

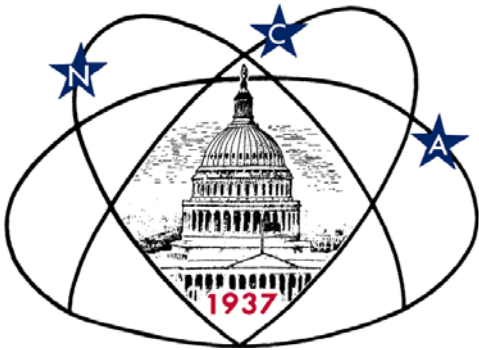
# Star Dust

National Capital Astronomers, Inc.

February 2011

Volume 69, Issue 6

<http://capitlastronomers.org>



## Next Meeting

**When:** Sat. Feb. 12, 2011  
**Time:** 7:30 pm  
**Where:** UM Observatory  
**Speaker:** Brian Jackson,  
NASA 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.

## February 2011: Brian Jackson NASA Goddard Space Flight Center From Extrasolar Gas Giant to Hot, Rocky Planet

**Abstract:** In the last several years, astronomers have found more than 400 planets orbiting stars other than our Sun. These extra-solar planets display a remarkable diversity of orbital and physical properties, and many of these planets are unlike planets in our own Solar System.

Even in this exotic menagerie, close-in extra-solar planets stand out as unusual and puzzling. These planets have masses ranging from several Earth masses to many Jupiter masses, but have orbits that are at least 10 times closer to their host stars than the Earth is to the Sun. Because they are the easiest planets to detect, close-in planets provide much of our current information about the physical and orbital properties of extra-solar planets, so understanding their origin and evolution is important for understanding extra-solar planets in general.

Being so close to their host stars, close-in planets are susceptible to the effects of tides, which can affect the planets' orbital and thermal evolution. For example, tides can circularize orbits and can cause them to decay.

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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

In many cases, tides may have already destroyed close-in planets by causing them to cross their Roche limits. As tides circularize orbits, they also heat the planets' interiors. This heating may cause gaseous planets to become inflated, or may drive vigorous volcanism on rocky planets, as on Jupiter's moon Io. Tides can also help strip the atmospheres from gas giant planets that wander too close to their host stars. In fact, the first plausibly rocky extra-solar planet discovered, CoRoT-7 b, may actually be the remnant rocky core of a tidally stripped gaseous planet. In this talk, I will discuss our rapidly evolving knowledge of close-in extra-solar planets, and will highlight the important and complex role played by tides and atmospheric mass loss.

**Biography:** Brian Jackson received his B.S. in Physics from the Georgia Institute of Technology in Atlanta GA, and his Ph.D. in Planetary Sciences from the Lunar and Planetary Laboratory at the University of Arizona in Tucson.

His graduate research focused on tidal effects on extra-solar planets. During his graduate work, Brian showed that many of the first-found rocky extra-solar planets may be volcanically active, as a result of tidal heating.

As a post-doctoral fellow at NASA's Goddard Space Flight Center, Brian has expanded his research to consider atmospheric evaporation from extra-solar planets very close to their host stars, and to search for the transits of these planets. He has authored and co-authored numerous scientific papers and conference proceedings and has crisscrossed the country to give invited talks at Caltech, MIT, Harvard, among others. He has contributed several short articles to "Astronomy" magazine and has given numerous public talks. Brian lives with his wife Maki in Greenbelt MD.

<http://www.lpl.arizona.edu/~bjackson>

## NCA Amateur Telescope Making Class Receives Milling Machine

*Michael Chesnes*

On the afternoon and evening of Wednesday, January 12, a group of half a dozen volunteers from the National Capital Astronomers and the Northern Virginia Astronomy Club moved a Grizzly milling machine weighing 620 lbs. from a moving truck to the basement of the Chevy Chase Community Center. Guy Brandenburg, the instructor of NCA's telescope making class, was able to purchase the milling machine with funds from selling a 24 inch mirror blank.

The milling machine will make it possible for Guy and his students at NCA's Amateur Telescope Making class to fabricate a greater range of telescope parts, which they previously had to purchase. Currently the motor on the milling machine is not working, although that situation may be rectified soon.

In order to set up the milling machine in its new home, the volunteers lowered it from the moving truck with a mechanized ramp, then wheeled it to the community center's elevator, where it barely fit after removing a piece. Once downstairs, the volunteers then erected a wooden scaffold around the milling machine, and used a hoist on top of the scaffold to raise the milling machine, so that it could fit on the wooden pedestal, which is now its new base. I have included some photographs of the moving process, which convey a sense of the machine's size and the effort involved.

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## 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	dmag	s	"	dur.	Ap.	Location
Feb 14	Mon	4:23	SAO 98687	6.7	Inna	9.2	1	2	s&wNC	neTN,scKY	
Feb 18	Fri	4:41	2UC43610749	11.4	Johanna	1.3	20	7	MD,DC	nVA,wPA,OH	
Feb 19	Sat	0:54	2UC44104756	12.5	2002 XV93	8.6	41	9	TNO;	N.America?	
Feb 19	Sat	1:56	2UC36462402	8.6C	Iris	0.1	48	7	NJ,MD,DC	PA,nVA	
Feb 22	Tue	22:40	2UC43261933	12.4C	Arsinoe	0.7	25	10	DE,MD,DC	nVA,wPA	
Feb 26	Sat	5:59	TYC04050779	10.9	Union	6.4	2	6	wNC,VA	MD,DE;DC?	
Feb 26	Sat	19:00	2UC34423158	13.1	Joella	2.4	10	10	VA,MD,PA	NY,QC	
Feb 27	Sun	2:44	SAO 182321	8.7	Leda	4.3	31	3	eMT,wKS	OK,c&sTX	
Feb 28	Mon	4:32	2UC30858619	13.6	Feronia	0.3	8	11	DE,MD,DC	nVA,wPA	
Feb 28	Mon	4:57	PPM 720454	9.4	Herculina	2.0	6	4	sPA,MD,DC	n&eVA	
Mar 7	Mon	4:48	TYC14370567	10.3	Imhotep	4.6	3	5	NJ,se&nwPA	neMD?	
Mar 9	Wed	1:05	SAO 138141	8.4	Feronia	3.6	7	2	FL-Keys	sLA,nTX	
Mar 10	Thu	20:50	2UC43253111	12.6C	Minerva	0.7	20	10	w&sPA,MD	nVA,DC	

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

Date	Day	EDT	Star	Mag.	% alt	CA	Location
Feb 11	Fri	17:42	ZC 566	6.1	56+ 71	12S	Trappe,MD(Sn-2);ArgosCornerDE
Feb 12	Sat	23:08	SAO 76826	7.9	68+ 42	13N	*s.Culpepr&s.Fredericksbrg,VA
Mar 11	Fri	23:18	ZC 693	6.0	41+ 16	13N	Lewisbury, PA; Elkton, MD

### Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag.	% alt	CA	Sp.	Notes
Feb 11	Fri	17:32	D	ZC 566	6.1	56+ 69	17S	B8	Sun +1; Delmarva graze
Feb 11	Fri	18:42	D	SAO 76283	7.6	57+ 74	78N	G0	Close double?
Feb 11	Fri	21:30	D	SAO 76334	7.8	57+ 50	77S	G0	
Feb 11	Fri	22:00	D	32 Tauri	5.6	58+ 44	24S	F2	ZC 582
Feb 12	Sat	22:11	D	SAO 76814	7.4	68+ 53	49S	K0	dbl?+mg3=11,sep5",PA62
Feb 13	Sun	21:46	D	ZC 887	7.0	77+ 67	80S	K5	Close double?
Feb 14	Mon	2:10	D	140 Tauri	7.0	79+ 18	76S	A2	ZC 907, close double?
Feb 14	Mon	19:35	D	SAO 78750	6.8	85+ 62	49S	M	
Feb 14	Mon	21:41	D	36 Gem	5.3	86+ 72	72N	A2	ZC 1047, close double?
Feb 14	Mon	23:47	D	ZC 1051	6.6	86+ 54	22S	K1	mg2 10,sep. 1.3",PA 188
Feb 14	Mon	23:47	D	ZC 1054	7.0	86+ 55	52N	B9	close double?
Feb 15	Tue	4:00	D	zeta Gem	4.0	87+ 8	69S	G3	Az.290,ZC 1077, double?
Feb 16	Wed	3:02	D	3 Cancr	5.6	94+ 27	58S	K3	ZC 1207, close double?
Feb 18	Fri	22:55	R	36 Sex	6.3	99- 44	77N	K4	AA 307,ZC 1566, double?
Feb 19	Sat	5:30	R	55 Leonis	5.9	98- 19	86N	F2	AA 295,ZC 1587, double?
Feb 19	Sat	5:55	R	57 Leonis	6.7	98- 14	48S	K0	Az259,AA249,ZC1590,dbl?
Feb 20	Sun	5:11	R	ZC 1713	5.6	93- 27	69N	K0	AA 301, close double?
Feb 22	Tue	4:58	R	83 Vir	5.6	77- 32	37N	G1	ZC 1967
Feb 24	Thu	3:06	R	ZC 2227	5.8	56- 19	52S	K0	mg.2 9,sep. 0.01",PA102
Feb 24	Thu	3:42	R	SAO 183654	7.2	56- 23	89S	K4	
Feb 24	Thu	4:05	R	ZC 2235	6.3	56- 25	78S	B9	
Feb 25	Fri	5:50	R	ZC 2398	6.1	45- 26	48N	A7	Sun alt. -11 deg.
Feb 26	Sat	3:44	R	ZC 2530	7.7	35- 9	75S	F5	Az. 132 deg.
Mar 7	Mon	19:18	D	SAO 92279	7.9	8+ 19	62S	F2	
Mar 8	Tue	21:06	D	ZC 289	7.8	15+ 9	10S	G0	Az. 283 deg.
Mar 9	Wed	20:55	D	ZC 411	7.0	22+ 22	73S	G0	mag2 8, sep 3.7",PA 306
Mar 10	Thu	21:10	D	SAO 76050	7.3	31+ 29	89S	A0	spectroscopic binary
Mar 11	Fri	17:47	D	72 Tauri	5.5	39+ 73	32S	B7	Sun alt. +4 deg.,ZC 664
Mar 11	Fri	20:12	D	SAO 76636	7.1	40+ 51	65N	K2	
Mar 11	Fri	23:10	D	ZC 693	6.0	41+ 17	31N	F5	
Mar 11	Fri	23:55	D	SAO 76683	7.5	41+ 9	80N	F5	Azimuth 292 deg.
Mar 12	Sat	23:14	D	SAO 77246	7.9	51+ 26	71S	K0	mg2 13,sep 12", PA 351

Explanations & more information are at <http://iota.jhuapl.edu/exped.htm>.  
 David Dunham, [dunham@starpower.net](mailto:dunham@starpower.net)  
 Phones: home 301-220-0415; cell 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/timg920.htm>.

Good luck with your observations.

## ***Hellish 'Super-Earths' Likely Prevalent Throughout Our Galaxy***

ScienceNOW - Up to the minute news from Science  
by Bruce Dorminey  
on 29 October 2010, 5:08 PM

When Kevin Schlaufman, a graduate student at the University of California, Santa Cruz, and colleagues used computer models to simulate a theoretical extrasolar planet population, they found that a new breed of super-Earths was also surprisingly prevalent. The team's results, to be published in *The Astrophysical Journal Letters*, indicate that these rocky planets would range up to 10 times the mass of Earth and would orbit their host stars in 24 hours or less.

"If our model and analysis are correct, these very hot super-Earths would be the hottest planets in the galaxy," says Schlaufman. "Their surfaces would likely be oceans of lava, possibly in the process of being vaporized by their own stars."

Such planets typically form early in the history of a stellar system and are farther away from their stars than Earth is from the Sun. So how does an Earth-mass planet end up so close to its parent star? The short answer is via inward migration. Over about 100,000 years, the planets interact with their surrounding, gas-rich planetary disks, causing their orbits to swiftly move inward toward their parent stars.

Natalie Batalha, the deputy science team lead for NASA's Kepler mission to find Earth-like worlds, says that Kepler's detection of many planetary candidates smaller than Neptune in close orbits around their stars suggests that Schlaufman and colleagues' models "might be right on target." The project is expected to announce the discovery of "Such super-Earths would be different from anything in our Solar System. Eventually, before being incinerated, the super-Earth will be ripped apart.

## **Science News**

*Thank you Nancy Grace Roman for finding these articles.*

### ***Hubble Astronomers Uncover an Overheated Early Universe***

NASA News  
Oct. 07, 2010

WASHINGTON -- During a period of universal warming 11 billion years ago, quasars -- the brilliant cores of active galaxies -- produced fierce radiation blasts that stunted the growth of some dwarf galaxies for approximately 500 million years.

This important conclusion comes from a team of astronomers that used the new capabilities of NASA's Hubble Space Telescope to probe the invisible, remote Universe. The team identified this era, from 11.7 to 11.3 billion years ago, when the ultraviolet light emitted by active galaxies stripped electrons off helium atoms. The process, known as ionization, heated the intergalactic helium from 18,000 degrees Fahrenheit to nearly 40,000 degrees. This inhibited the gas from gravitationally collapsing to form new generations of stars in some small galaxies.

The Universe went through an initial heat wave more than 13 billion years ago when energy from early massive stars ionized cold interstellar hydrogen from the Big Bang. This epoch is called reionization, because the hydrogen nuclei originally were in an ionized state shortly after the Big Bang.

The Hubble team found it would take another two billion years before the Universe produced sources of ultraviolet radiation with enough energy to reionize the primordial helium that also was cooked up in the Big Bang. This radiation didn't come from stars, but rather from super massive black holes. The black holes furiously converted some of the gravitational energy of this mass to powerful ultraviolet radiation that blazed out of these active galaxies.

The helium's reionization occurred at a transitional time in the universe's history when galaxies collided to ignite quasars. After the helium was reionized, intergalactic gas again cooled down and dwarf galaxies could resume normal assembly.

### **Volunteers Needed for Regional Science Fairs**

*Jay Miller*

The regional science fairs are coming up in March. Winners in the various categories go on to the national fair. There are several that we have judged for NCA awards. These include the Montgomery County fair which will be held 19 March at the University of Maryland, the P.G. County fair which will be 26 March in Largo, and the Northern Virginia fair which will be 5 March at Wakefield H.S. As I've said before, you don't have to be an astronomical genius to judge them. Your attendance at the NCA meetings gives you adequate knowledge. I usually do the Montgomery County fair, but, as with all of the fairs, more than one judge is preferred. The NCA winners get a year's membership in NCA and a year's subscription to Sky & Telescope magazine. Let me know if you can help. [rigel1@starpower.net](mailto:rigel1@starpower.net)

## Help Wanted

Here is a listing of upcoming public outreach events where NCA members can volunteer. Most of the March events are science fairs, although the Kenmore MS event needs observers with telescopes.

March 5  
Wakefield High School, Arlington, VA  
Northern Virginia Regional Science and Engineering Fair  
Contact: Jay Miller [rigel1@starpower.net](mailto:rigel1@starpower.net)

March 19  
Science Montgomery (Montgomery County Science Fair) College Park, MD  
Contact: Jay Miller [rigel1@starpower.net](mailto:rigel1@starpower.net)

March 25  
Kenmore Middle School, Arlington, VA  
Contact: Pam Juhl [pam.juhl@verizon.net](mailto:pam.juhl@verizon.net)

March 26  
Prince George's Area Science Fair  
PG Community College, Largo, MD  
Contact: Jay Miller [rigel1@starpower.net](mailto:rigel1@starpower.net)

## Calendar of Events

**NCA Mirror- and Telescope-making Classes:** Tuesdays Feb. 1, 8, 15, 22 and Fridays, Feb. 4, 11, 18, 25, 6:30 to 9:30 pm at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at [gbrandenburg@yahoo.com](mailto:gbrandenburg@yahoo.com). In case there is snow, call 202-282-2204 to see if the CCCC is open.

**Open house talks and observing** at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00 pm (Nov-Apr) or 9:00 pm (May-Oct). There is telescope viewing afterward if the sky is clear.

**Dinner:** Saturday, Feb. 12 at 5:30 pm, preceding the meeting, at the [Garden Restaurant](#) in the University of Maryland University College Inn and Conference Center.

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

Feb 12, 2011 **Brian Jackson** (GSFC) - *From Extrasolar Gas Giant to Hot, Rocky Planet*

Mar 12, 2011 **John Debes** (GSFC) - *A Stellar Debris Disk Flapping in the Interstellar Wind*

Apr 9, 2011 **Jessica Rosenberg** (GMU) - *Gas and Stars in the Local Universe: What Normal Matter Can Teach us About the Formation and Evolution of Galaxies*

## 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



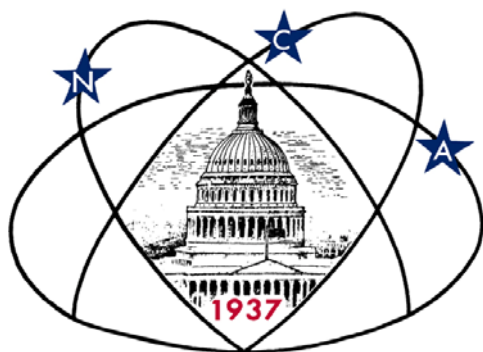
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Silver Spring, MD 20902-4254

**First Class**

**Dated Material**



Next NCA Mtg:

**Feb. 12**

**7:30 pm**

**@ UM Obs**

**Dr. Brian Jackson**

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