

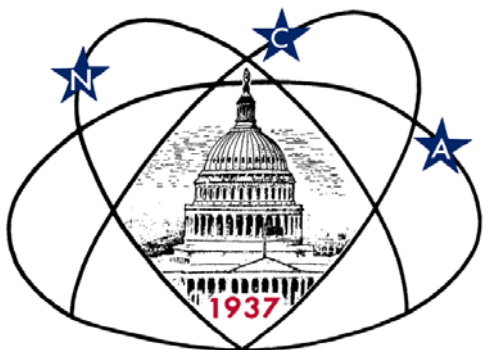
Star Dust

National Capital Astronomers, Inc.

March 2010

Volume 68, Issue 7

<http://capitalastronomers.org>



Next Meeting

When: Sat. Mar. 13, 2010
Time: 7:30 pm
Where: UM Observatory
Speaker: Chris Reynolds,
University of Maryland

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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.

Observing after the Meeting

Following the meeting, members and

March 2010: Dr. Chris Reynolds University of Maryland X-rays from the Nuclei of Galaxies

Abstract: We now know that almost all galaxies possess a central supermassive black hole, and that the accretion of gas into those black holes are responsible for the spectacular phenomena known as active galactic nuclei or quasars. X-ray observations provide a unique probe of these phenomena - the X-rays are produced by the hottest gases, closest to the black hole, and they can penetrate through the surrounding dust and gas so that they can be observed at Earth. I will review what we have learned by studying X-rays from galactic nuclei, including recent work that allows us to measure the spin rates of the supermassive black holes. I will conclude with a discussion of the future prospects for this field.

Biography: Dr. Chris Reynolds is a professor of astronomy at the University of Maryland, College Park, and Director of the newly formed UMD/NASA Joint Space Science Institute. After obtaining his PhD in astrophysics from the University of Cambridge (UK) in 1996, he moved to the University of Colorado at Boulder, where he was a Postdoctoral Research Associate and then a Hubble Fellow. He joined the faculty of the University of Maryland in 2001. His research interests include X-ray studies of black hole systems and galaxy clusters, theoretical studies of magnetohydrodynamic turbulence and its applications to black hole accretion disks, and computational fluid dynamics.

Sharpen, Steady and Clarify Your View March, 2010

*By Tom Koonce
Antelope Valley Astronomy Club, Inc.
Lancaster, California*

There are at least three important elements affecting your telescope that if improved, can make a dramatic improvement in the views you'll get this springtime. You've probably heard a lot about the first element – collimation. If you are using a Newtonian or Schmidt-Cassegrain telescope, accurate optical collimation can make a huge difference in your views. How much? From personal experience I can tell you that with an eight inch Schmidt-Cassegrain, it makes the difference between being able to make out the main bands on Jupiter and being able to see the curly festoons *between* the main bands on clear, steady evenings. There are many fine articles about the proper way to collimate your telescope; a Google search will reveal dozens.

Continued on Page 2

guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

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If you can switch from paper to digital, please contact Michael L. Brabanski, the NCA Sec-Treasurer, at mlbrabanski@verizon.net or 301-649-4328 (h).

Thank you!

Continued from Page 1

The second element to upgrade is your mount. Nothing can ruin a great observing night faster than a shaky, unsteady or oscillating mount. A number of years ago, I recall that a friend of mine had had custom telescope called a Schiefspiegler built for him. This was not a small telescope (at over 4 feet in length), but the planetary and binary star views promised to be superb based upon the indoor optical tests. I went out with him the first night he set it up. We found out that the slightest breath of wind or slight tap to the side of the scope would cause oscillations lasting for many, many seconds. This wasn't only annoying; it nearly made us seasick and it certainly spoiled the view. I remember that he spent several hours later trying to beef-up the mount. Ultimately he sold the telescope because he couldn't get the mount steady enough to be both functional and portable. Always go for 'overkill' when it comes to your mount.

No astronomer has ever been heard complaining that their mount was just *too steady*. A big part of why the great observatories of the world are so expensive to build is because awesome views require rock steady support of the optics. I'm always trying to add stability. Little tricks like hanging a brick from a chain from below the center of your mount's tripod will add stability. Isolation pads under the tripod legs can reduce vibration. Talk to other amateurs at the next event to hear about other ideas you may try.

The third often neglected element is, of course, your eyepieces. Anything that affects the light path coming from the object you want to view contributes to the overall quality of the image you are seeing. Spending good money for your telescope but then using cheap eyepieces will result in a disappointing view of the star, galaxy, or planet you want to see. The most obvious improvement to the sharpness, contrast and field of view can be obtained by using better eyepieces in the scope that you already have.

Beginners typically will use whatever eyepiece(s) came with their telescope, so I'm addressing the needs of "intermediate" level amateur astronomers with this advice. I recommend the Meade, Celestron, Pentax and Orion lines of Plossl eyepieces, and strongly recommend *anything* made by TeleVue. The best way to shop for an eyepiece is to go out with other amateurs to a star party and borrow their eyepieces for a few minutes and check out the view they produce using your own telescope. Most of the other folks in the astronomy club will be glad to do this since that's likely how they originally decided on what eyepieces to buy! You may be able to field test two or three "side-by-side". Just remember to treat their eyepieces as if they were gold and return them right after you're done with your assessment.

There are trustworthy classified ad sites like those at AstroMart.com and CloudyNights.com that can offer you exceptional deals on top quality eyepieces. With patience and knowledge of what you want to buy you can build an eyepiece collection of higher-end eyepieces for relatively little money. If you have used 1 ¼ inch diameter eyepieces for a while, you may consider adding a 2" eyepiece to your collection. This may require that you upgrade your telescope's focuser to accommodate the larger size, but this is the sort of eyepiece change that will make your jaw drop with the spectacular vistas they show.

By considering any one of these elements you'll get the "Wow!" factor back into your viewing when you see the detail that your equipment is really capable of seeing.

Reference websites:

<http://www.astromodel.50megs.com/Collimation.html>

<http://www.skyandtelescope.com/howto/diy/3306876.html>

<http://www.galacticfool.com/collimate-newtonian-telescope/>

www.telescopemaking.org/schief.html

<http://www.homebuiltastronomy.com/downbino/EyepieceCase.htm>

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20 Inch Cassegrain Telescope

Michael Chesnes

At NCA's telescope making class, instructor Guy Brandenburg disassembles a 20 inch Cassegrain telescope in order to test its mirrors. The telescope, which has been in storage at Hopewell Observatory, features a finely made primary cell with a heavy mounting bracket behind it. A deteriorated gasket adhered the rugged sheet metal tube to the primary cell, but the bracket allowed Guy to stand the telescope on end in a vice while prying off the tube with a hammer and putty knife. Also notice the unusually thick spider vanes in the photo at lower right. Thank you Bill Rohrer for lending me your camera.



Sat. pm, March 20: Our Last Pleiades Occultation Until 2023

Dr. David Dunham

During Saturday evening, March 20th, the crescent Moon, only 24% sunlit, will pass over the southern and eastern outer areas of the Pleiades, our last chance to see such a spectacle until 2023. Several occultations, that will be visible throughout the greater Washington, DC region (including central Maryland and northern Virginia) are included for that evening in our monthly list, but many more occultations of fainter stars will be visible with 5-inch and larger telescopes.

For Pleiades occultations, region of visibility maps and predictions for hundreds of N. American cities for the brightest 6 stars can be found on IOTA's lunar occultation Web site at: <http://www.lunar-occultations.com/iota/pleiades/pleiades.htm> but during this Pleiades passage none of these brightest stars will be occulted for us. Predictions for all of 2010 for stars to mag. 6.0 for 40 of the larger N. American cities can be downloaded in .zip files from this Web site: <http://www.lunar-occultations.com/bobgraze/index.html> but fainter occultations, down to 8th magnitude during favorable crescent phases, are included in the predictions published monthly in Star Dust.

Especially interesting will be grazing occultations visible from narrow zones at the predicted northern edges of the regions of visibility of the occultations. In those zones, the star's apparent motion relative to the Moon's disk will be a tangent line and the star will flash off and on as it is repeatedly covered and uncovered by mountains and craters on the dark edge of the Moon near the lunar north pole close to the north cusp of the lunar crescent. Four grazing occultations in the Mid-Atlantic states are listed in the monthly list of grazing occultations. For our area, the best of these will be the grazing occultation of the 6.2-magnitude spectral type B8 (bluish) star ZC 564 that will occur from 10:53pm to 10:55pm in a narrow path that passes over the northern part of Columbia, Maryland, and areas northwest and southeast of there, including just north of Frederick and the southern part of BWI airport. Information about some of the grazes in the monthly list is given below:

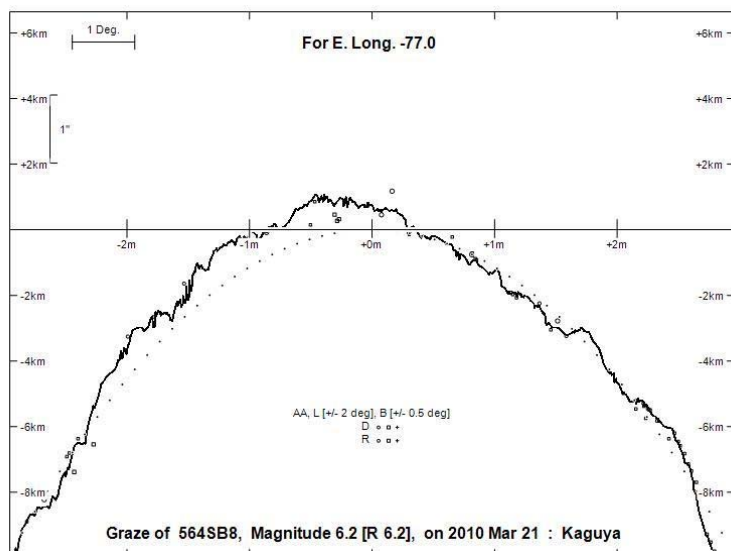
SAO 76135: Hollymead is 5 mi. n. of Charlottesville.

SAO 76189: The path also passes near/over Greenbank, WV and Williamsburg, VA.

ZC 564: The star is a spectroscopic binary. The path also passes over or very close to Caledonia, MI; Kent, OH; and Hagerstown, Frederick, Mount Airy, BWI, & Severna Park, MD. I will lead an effort to observe this very good graze only if the weather forecast is significantly worse for the Merope graze in Texas; if I'm not present, I hope that someone else might lead a local effort for this.

If the weather forecast is good, we'll undertake an expedition to observe the graze of ZC 564. You can generate detailed maps of the path for this and other grazes using Brad Timerson's interactive Google maps Web site at <http://www.timerson.net/IOTA/>. You need to know the offsets for the graze zone in your area, but we can help you determine that. For the grazing occultation of ZC 564 in central Maryland, the values to specify are -1.07 and -0.52. These are km; negative values are distances north of the predicted limit line. The offsets are drawn with gray lines and define the graze zone where multiple events will occur; the predicted limit line is light green. The predicted profile based on laser ranging observations by the Japanese Kaguya lunar orbiter is shown in the predicted profile below:

Occult 4.0.8.7



In the profile, the star follows parallel horizontal paths at the distances from the predicted limit line indicated on the left and right side of the profile. The time marks along the horizontal line shown (for an observer at the predicted limit) are relative to the predicted time of central graze, which increases with longitude towards the east along the limit. Only the top part of the profile, specified by the numbers above, will produce many occultations of the star. Observers farther north will see no occultation of the star, and those farther south will see effectively a short total occultation of the star lasting from 1.5 minutes to 4 minutes 3 km (2 miles) south of the predicted line. Observers in the wider range from the narrow graze zone even down to about 4 km south of the predicted line, may see the star disappear, then quickly reappear and disappear (maybe even two times), then be invisible behind the Moon for a few minutes, then reappear, with possibly another one or two short occultations afterwards.

Pleiades Occultation

Mar. 20

Continued from Page 4

The narrow graze zone across central Maryland is shown in the map generated from Timerson's Web site mentioned above.

If the weather forecast is favorable, we expect to lead an expedition to observe the graze northwest of Columbia, probably in the area near "Farside" on the map. I will lead the expedition only if I am not instead trying to observe the graze of Merope during this Pleiades passage northeast of Corpus Christi, Texas, that is, if the weather forecast is worse there than in central Maryland. If I decide to go to Texas, Wayne Warren will probably lead the expedition. More information (including more maps of the graze path), with updates as the time of the event draws near, will be posted on my Web site at <http://iota.jhuapl.edu/exped.htm> and distributed to NCA's e-mail list server.

Much information about observing occultations of all types is in

"Chasing the Shadow: The IOTA Occultation Observer's Manual"

available for free download at <http://www.poyntsource.com/IOTAMannual/Preview.htm>. Simple timing techniques (use whatever is available to you) are described at <http://iota.jhuapl.edu/timng920.htm>.

Note also that on Tuesday evening, March 23rd, there will be a grazing occultation of 7.2-mag. SAO 78707 by the first quarter Moon whose graze zone will cross Washington, DC, near the U. S. Naval Observatory, as well as passing over or near Sterling and Great Falls, Virginia, and Upper Marlboro, Maryland. If the weather forecast is promising for that event, maps and more information about it will be posted on my Web site and distributed by e-mail.

Mid-Atlantic Occultations and Expeditions

Dr. David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag.	Asteroid	mag	dur.	Ap. s "	Location
Mar 12	Fri	23:12	2UC38931470	11.3C	Europa	0.16	21	10	OH,PA,MD,DC,nVA
*** Dates and times above are EST, those below are EDT ***									
Mar 26	Fri	23:01	TYC08440201	10.3	1998 QA93	6.8	0.9	4	MD,nVA,WV;DE,DC?
Mar 31	Wed	20:43	2UC36449209	12.3C	Elektra	0.5	11	10	OH,PA,NY;WV,WMD?
Apr 1	Thu	1:01	2UC27108535	13.1	2006 HP122	10.1	6	9	TNO; N. America
Apr 4	Sun	20:03	TYC07592596	11.6	Chaldae	1.5	4	7	neNC; Sun -8
Apr 6	Tue	3:35	zeta Oph	2.5	Anastasia	12.2	9	0	cenCA,wNV,wID,AB
Apr 10	Sat	22:56	SAO 114835	6.0	Sternberga	9.9	2	2	nKY,sWV,cen.VA

Lunar Grazing Occultations (*, Dunham plans no expedition)

Date	Day	EDT	Star	Mag.	% alt	CA	Location
Mar 20	Sat	19:11	Merope	4.1	24+	52	10N Estes, TX Sun alt. -8 deg.
Mar 20	Sat	19:59	SAO 76103	7.9	24+	49	16N *New Freedom, PA Sun alt. -8
Mar 20	Sat	21:51	SAO 76189	7.0	25+	28	13N *Dayton,OH;Richmond,Langly,VA
Mar 20	Sat	22:54	ZC 564	6.2	25+	16	14N Cleveland;Pitsbrg;Columbia,MD
Mar 22	Mon	20:30	SAO 77513	7.5	45+	54	13N Lebanon & West Chester, PA
Mar 23	Tue	19:46	SAO 78707	7.2	56+	70	13N Strling,VA;Wash.,DC;UpMrbo,MD
Apr 9	Fri	4:53	SAO 164503	8.6	23-	18	62N Carmel Church,VA; Dameron,MD

Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag.	% alt	CA	Sp.	Notes
Mar 11	Thu	6:18	R	sigma Cap	5.3	16-	19	76N	K2 ZC 2963, Sun-2 deg.
*** Dates and times above are EST, those below are EDT ***									
Mar 18	Thu	19:38	D	SAO 92732	7.8	9+	19	84S	F5
Mar 19	Fri	22:37	D	ZC 425	7.1	17+	8	2S	K0 Azimuth 290 deg.
Mar 20	Sat	19:48	D	SAO 76103	7.9	24+	51	27N	A9 Sun -7,double,sep.0.02"
Mar 20	Sat	21:33	D	SAO 76202	7.8	25+	31	64N	K0 Our last Pleiades occ'n
Mar 20	Sat	21:39	D	SAO 76198	7.8	25+	30	39N	A3 until 2023
Mar 20	Sat	21:46	D	ZC 556	5.4	25+	29	71S	B8 maybe close double
Mar 20	Sat	22:50	D	ZC 564	6.2	25+	17	22N	B8 Columbia, MD graze
Mar 20	Sat	22:59	R	ZC 564	6.2	25+	15	5N	B8 Az. 288
Mar 22	Mon	21:18	D	SAO 77513	7.5	45+	56	36N	K0
Mar 22	Mon	22:20	D	ZC 880	6.8	45+	45	64S	K2
Mar 22	Mon	22:22	D	SAO 77571	7.6	46+	44	59S	K ZC 880 dist. companion
Mar 22	Mon	22:56	D	132 Tau	5.0	46+	38	50S	G8 ZC 882, close double?
Mar 23	Tue	2:08	D	ZC 898	6.0	47+	3	67S	A0 Azimuth 299 deg.
Mar 23	Tue	20:44	D	ZC 1036	6.5	56+	71	89N	G8
Mar 23	Tue	21:58	D	SAO 78758	7.5	57+	59	86N	G5 mg2 12,sep. 13",PA 305
Mar 23	Tue	22:26	D	SAO 78771	6.8	57+	54	76N	A0
Mar 24	Wed	2:32	D	ZC 1059	6.9	59+	8	77N	G5 Azimuth 293; double?
Mar 24	Wed	19:43	D	SAO 79652	7.4	67+	67	34S	G5 Sun alt. -5 deg.
Mar 24	Wed	19:55	D	79 Gem	6.5	67+	69	77S	A1 ZC 1171; Sun alt. -7
Mar 25	Thu	0:24	D	ZC 1186	6.0	69+	40	20S	K1
Mar 28	Sun	2:18	D	36 Sex	6.3	95+	37	39S	K4 ZC 1566, close double?
Apr 1	Thu	2:44	R	SAO 158556	6.8	93-	31	74N	A2 WA 295,comp. of ZC 2066
Apr 1	Thu	2:46	R	ZC 2066	6.6	93-	31	74N	A1 WA 295
Apr 1	Thu	6:14	R	ZC 2076	7.1	93-	15	45S	K0 Sun -8, Az. 227, WA 233
Apr 3	Sat	2:56	R	sigma sco	2.9	79-	21	60S	B1 ZC2349, close double
Apr 6	Tue	3:56	R	ZC 2793	6.7	50-	12	52N	G8 Azimuth 133
Apr 8	Thu	4:46	R	SAO 163886	7.6	31-	11	23N	F0 Azimuth 121
Apr 8	Thu	4:48	R	SAO 163888	7.8	31-	11	51S	F5 Azimuth 122
Apr 8	Thu	5:05	R	ZC 3036	7.0	31-	14	79N	F5 Azimuth 125

David Dunham, Phones: home 301-220-0415; cell 301-526-5590
e-mail: dunham@starpower.net.

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.

Explanations & more information are at <http://iota.jhuapl.edu/exped.htm>.
Information on timing occultations is at: <http://iota.jhuapl.edu/timng920.htm>.

Good luck with your observations.

Science News

Thank you Nancy Grace Roman for finding these articles.

Binary protoplanetary disk

Only a minority of stars are single, but all studies of protoplanetary disks have been of single disks. The Japanese have now observed the direct image of an interacting binary protoplanetary system. Both circumprimary and circumsecondary disks are resolved in the near-infrared. There is a bridge of infrared emission connecting the two disks and a long spiral arm extending from the circumprimary disk. Fresh material streams along the spiral arm, consistent with the theoretical scenarios where gas is replenished from a circummultiple reservoir.

Forest Heights Science Fair Rescheduled for Mar. 24

Anyone interested in being a judge for a K-6 STEM (Science, Technology, Engineering, Math) fair now scheduled for Mar. 24 in Forest Heights, MD for a high needs school should contact Elizabeth Levin at elizabeth.levin@pgcps.org.

Short-lived Exoplanet

Physics Today, Physics Update
From Hellier et al., Nature 460, 1098, 2009
October 2009

Almost 400 extrasolar planets have been found to date but a new planet stands out. WASP-18b is 10 times the mass of Jupiter with an orbital radius of only 0.02 AU and the shortest orbital period of any hot Jupiter yet observed, 0.94 days. According to current theory, the tidal bulge that the planet raises on the star exerts a torque that will cause the planet to spiral inward. If the star's tidal dissipation rate is comparable to that which has been measured for binary stars and the gas giants in our own solar system, WASP-18b has less than a million years to live. Over the next decade, its death spiral should produce a measurable shift in the planet's observed transit time. The absence of tidal decay – a possibility, given the rarity of finding a planet so close to the end of its life – would constitute direct evidence for a different class of tidal interactions in the host star and provide new constraints on models of stellar interiors.

A violent collision near a near-by star

Physics Today, October 2009
Search/Discovery

For some time, astronomers have recognized that large bodies collided in the early solar system. The best known example is the collision of a Mars-sized body with the earth, the debris from which formed the moon. Carey Lisse used the spectroscopic techniques that had been developed for analyzing the Deep Impact collision to study the debris from such a collision around a nearby star, HD 172555, finding amorphous silica dust and silicon monoxide gas. The star is about 12 million years old, young enough to harbor a disk where planet formation is still going on. The mass of the debris is at least 10^{22} kg, implying an impact speed of at least 10 km./sec, similar to the speed of the impact that formed the Moon.

From Editors' Choice:

Highlights of the Recent Literature

November 6 2009, 326 (5954)
Based on Astrophys. J. 705, L45 (2009).

Galaxies undergoing vigorous bursts of star formation are often optically concealed by dust but appear luminous at longer wavelengths because the dust absorbs the light of the stars and re-emits it in the far infrared. If the galaxies are distant, they are detected at submillimeter wavelengths near Earth, because the far-infrared light gets stretched (or redshifted) by the cosmological expansion of the universe. In this way, hundreds of dusty, star-forming submillimeter galaxies have been detected over the past decade. Determining their precise distances from Earth, however, requires measuring a spectrum of their starlight, which is often too faint to detect.

As a proof of concept for circumventing this problem, Wei et al. used the new receiver at the IRAM 30-m radio telescope to look for CO emission lines—arising from the molecular gas that fuels star formation—from a submillimeter galaxy that was discovered in 1998, but for which it has not been possible to determine a distance. Their detection of two emission lines places the submillimeter galaxy SMM J 14009+0252 at redshift 2.93, or 11.4 billion light years away, and showcases a promising technique for determining the redshifts of submillimeter galaxies.

Star Dust Speaker Reviews

Michael Chesnes

I warmly encourage NCA members to write reviews for the talks at our meetings, so that they can be published in Star Dust. We have an excellent lineup of speakers every year, and our reviews are both a valuable historical record of our activities and a way to recognize our speakers.

Reminder

After the meeting, everyone is invited to join us at Plato's Diner in College Park. Plato's is 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.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Tuesdays Mar. 2, 9, 16, 23, 30 and Fridays, Mar. 5, 12, 19, 26, 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 gfbrandenburg@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, Mar. 13 at 5:30 pm, preceding the meeting, at the [Garden Restaurant](#) in the University of Maryland University College Inn and Conference Center.

Forest Heights Science Fair: Rescheduled for March 24, Contact: elizabeth.levin@pgcps.org

Upcoming NCA Meetings at the University of Maryland Observatory

Mar. 13, 2010
Chris Reynolds (UMD) *X-rays from the Nuclei of Galaxies*

Apr 10, 2010
David Thompson (GSFC) *Results from Fermi Gamma-ray Space Telescope*

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Paper copy of Star Dust	\$10
Sky & Telescope	\$33
Total	_____

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Paper copy of Star Dust	\$10
Sky & Telescope	\$33
Total	_____

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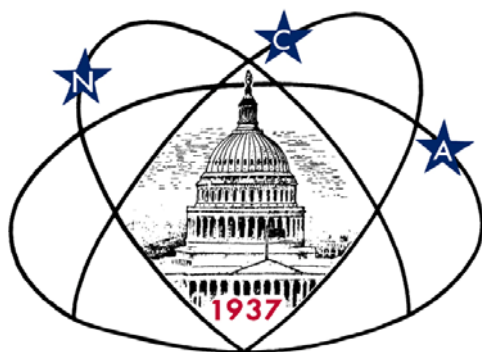
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First Class

Dated Material



Next NCA Mtg:

Mar. 13

7:30 pm

@ UM Obs

Dr. Chris Reynolds

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