dec 10	Sat	6:07	PPM 158230	9.9	Marlu	6.6	4 4	sON, n&ePA, NJ

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

Date	Day	EDT	Star	Mag.	%	alt	CA	Location
Nov 17	Thu	4:04	SAO 98040	8.5	63-	61	9S	*Winchstr, VA; Gaithrb&Laur1, MD

### Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag.	%	alt	CA	Sp.	Notes
Nov 10	Thu	3:03	D 27	Arietis	6.2	100+	49	51N	G5	ZC 371, Term. Dist. 4"
Nov 12	Sat	6:28	R 51	Tauri	5.6	98-	20	79S	F0	Sun-4, WA260, ZC631, dbl.
Nov 14	Mon	3:09	R ZC	905	6.9	89-	71	66S	A0	close double
Nov 15	Tue	5:55	R SAO	96312	7.4	81-	53	88S	A5	Sun alt. -11
Nov 15	Tue	22:48	R 74	Gem	5.0	74-	19	80S	M0	ZC1158, close double?
Nov 17	Thu	1:07	R SAO	97952	7.4	64-	33	55S	A0	mag2 8.1, 44", PA 313
Nov 17	Thu	1:08	R SAO	97953	8.1	64-	33	53S	A0	comp. SAO 97953 +56s
Nov 19	Sat	4:54	R RX	Sex	6.7	41-	47	50N	A3	ZC1528, mg2 9, 11.7", PA191
Nov 19	Sat	6:08	R SAO	118314	7.4	41-	54	80N	K0	Sun-9, mg2 9, 0.5", PA 140
Nov 19	Sat	6:41	R SAO	118319	7.8	40-	54	71S	A0	Sun alt. -3
Nov 20	Sun	2:52	R ZC	1629	6.6	31-	16	68S	K0	
Nov 20	Sun	5:27	R SAO	138129	7.9	30-	40	61N	F8	comp. ZC1639, -9s
Nov 20	Sun	5:27	R ZC	1639	7.1	30-	41	61N	F8	mg2 7.9, 10", PA 254 deg.
Nov 29	Tue	19:06	D SAO	163793	7.8	26+	23	60S	F0	mg2 11, sep. 3", PA 227
Nov 30	Wed	19:57	D ZC	3154	7.4	36+	27	39N	G0	maybe close double
Nov 30	Wed	20:54	D SAO	145483	7.9	36+	18	81N	B9	
Dec 1	Thu	18:45	D 44	Aquarii	5.8	46+	44	26N	G6	ZC 3272
Dec 1	Thu	23:02	D 51	Aquarii	5.8	47+	6	50S	A0	Az.259, ZC3287, double?
Dec 2	Fri	21:59	D ZC	3397	7.1	56+	28	70S	K0	
Dec 3	Sat	16:58	D TX	Piscium	5.0	64+	44	78N	N0	Sun alt. -3, ZC3501
Dec 3	Sat	23:52	D ZC	3517	7.7	66+	18	18N	K0	
Dec 4	Sun	21:45	D ZC	77	7.9	74+	50	44N	G5	
Dec 5	Mon	1:00	D ZC	89	6.5	75+	16	51N	F5	
Dec 5	Mon	21:02	D ZC	197	7.0	82+	63	78S	K0	maybe close double
Dec 8	Thu	4:06	D ZC	460	6.9	95+	13	57S	A0	Azimuth 285 deg.
Dec 8	Thu	18:05	D ZC	534	6.1	98+	29	32N	A0	Term. dst. 13", spec. bin.
Dec 9	Fri	2:02	D ZC	586	6.8	98+	46	89S	K0	
Dec 11	Sun	20:15	R 15	Gem	6.7	98-	24	66S	K0	AA255, ZC989, mg2 8, 25"

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

Timing 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/timng920.htm>.



## NASA News from Frank Reddy

### Spiral Arms Point to Possible Planets in a Star's Dusty Disk 10.19.11

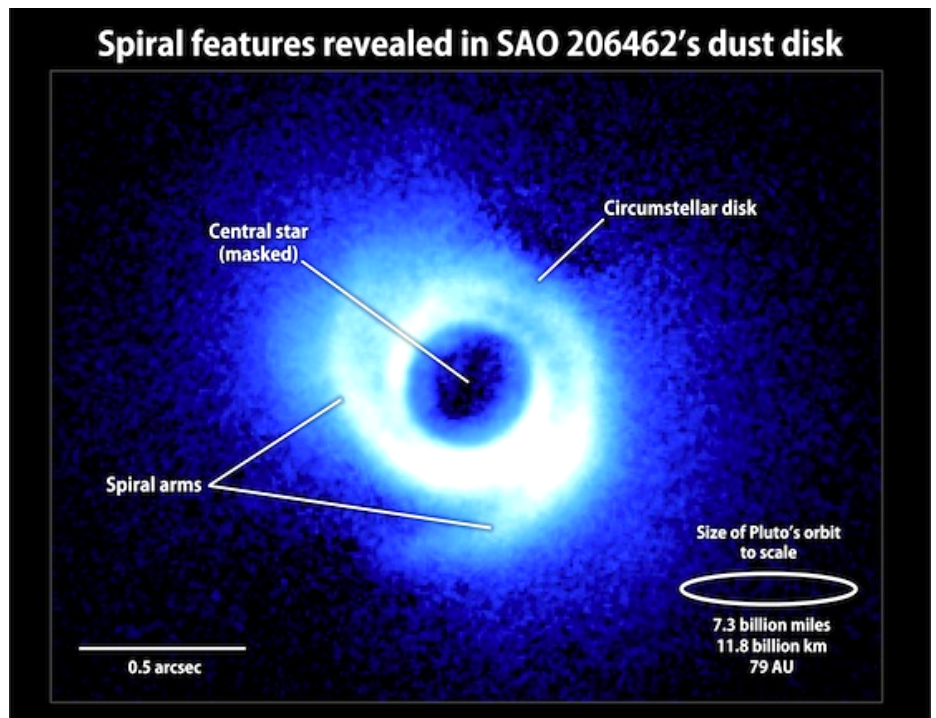
A new image of the disk of gas and dust around a sun-like star is the first to show spiral-arm-like structures. These features may provide clues to the presence of embedded but as-yet-unseen planets.

"Detailed computer simulations have shown us that the gravitational pull of a planet inside a circumstellar disk can perturb gas and dust, creating spiral arms. Now, for the first time, we're seeing these dynamical features," said Carol Grady, an astronomer with Eureka Scientific, Inc., who is based at NASA's Goddard Space Flight Center in Greenbelt, Md. She revealed the image today at the Signposts of Planets meeting hosted this week at the center.

Grady's research is part of the Strategic Exploration of Exoplanets and Disks with Subaru (SEEDS), a five-year-long near-infrared study of young stars and their surrounding dust disks using the Subaru Telescope atop Mauna Kea in Hawaii. The international consortium of researchers now includes more than 100 scientists at 25 institutions.

"What we're finding is that once these systems reach ages of a few million years, their disks begin to show a wealth of structure -- rings, divots, gaps and now spiral features," said John Wisniewski, a collaborator at the University of Washington in Seattle. "Many of these structures could be caused by planets within the disks."

The newly imaged disk surrounds SAO 206462, an 8.7-magnitude star located about 456 light-years away in the constellation Lupus. Astronomers estimate that the system is only about 9 million years old. The gas-rich disk spans some 14 billion miles, which is more than twice the size of Pluto's orbit in our own Solar System.



***Two spiral arms emerge from the gas-rich disk around SAO 206462, a young star in the constellation Lupus. This image, acquired by the Subaru Telescope and its HiCIAO instrument, is the first to show spiral arms in a circumstellar disk. The disk itself is some 14 billion miles across, or about twice the size of Pluto's orbit in our own solar system. (Credit: NAOJ/Subaru)***

The Subaru near-infrared image reveals a pair of spiral features arcing along the outer disk. Theoretical models show that a single embedded planet may produce a spiral arm on each side of a disk. The structures around SAO 206462 do not form a matched pair, suggesting the presence of two unseen worlds, one for each arm.

However, the research team cautions that processes unrelated to planets may give rise to these structures.

The view was made possible by the High Contrast Instrument for the Subaru Next Generation Adaptive Optics, or (HiCIAO, pronounced "HI-chow"), which is designed to block out harsh direct starlight.

"Together with improvements to Subaru's adaptive optics system, which counteracts the blurring effects of Earth's atmosphere, the telescope is operating near its theoretical performance limits," said SEEDS principle investigator Motohide Tamura at National Astronomical Observatory of Japan, which operates the telescope. "We are just beginning to see what it will do."

"The Signposts of Planets meeting is all about understanding these kinds of patterns," said NASA Goddard's Marc Kuchner, who organized the conference. "It's a new kind of planet-hunting technique that is just now coming to fruition, and this new image from SEEDS is the perfect example of how it can work."

The Howard B. Owens  
 Science Center Planetarium  
 9601 Greenbelt Road  
 Lanham-Seabrook, MD 20706  
<http://www1.pgcps.org/howardbo-wens/>

All Programs held the second Friday of the month unless otherwise indicated.

Doors open by 7:15 p.m.

Program begins at 7:30 p.m.

Call 301-918-8750 during school hours to confirm program topic.

Cost is \$5.00 for adults; \$3.00 for students/teachers/seniors. Children 3 and under are free.

**November 18, 2011\*:**

*Treasure of the Stars*

*\*NOTE: This is the 3<sup>rd</sup> Friday of the month*

"X" marks the spot... or does it?! On this evening, your quest begins OUTSIDE the planetarium, beginning at 7:00 p.m. Help us find the clues that we need to take into the planetarium in order to find the

## Calendar of Events

- **NCA Mirror- and Telescope-making Classes:** Tuesdays Nov. 1, 8, 15, 22 and Fridays, Nov. 4, 18, 25, (NOT Nov. 11), 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.
- **Exploring the Sky** at Rock Creek Park Nov. 5 7:30 pm. Much of Moon sunlit; winter constellations appear. <http://www.nps.gov/rocr/planyourvisit/expsky.htm>. Questions? Call the Nature center at (202) 895-6070.
- **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, Nov. 12 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, Nov. 19 at 7 pm. 7621 Fenton Street, Takoma Park, MD (240) 567-1463. "Black Bubbles (Holes), Gravity to the Max: or how c, G, and M make a bubble in the fabric of time-space (reality)!" <http://www.mc.cc.md.us/Departments/planet/>
- **Upcoming NCA Meetings** at the University of Maryland Observatory
  - Nov. 12, 2011 **Dan Wik** (GSFC) - *Merging Galaxies and Clusters of Galaxies*
  - Dec. 10, 2011 **Justin Finke** (NRL) - *Gamma Rays from Radio Galaxies*
  - Jan. 14, 2012 **Guy Brandenburg** (DCPS-retired) - *Making Your Own Telescope*

## National Capital Astronomers Membership Form

**Name:** \_\_\_\_\_ **Date:** \_\_\_/\_\_\_/\_\_\_

**Address:** \_\_\_\_\_ **ZIP Code:** \_\_\_\_\_

**Home Phone:** \_\_\_-\_\_\_-\_\_\_ **E-mail:** \_\_\_\_\_ **Age:** \_\_\_\_\_

**Present or Former Occupation (Or, If Student, Field of Study):** \_\_\_\_\_

**Academic Degrees:** \_\_\_\_\_ **Field(s) of Specialization:** \_\_\_\_\_

**Employer or Educational Institution:** \_\_\_\_\_

**Student Membership:** ..... \$ 5

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

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

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

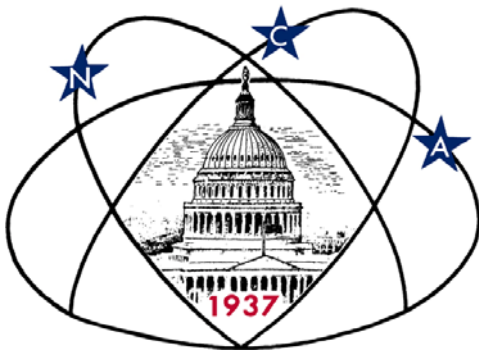
Members receive Stardust, the monthly newsletter announcing NCA activities, by e-mail. If you would like to receive a paper copy of Stardust via regular mail, please check here: \_\_\_\_\_

Please mail this form with check payable to National Capital Astronomers to:  
 Michael L. Brabanski, NCA Treasurer; 10610 Bucknell Drive; Silver Spring, MD 20902

National Capital Astronomers,  
Inc.

**If undeliverable, return to**  
NCA c/o Michael L. Brabanski  
10610 Bucknell Dr.  
Silver Spring, MD 20902-4254

**First Class**



Next NCA Mtg:  
Nov. 12  
7:30 pm  
@ UM Obs  
Dr. Dan Wik

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