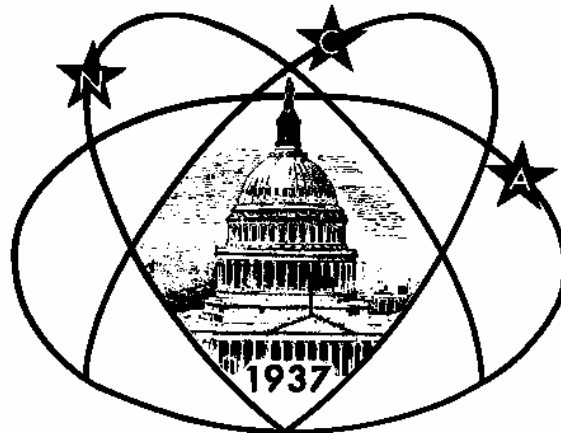


# Star



# Dust

National Capital Astronomers, Inc.

<http://capitalastronomers.org>

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## March Speaker: Dr. Michael F. A'Hearn, "Deep Impact: Excavating Comet Tempel 1" *Submitted by Dr. Walter L. Faust*

Dr. Michael F. A'Hearn will present the talk "Deep Impact: Excavating Comet Tempel 1" at the March 11 meeting of the National Capital Astronomers.

### Abstract of Talk

On 4 July 2005, Deep Impact delivered 19 Gjoules of kinetic energy to comet 9P/Tempel 1. On approach, we learned that outbursts by comets are far more common than previously realized and that they can be associated with regions on the surface. We can confidently rule out exogenic sources for these outbursts. The geology of

the surface is clearly different from that of the few other cometary nuclei visited and very puzzling. There are clearly distinct layers, which are likely not complete shells. Surface photometric properties are reasonably uniform except in a few small areas.

The impact itself was oblique. Most ejecta were cold, slow-moving, few-micron sized particles. After the first second, the ejecta include small crystals of ordinary ice, indicating excavation without heating and thus probably without chemical alteration.

The ejected gases included a large amount of CO<sub>2</sub> and a very large amount of organics in addition to water and species yet unidentified. The refractory to volatile ratio in the ejecta is greater than unity but not dramatically so.

The ejecta enable us to determine both the strength of the surface layers at scales from microscopic to a few hundred meters and the bulk density of the nucleus, which must be extremely porous.

This talk will present the current state of

*(Continued on page 2)*

## Review of talk by Dr. George Doschek: "The Solar Atmosphere" *Reviewed by Jay Miller*

Dr. George Doschek presented the talk "The Solar Atmosphere" at the September 10 meeting of the National Capital Astronomers at the University of Maryland Astronomy Observatory.

I found out that not only did Dr. Doschek graduate from my alma mater, the University of Pittsburgh, but we were there at the same time, since he received his B.S. degree three years after I did. Also, he informed us that he spoke to us once before on September 10, 1977. We will have to invite him again, sooner.

### Solar Overview

Dr. Doschek began with an overview of the Sun. He pointed out that 200 billion neutrinos course through our fingernails every second and one may actually react with us every 70 years. He next described the process of energy production in the Sun

with protons combining to form helium plus more protons to carry on the reaction. The energy from this process travels out of the Sun, first by radiation, then by convection, when the density of gas becomes too thin to support radiation (about 2/3 of the way out to the photosphere). The temperature in the Sun decreases from about 15 million Kelvin in the center to about 5500 K at the photosphere, the visible surface. Convection causes granularity at the surface and also causes it to oscillate and vibrate, producing acoustic waves. The acoustic wave and neutrino data agree very well with the standard model of the Sun. There is also a symmetry which breaks down as one moves above the surface into the corona and above. This breakdown is caused by the magnetic fields that are produced in the Sun and leave the surface at the sunspots. Above the photosphere, the

temperature begins to increase until it is several million degrees in the solar atmosphere. The high temperature strips electrons from the atoms producing ions. These ions move along the magnetic field lines and this causes an inhomogeneity. Other phenomena on the Sun are flares, prominences, active regions, and mass ejections. The mathematics to describe all of this becomes quite complex and the descriptions uncertain.

### The Solar Spectrum

With new satellites in space and instruments on the ground, we have been able to extend our observations of the Sun to the entire electromagnetic spectrum. This is important, because as the temperature increases, energy is emitted at shorter wavelengths in the ultraviolet and x-ray regions

*(Continued on page 3)*

## NCA Events This Month

The Public is Welcome!

NCA Home Page: <http://capitlastronomers.org>

**NCA Mirror- and Telescope-making Classes:** Fridays, March 3, 10, 17, 24, and 31, 6:30 to 9:30 P.M. at the Chevy Chase Community Center, at the north-east corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at [gfbrendenburg@yahoo.com](mailto:gfbrendenburg@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 9 P.M. The talks are non-technical. There is telescope viewing afterward if the sky is clear.

**Next NCA Meeting:** Saturday, March 11 at 7:30 P.M., at the University of Maryland's Observatory on Metzerott

Road: Dr. Michael F. A'Hearn will present the talk "Deep Impact: Excavating Comet Tempel 1." See map and directions on Page 6.

**Dinner with NCA members and speaker:** Saturday, March 11 at 5:30 P.M., preceding the meeting, at the Garden Restaurant in the University of Maryland University College Inn and Conference Center. See map and directions on Page 6.

### Upcoming NCA Meetings—Saturdays

April 8: Alan Bunner, NASA HQ (retired): "The Anthropic Principle"

May 13: Robert W. Farquhar, The Johns Hopkins University Applied Physics Laboratory, Space Department: "The Lagrange Points"

June 10: TBA.

## Observing with the NCA C-14

**Mike McNeal**

Schedule is open, generally, Saturdays at 7:30 P.M. Call to set up a time.

In Mike McNeal's backyard, 5410 Grove St, Chevy Chase, MD, (Friendship Heights Metro).

Please make reservations by 10 p.m. the Friday before.

Call Mike at 301-526-2648 or email him at [mcnealmi@verizon.net](mailto:mcnealmi@verizon.net).

We need a new volunteer to house NCA's C-14, make it available for weekly viewing, and transport it to other sites, e.g., Exploring the Sky and star parties.

*The deadline for the April Star Dust is March 22.*

*Please send your material to Elliott Fein by that date to ensure inclusion. Send submissions to Elliott Fein at [elliott.fein@verizon.net](mailto:elliott.fein@verizon.net).*

*Articles submitted may be edited to fit the space available.*

## "Deep Impact: Excavating Comet Tempel 1"

*(Continued from page 1)*

our rapidly evolving understanding of comet Tempel 1.

This work was supported by NASA's Discovery Program.

### Bio

Dr. Michael F. A'Hearn was born in Wilmington Delaware in November 1940, but grew up in the suburbs of Boston (all of his family roots are in the Boston area). He received a B.S. in physics, at Boston College, 1961. This was followed by earning a Ph.D. in astronomy, at the University of Wisconsin, 1966. His doctoral thesis, under advisor Art Code, was on the polari-

zation of Venus and therefore the clouds could not be water droplets (He says "this was not a real breakthrough but at least the right answer"). Dr. A'Hearn wrote his first paper on comets in his second year of graduate school under the guidance of Don Osterbrock.

Dr. A'Hearn came to Maryland as Assistant Professor in 1966 and (he says) unexpectedly just stayed, rising through the ranks and being appointed a Distinguished University Professor (of Astronomy) in 2000. Dr. A'Hearn did some work on interstellar dust in his first years at Maryland and then switched back to comets with comet Bennett in 1970. He did a little

bit of research at the Metzerott Rd. observatory, but soon switched to collaborating at Lowell Observatory and observing in better climates than Maryland's. Over his career he wrote more than 140 papers in refereed journals, mostly about comets, some about asteroids and some early ones about interstellar dust and diffuse interstellar bands. His emphasis has been on observational studies at all wavelengths, supporting them with what limited (he says) theoretical simulations are needed to understand the observations.

Dr. A'Hearn is a long time member of NCA and has been a featured speaker at our monthly meetings.

## In the News

**Reported by Dr. Nancy Grace Roman**

### Five Items from NASA

- The latest images from NASA's Chandra Observatory are showing that black holes mean mayhem for some elliptical galaxies. The data revealed a surprising amount of turmoil in the center of these galaxies, despite the appearance of tranquility given by optical light observations. At the root of this activity, it seems, are the

centrally located supermassive black holes.

- In cooperation with the Department of Energy, the NSF, and international collaborators, NASA researchers have discovered the smallest, most Earth-like extrasolar planet yet. Five times as massive as Earth, the planet orbits a nearby red dwarf star every 10 years. With a frosty surface temperature of about minus 364 degrees

Fahrenheit, the planet is unlikely to harbor any life. But the new methods used to detect the planet hold great promise for the future discovery of other small, rocky planets elsewhere in the Universe.

- At the 207th annual meeting of the American Astronomical Society in Wash-

*(Continued on page 5)*

# Dr. George Doschek “The Solar Atmosphere”

(Continued from page 1)

of the spectrum. As the remaining higher level electrons are excited and drop down to their ground state, they release photons at specific quantized energy levels which produce discrete lines that can be measured with high resolution spectrometers. From observing the lines, we can tell the gas temperature, density, and abundance of the ions.

## The spectral lines

Each line actually has a Gaussian shape because the ions in the gas are moving in different directions producing a Doppler shift. This can also serve as another measure of the temperature of the gas. If there is a flare causing mass movement of the gas, the line can be skewed to one side or the other of the central peak indicating the velocity of the movement. Dr. Doschek showed a spectrum from 800-1500 Angstroms containing several hundred lines. The heights of the lines are indicative of elemental abundance.

## Solar Satellites

Two of the solar observing satellites are SOHO<sup>1</sup> and Yohkoh<sup>2</sup> which contain cameras to observe the Sun in the visible, infrared, ultra-violet and X-ray. He showed pictures taken with these instruments, comparing their results. Also important to all of these instruments are filters, which isolate spectral bands, allowing greater precision. In the X-ray, coronal holes are visible. These are regions, mostly over the poles, where there is no outward flow of the corona. Gas over sunspots is about 2-3 times hotter than over the poles.

Images can be taken simultaneously at different wavelengths so that we can compare various features and see how they interact and what structures are causing features in the corona, for instance. This can help us answer questions such as: what heats the corona, what drives the solar explosions, and how does this affect the heliosphere and the Earth's atmosphere?

## The transition zone

The transition zone, a thin region between the photosphere and the corona, is important. In this region, the temperature rapidly increases by a factor of at least 100 and the density dramatically decreases. There is also much structure with loops and funnel-like features over the granules. Even

though the spectrometers have a resolution of one arc second or about 700 km, there are features with sizes of about 150 km and less which need to be resolved, but can't be by present instrumentation.

## The Corona

Now let's go into the corona where there are loops. The TRACE<sup>3</sup> instrument can resolve structure down to about 0.5", but again, the loops seem to consist of even finer threads which can't be resolved. These fine threads are of differing magnetic orientations. When these sub-threads reconnect they annihilate each other producing heat. There are probably other mechanisms for heating the corona, but again, better resolution instruments are needed to help correlate the various phenomena occurring in and above the photosphere. The LASCO<sup>4</sup> instrument shows images farther out in the corona which indicate CMEs (coronal mass ejections) are continually being emitted from the Sun and sending particles toward the Earth. These CMEs contain about one billion tons of material traveling at about one million miles per hour. They are stress releases of magnetic field lines. Prominences are frequently associated with them. On Earth, the effects of the CMEs can include damage to satellites or power grids. There are several theories attempting to model the CME. One problem is that we can't see the magnetic field farther out in the corona. Surprisingly, there is also material moving inward in the corona. These may be indicative of magnetic reconnection events. The Solar Dynamics Observatory, to be launched in a few years, will produce more detail.

## Solar Flares

Flares are small events, covering a small region of the Sun, unlike CMEs. They do reach 100 million degrees, much higher than CMEs, with not only H-alpha radiation, but also x-ray and gamma ray emission. This high temperature can actually produce nuclear reactions in the Sun's atmosphere. Some flares can last a day and can be associated with CMEs. It's the flares that can ionize the Earth's ionosphere, which can affect communications, and their x-rays can harm astronauts. Flares are similar to other phenomena in that they also seem to involve magnetic reconnections as an energy source. Again, we have flux tubes and threads. In the x-

ray region, the instruments can produce very detailed spectra of the ionized elements allowing temperatures to be accurately ascertained. Unfortunately, positional data can't be obtained. Interestingly, we can compare the solar data to that of flare stars such as Algol or UX Ari and there is a definite trend with the solar data at the low temperature end and the flare stars as much as twice as hot.

## Upcoming Missions

Dr. Doschek ended his talk with discussions of upcoming space missions. He began with the Solar-B spacecraft which is a follow up to the Yohkoh mission and with which he is involved. It, like Yohkoh, is a Japanese mission, but Great Britain and Norway are involved, as well as the U.S. There are six instruments attached to it to study the Sun in the extreme ultraviolet and the X-ray. It will be used to give us more data on flare loop structure.

We thank Dr. Doschek for a very interesting and informative talk.

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[Ed. Note: the endnotes that follow were obtained from the web pages of each of the listed items.]

<sup>1</sup>SOHO is the Solar and Heliospheric Observatory, a project of international cooperation between ESA (European Space Agency) and NASA.

<sup>2</sup>Yohkoh The *Yohkoh* satellite is an observatory for studying X-rays and gamma-rays from the Sun, launched from Kagoshima, Japan on August 31, 1991. *Yohkoh* is a project of the Institute for Space and Astronautical Sciences. The spacecraft was built in Japan and the observing instruments have contributions from the U.S. and from the U.K. The name *Yohkoh* is Japanese for "sunbeam"

<sup>3</sup>TRACE Transition Region and Coronal Explorer is a NASA Small Explorer (SMEX) mission to image the solar corona and transition region at high angular and temporal resolution.

<sup>4</sup>LASCO The Large Angle and Spectrometric Coronagraph instrument is one of eleven instruments included on the joint NASA/ESA/SOHO spacecraft.

# Mid-Atlantic Occultations and Expeditions

by David Dunham

## Asteroidal Occultations

Date	Day	EST	Star	Mag	Asteroid	dmag	dur.	Ap.	s in.	Location
Mar 10	Fri	19:25	TYC18290361	9.8	Phobos	5.0	1	4	N. Carolina	
Mar 26	Sun	2:10	2UC25321079	13.2	2001 FR185	10.2	4	11	TNO,N.America?	
Mar 26	Sun	20:05	SAO 119083	7.9	Susanna	6.3	3	2	s.MD, n.VA	
Mar 26	Sun	22:32	SAO 140633	9.2	Esther	5.9	5	3	Maryland; low	

## Grazing Occultations

DATE	Day	EST	Star	Mag	% alt	CA	Location
Mar 2	Thu	20:35	ZC 209	7.2	12+ 10	1S	SterlingVA;Bethsda,Woodmore,MD
Mar 4	Sat	22:28	ZC 474	9.0	31+ 15	5N	Frostburg, MD; Ladysmith, VA
Mar 6	Mon	21:40	ZC 771	6.0	52+ 47	6N	Lewisbury, PA; Stanton, DE
Mar 31	Fri	19:19	SAO 93103	9.1	8+ 34	6N	DC; Potomac & s.Bowie, MD
Mar 31	Fri	19:25	SAO 93107	8.7	8+ 23	6N	Nanjemoy, MD; s. Manassas,VA
Apr 1	Sat	19:44	Maia	3.9	16+ 32	7N	Bethesda, TakomaPark, Bowie, MD

## Total Lunar Occultations

DATE	Day	EST	Ph Star	Mag	% alt	CA	Sp.	Notes	
Mar 6	Mon	21:27	D ZC 771	6.1	52+ 50	27N	A5 mg2	9.1, ".2; grazePA	
Mar 6	Mon	21:35	D ZC 773	7.0	52+ 48	21S	F8 mg2	8.7, 14", PA 352deg	
Mar 9	Thu	1:48	D 47 Gem	5.8	73+ 21	42S	A4 ZC	1088	
Mar 10	Fri	0:04	D 4 Cancri	6.3	81+ 49	72N	A1 ZC	1211	
Mar 13	Mon	21:42	D chi Leonis	4.6	99+ 48	46S	F2 ZC	1609; term. 6.1"	
Mar 17	Fri	2:09	R 58 Vir	6.9	95- 40	75N	F0 ZC	1908; WA 306	
Mar 17	Fri	4:49	R 62 Vir	6.7	95- 24	76N	K0 ZC	1914; spec.binary	
Mar 18	Sat	3:59	R ZC 2018	6.6	90- 31	76N	A1 WA	290 deg.	
Mar 21	Tue	2:57	R ZC 2397	6.5	65- 18	58N	K1		
Mar 24	Fri	4:46	R SAO 188613	7.5	32- 12	13N	G8	Azimuth 139 deg.	
Apr 1	Sat	18:37	D Electra	3.7	16+ 44	83N	B6 ZC	537; Sun alt. -2	
Apr 1	Sat	18:57	D Celaeno	5.5	16+ 41	36N	B7 ZC	536; Sun-6; GrazeNYC; db	
Apr 1	Sat	19:05	D SAO 76158	7.9	16+ 39	71S	A0	Sun alt. -7 deg.	
Apr 1	Sat	19:20	D SAO 76167	7.6	16+ 36	79N	K2	Sun-10; mg2 12, 18", PA 8	
Apr 1	Sat	19:21	D SAO 76169	8.1	16+ 36	80N	A3	Sun-10; mg2 9, ".6, PA175	
Apr 1	Sat	19:23	D Merope	4.1	16+ 36	45S	B6 ZC	545; Sun alt. -11	
Apr 1	Sat	19:25	D SAO 76152	7.2	16+ 35	31N	B9 mg2	9.0, sep 0.2", PA359	
Apr 1	Sat	19:31	D ZC 546	7.3	16+ 34	67N	A0	Maybe close double	
Apr 1	Sat	19:44	G Maia	3.9	16+ 32	7N	B8 ZC	541; spec.bin; nDCGraze	
Apr 1	Sat	19:49	D 24 Tauri	6.3	16+ 31	75S	A0 ZC	549; close double?	
Apr 1	Sat	19:53	D Alcyone	2.9	16+ 30	71S	B7 ZC	552; close double?	
Apr 1	Sat	20:00	D ZC 553	6.8	16+ 29	68N	A0	spectroscopic binary	
Apr 1	Sat	20:04	D ZC 551	7.3	16+ 28	20S	B9	X33299 7" away, PA 265	
Apr 1	Sat	20:30	D ZC 557	7.0	17+ 23	63N	A1	maybe close double	
Apr 1	Sat	20:39	D Pleione	5.1	17+ 22	66S	B7 ZC	561; close double?	
Apr 1	Sat	20:42	D Atlas	3.6	17+ 21	46S	B8 ZC	560; spec. binary	
Apr 1	Sat	20:53	D SAO 76234	7.5	17+ 19	55N	A0	comp.ZC562; D 11s before	
Apr 1	Sat	20:53	D ZC 562	6.6	17+ 19	60N	B9	probably close double	
Apr 1	Sat	20:54	R Alcyone	2.9	17+ 19	-87S	B7 ZC	552	
Apr 1	Sat	21:00	D SAO 76249	7.5	17+ 17	73N	A0		
Apr 1	Sat	21:34	D SAO 76259	7.4	17+ 12	29N	A2 mg2	8.8 ".015, PA 114	
*** Dates and times above are EST, those below are EDT ***									
Apr 3	Mon	23:50	D ZC 885	5.6	36+ 20	21S	G7 mg2	11.6 15", PA 231	

David Dunham, e-mail [dunham@starpower.net](mailto:dunham@starpower.net), more info. <http://iota.jhuapl.edu>  
Phone home 301-474-4722; office 240-228-5609; cell 301-526-5590

# Other National Capital Area Meetings

## Northern Virginia Astronomy Club

The next NOVAC general meeting will be on March 12 at 7 P.M. The April 9 meeting will be held in the Science and Technology 1 Building.

Please note: For the April 9 meeting only, we will meet in a different room in a different building. The room is Science and Technology 1, Room 131

## Upcoming Meeting

Sunday, March 12, 7:00 p.m.

*Outreach: How-To/Survey of Open Clusters*

Everything you always wanted to know about outreach but were afraid to ask! Ed Witkowski will give members tips on how to prepare for an outreach event. Later he will discuss a wide range of open clusters viewable by amateurs. Numerous winter objects will be discussed in detail. Along with the cataloging of open clusters, viewing techniques will be discussed.

Professor Harold Geller's sky tour can be found at <http://physics.gmu.edu/~hgeller/NOVACsky>.

General membership meetings are open to the public, and are held at Enterprise Hall, Room 80, on the campus of George Mason University (directions) in Fairfax, Virginia. The meeting hall is in the basement floor of the building. It is best to park in parking lot B and walk up the hill to the rear of Enterprise Hall (see note above).

Meetings start at 7:00 P.M., on the second Sunday of every month. If you come earlier, you can do a little socializing. The first part of the meeting is club business, during which the officers make reports about their activities and areas of responsibility. The next part of the meeting usually includes:

- Show and Tell, where members share gadgets, books, techniques, etc.
- The Observing Report, describing the astronomical events for the next month.
- Q&A, where beginning astronomers are encouraged to ask questions to be answered by more experienced members.
- The Sky Tour, describing what's where in the sky for the next month.

The final part of the meeting is a program, usually by one of the members, but sometimes by "outside experts."

We've had presenters from all aspects of Astronomy.

There's a good deal of socializing before and after meetings, allowing members to put faces with the voices they've heard in the dark.

## Please Join Us For Dinner!

Since February 1995, a number of NOVAC members have been congregating on the night of our regular meetings for dinner. Hopefully this assists in getting to know one another, at a more relaxed location than at the meeting itself. It's also nice to see who it is you're talking to for a change and be able to connect faces with names - unlike the usual observing situation. All are welcome to attend, whether NOVAC members or prospective members, guests or whoever - just be prepared to discuss a little astronomy or any other topic that pops up!

If you'd like to join us, stop by the Red, Hot and Blue restaurant at 5:30 P.M. See you there!

## Montgomery College Planetarium

is located at the Takoma Park/Silver Spring Campus Maryland, United States of America, Planet Earth around star named Sol, in the Milky Way Galaxy an out lying member of the Virgo Super Cluster around 13.7 billion years after creation.

**Directions to the planetarium.** Astronomy is the oldest science and one of the few sciences that welcomes amateurs. *Everyone who looks up at the stars with wonder is an astronomer.* The planetarium is open from the last week in August until the Friday before Memorial day in May. This is an academic institution so there are a few holidays like Thanksgiving and around Christmas and New Year's Day when the entire institution is closed. All evening planetarium programs include a star party after the show, if it is clear. Star party means we look at the sky with telescopes. We have a 10-inch (2540mm) Meade LX200-GPS-SMT, a 3 1/2 inch (88.9mm) Questar, and a 4 1/8 inch (105mm) Edmund Astroscan telescopes that we bring outside the planetarium when clear. Bring your telescope to the star party, and we can have even more fun sharing, the more the merrier.

**Monday, 20 March 2006 at 7 P.M.**

*The Rites of Spring, the Vernal Equinox* the vernal equinox is at 1:26PM.

**Thursday, 6 April 2006 at 1 P.M.**

*Astrolabes in Islam* celebrating Arab-American Heritage Month.

**Tuesday, 11 April 2006 at 6:30 P.M.**

A Montgomery College Community Colloquium: **Navigating Uncertainties** not in the planetarium, but in the Health Science Building Room 122 at 7977 Georgia Avenue, Silver Spring, MD 20910

**Saturday, 15 April 2006 at 7 P.M.**

*Space-time Invariance and Quantum Gravity* discover the smallest distances and times measurable and how the universe is pixilated.

**Friday, 28 April 2006 at 11 A.M.**

*Astrolabes in Islam* celebrating Arab-American Heritage Month.

**Saturday, 20 May 2006 at 7 P.M.**

*The Search for Extraterrestrial Intelligence* discover how you can help look for ET using your computer at home and how it all is tied together.

## In the News By Nancy Grace Roman

*(Continued from page 2)*

ington, D.C., some impressive new data from NASA's Spitzer Space Telescope made its debut. Included in the new findings is a dazzling image of stars swirling around the supermassive black hole in the center of the Milky Way. See <http://www.spitzer.caltech.edu/Media/releases/ssc2006-02/release.shtml>

- Also from Spitzer, new evidence of two huge "hypergiants" stars circled by large disks of dust. The findings were both a surprise and a delight to astronomers, because such dust might be suitable for planet formation, previously thought to be unlikely near stars so big.
- Historically, astronomers have only found evidence of two kinds of black holes -- widespread stellar mass black holes a few times as massive as the Sun, and supermassive giants millions or billions of times more massive. But now there appears to be reason to believe in a middle sibling: Using NASA's Rossi X-ray Timing Explorer, scientists have found a dying star orbiting what appears to be a medium-sized black hole.

## Getting to the NCA Monthly Meeting and the Dinner Before the Meeting

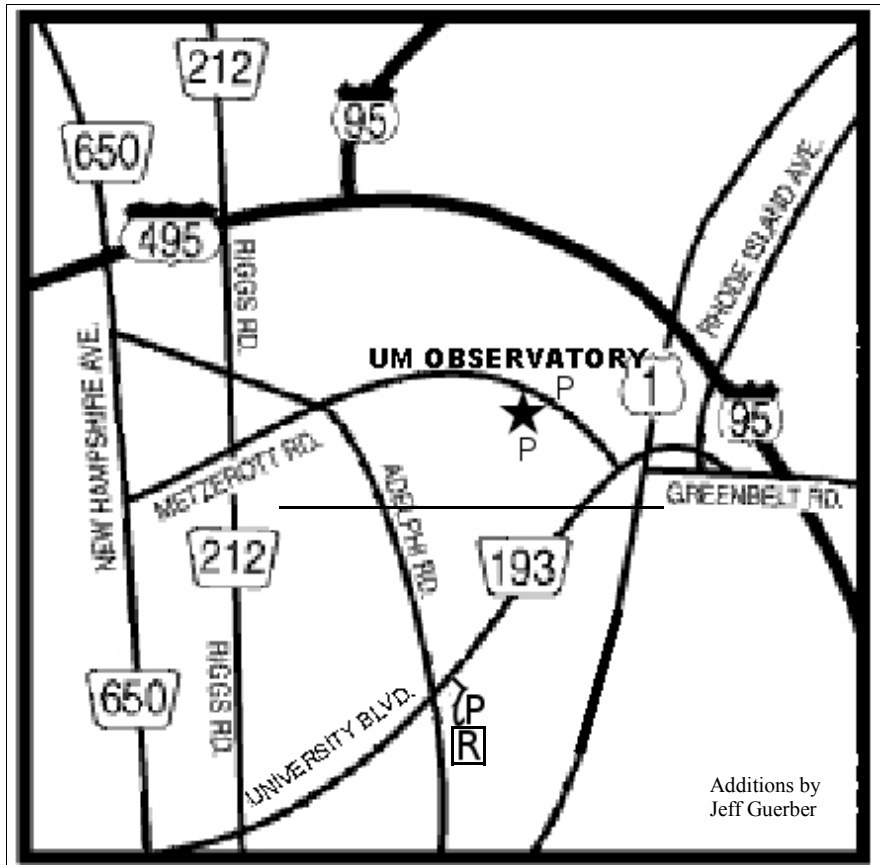
*Jeff Guerber*

NCA meetings are now held at 7:30 p.m. at the University of Maryland Observatory, in College Park on Metzertott Rd. between University Blvd. (MD-193) and Adelphi Rd. To get there from the Capital Beltway (I-495), either take US Rt. 1 south about a mile, turning right onto MD-193 West, then at the first light turn right onto Metzertott; or, take New Hampshire Ave. (MD-650) south, turn left at the second light onto Adelphi Rd., two more lights, turn left onto Metzertott, and proceed about a mile to the observatory. The observatory is on the south side of Metzertott Rd., directly opposite the UM System Administration building; you can park there if the observatory lot is full, but be careful crossing Metzertott Rd.

**At 5:30 p.m., before the meeting,** please join us for dinner at the Garden Restaurant in the UMD University College Inn and Conference Center, 3501 University Blvd. East at Adelphi Rd. From the Beltway, either take New Hampshire Ave. south, turn left onto Adelphi, and at the third light (passing Metzertott) turn left onto University then immediately right into the garage; or, take US-1 south, turn right onto University Blvd. west, and take it to the intersection with Adelphi Rd. Park either in the garage (costs), or in Lot 1 nearby (free). To get to the Observatory, exit to the right onto University Blvd. (MD-193) east, and at the second light turn left onto Metzertott Rd.

### Do You Want to Get *Star Dust* Electronically?

Any member wishing to receive *Star Dust*, the newsletter of the National Capital Astronomers, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, should contact Nancy Grace Roman, the NCA Secretary, at nancy.roman6@verizon.net or 301-656-6092 (home).



Getting to the NCA Meeting  
Star=Observatory R=Restaurant P=Parking

## Observing after the Meeting

*Elizabeth Warner*

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.

### Are You Coming to Dinner?

If you are planning to come to the dinner before the meeting, please tell Benson J. Simon, telephone: 301-776-6721, e-mail st88@ioip.com, so that we can make reservations for the right number of people.

### Do You 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 email at rigell@starpower.net.)

# Support the IDA

Join the International Dark-Sky Association  
3225 N. First Avenue Tucson, AZ  
85719-2103  
[www.darksky.org](http://www.darksky.org)

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## National Capital Astronomers, Inc.

<http://capitalastronomers.org>

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NCA Web Page: <http://capitalastronomers.org/>.

Appointed Officers and Committee Heads: Exploring the Sky - Joseph C. Morris; Meeting Facilities - Jay H. Miller;

Observing - Michael McNeal, [mcnealmi@verizon.net](mailto:mcnealmi@verizon.net); Telescope Making - Guy Brandenburg; *Star Dust* Editor - Elliott Fein

### SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a nonprofit, membership-supported, volunteer-run, public-service corporation dedicated to advancing astronomy, space technology, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. NCA is an IRS Section 501(c)(3) tax-deductible organization. All are welcome to join NCA.

#### SERVICES & ACTIVITIES:

**Monthly Meetings** feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. See monthly *Star Dust* for time and location.

**NCA Volunteers** serve in a number of capacities. Many members serve as teachers, clinicians, and science fair judges. Some members observe total or graze occultations of stars occulted by the Moon or asteroids.

**Publications** received by members include the

monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

**Consumer Clinics:** Some members serve as clinicians and provide advice for the selection, use, and care of binoculars and telescopes and their accessories. One such clinic is the semianual event held at the Smithsonian Institution National Air and Space Museum.

**Fighting Light Pollution:** NCA is concerned about light pollution and is interested in the technology for reducing or eliminating it. To that purpose, NCA is an Organization Member of the International Dark Sky Association (IDA).

**Classes:** Some NCA members are available for educational programs for schools and other organizations. The instruction settings include star parties, classroom instruction, and school-teacher training programs that provide techniques for teaching astronomy. NCA sponsors a telescope-making class, which is described in

the *Star Dust* "Calendar of Monthly Events."

**Tours:** On several occasions, NCA has sponsored tours of astronomical interest, mainly to observatories (such as the National Radio Astronomy Observatory) and to the solar eclipses of 1998 and 1999.

**Discounts** are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

**Public Sky Viewing Programs** are offered jointly with the National Park Service, and others. Contact: Joe Morris, [joemorris@erols.com](mailto:joemorris@erols.com) or (703) 620-0996.

**Members-Only Viewing Programs** periodically, at a dark-sky site.

**NCA Juniors Program** fosters children's and young adults' interest in astronomy, space technology, and related sciences through discounted memberships, mentoring from dedicated members, and NCA's annual Science Fair Awards.

**Fine Quality Telescope**, 14-inch aperture, see "Calendar of Monthly Events."

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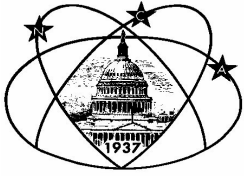
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