Star Dust

National Capital Astronomers, Inc.

November 2012 *Vol. 71, Issue 3*

http://capitalastronomers.org

Celebrating 75 years 1937-2012

Next Meeting

When: Sat. Nov. 10, 2012

Time: 7:30 pm

Where: UMD Observatory

Speaker: Michael Loewenstein (UMD)

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Directions to Dinner/Meeting

Our ***new location*** for dinner with the speaker before each meeting is at Mulligan's Grill and Pub on the UMD Golf Course. Mulligan's is one intersection closer to the observatory on Route 193 than UMUC. One turns on to "Golf Course Road" and drives a few hundred feet to the golf course building, where "Mulligan's Grill and Pub" is located. More detailed directions are on page 7.

The dinner menu can be downloaded from mulligans.umd.edu/

The meeting is held at the UMD Astronomy Observatory on Metzerott 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.

November 2012: Michael Loewenstein
University of Maryland

What X-rays Tell Us About Dark Matter and Clusters of Galaxies

Abstract: Astronomers have known for many decades that an invisible form of matter pervades the Universe on large scales.

One infers the presence of this "dark matter" through the gravitational influence that it exerts on visible matter and radiation. Through its large-scale gravitational effects, we now know that 83% of the matter in the Universe exists in this, as yet unidentified, form. At the same time, indirect arguments imply that dark matter is overwhelmingly composed of some new kind of elementary particle. Since identification of this particle is a crucial missing ingredient in efforts to progress toward a Theory of Everything that unifies all of physics, intensive searches are underway.

I will briefly summarize the evidence for dark matter and current thinking on various candidates and prospects for their discovery. I will focus in particular on the role that astronomical observations at X-ray wavelengths have played, and continue to play, in measuring the amount and distribution of dark matter, and in searching for clues as to its nature and composition. The targets of these X-ray studies range from the smallest galaxies to the hot gas that pervades clusters of thousands of galaxies, and I will offer a digression into the puzzling demographics (including dark matter) of individual clusters of galaxies, based on X-ray investigation of the thermal and chemical properties of this hot intracluster medium.

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.

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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

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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.

Biography: Mike Loewenstein was Principal Investigator of the first dedicated X-ray dark matter search, and is currently an Associate Research Scientist at the University of Maryland in the College Park Department of Astronomy. He has conducted research in X-ray astronomy at NASA/GSFC since 1990 in the areas of dark matter and astroparticle physics; the formation, evolution, and structure of galaxies and clusters of galaxies; extragalactic X-ray stellar populations; and supermassive black holes. After receiving an A.B. in Astronomy from UCLA and a Ph.D. in Astronomy and Astrophysics from UC-Santa Cruz, he held postdoctoral positions at the University of Cambridge Institute of Astronomy and at the University of Colorado at Boulder. He is currently working with the Astro-H mission -- a joint U.S./Japan X-ray Observatory to be launched in 2014.

Russian Space Activity

Nancy Grace Roman

From an article by Zhou Qi in an advertizing supplement to *Science* by the Chinese Academy of Sciences with comments on the Chinese program by Peter Mertz in *Space Times*, no. 5, vol. 51

Last month I wrote about Chinese developments in ground based astronomy. This month I am supplementing it with news of astronomy and related activities in space.

The Strategic Priority Research Program on Space Science was initiated in January 2011 focusing on the properties of black holes, physical laws in extreme conditions, the nature of dark matter, the kinetic theory of matter*, and fundamental laws governing life in space. There are seven projects in this program for the period 2011-2015. These are:

Hard X-Ray Modulation Telescope (HXMT). This, the first Chinese space telescope, helps researchers understand the origin of the cosmic X ray background, the statistical properties of supermassive black holes and the behavior of physical laws in extreme conditions.

Quantum Experiments at Space Scale (QUESS). These experiments test an experimental quantum key distribution for future secure communications.

Dark Matter Particle Explorer (DAMPE) The explorer will investigate dark matter particles from deep space by high-resolution observations of gamma rays as well as electron spectra and their distribution in space. It will also help scientists study the motion and acceleration of cosmic rays in the galaxy by measuring the energy spectra of heavy ions.

ShiJian-10 (SJ-10) Using recoverable satellite technology, SJ-10 focuses on the behavior of matter and life activities in space.

KUAFU Mission (KUAFU) Named after the legendary Chinese figure who chases the Sun, the project will help scientists study solar influences on earth and space weather. It consists of three satellites, one located at L-1, and two in polar orbits. It is a cooperative mission with international collaborators. China will launch the satellite to L-1.

Intensive Study of Future Space Science Missions. This study is in preparation for new missions in the period 2016-2020.

Advanced Resarch of Space Science Missions and Payloads. This research is intended to advance key technologies for future space science satellites by supporting a related group of research subjects.
China is also starting an extensive program to obtain information on climate change and its alleviation.

China had more space launches in the first half of 2012 than any other country, (China: 10; Russia: 9; and U.S.: 8. One of these launches included a manned docking in space. Although there is interest among both scientists and the aerospace industry in the Chinese activity, Congress has forbidden any NASA cooperation with China.

2012-2013 Officers

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

Vice-President:
John Hornstein
jshgwave@yahoo.com
301-593-1095 (h)

Secretary:
Manjunath Rao
kurchi@hotmail.com
571-272-0939

Treasurer:
Henry Bofinger
hbofinger@earthlink.net
202-675-1075

Asst. Secretary-Treasurer:
Jeffrey B. Norman
jeffreynorman@comcast.net

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Appointed Officers and Committee Heads:

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

Telescope Making
Guy Brandenburg
gfbrandenburg@yahoo.com
202-635-1860

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

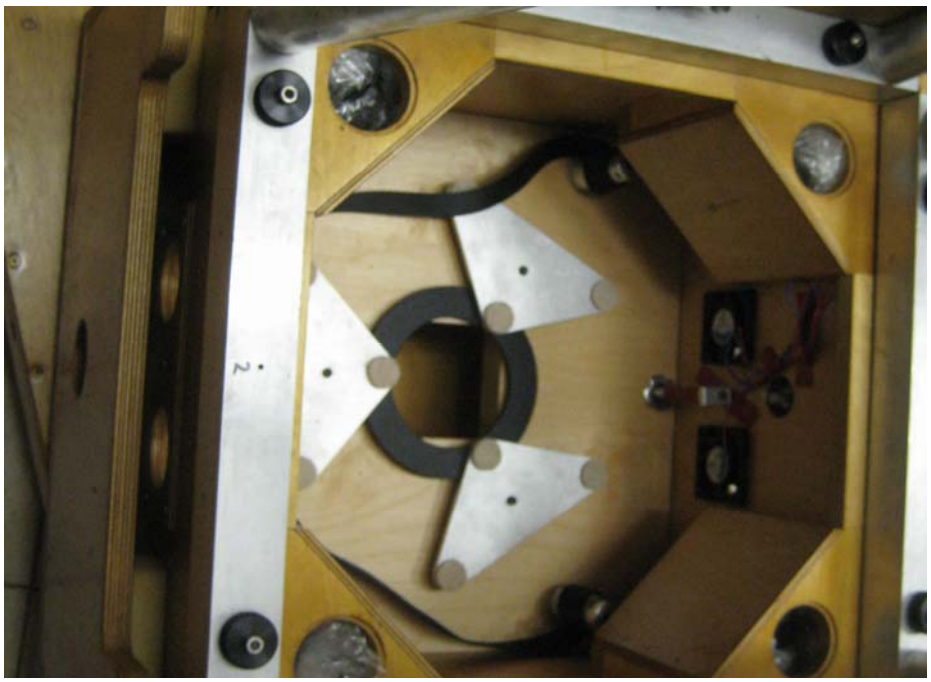
Meeting Facilities
Jay H. Miller
rigel1@starpower.net
240-401-8693

Star Dust Editor
Michael Chesnes
m.chesnes@verizon.net
301-313-0588

Hopewell Observatory Acquires 14 Inch Bromboscope

On Tuesday, October 16, NCA members Guy Brandenburg, Michael Brabanski, and Alan Bromborsky transported a 14 inch Dobsonian telescope which Alan built to Hopewell Observatory, where Guy is a member.

The telescope is a rugged truss-tube design, with adjustable feet on the legs extending from its rocker box. The legs give the telescope additional stability, and the adjustable feet help keep it level on uneven ground. A small round bubble level permanently mounted on the base is helpful for setting up the telescope evenly. In the photo below, the primary mirror's cell and cooling fans are visible at the bottom of the telescope's rocker box.

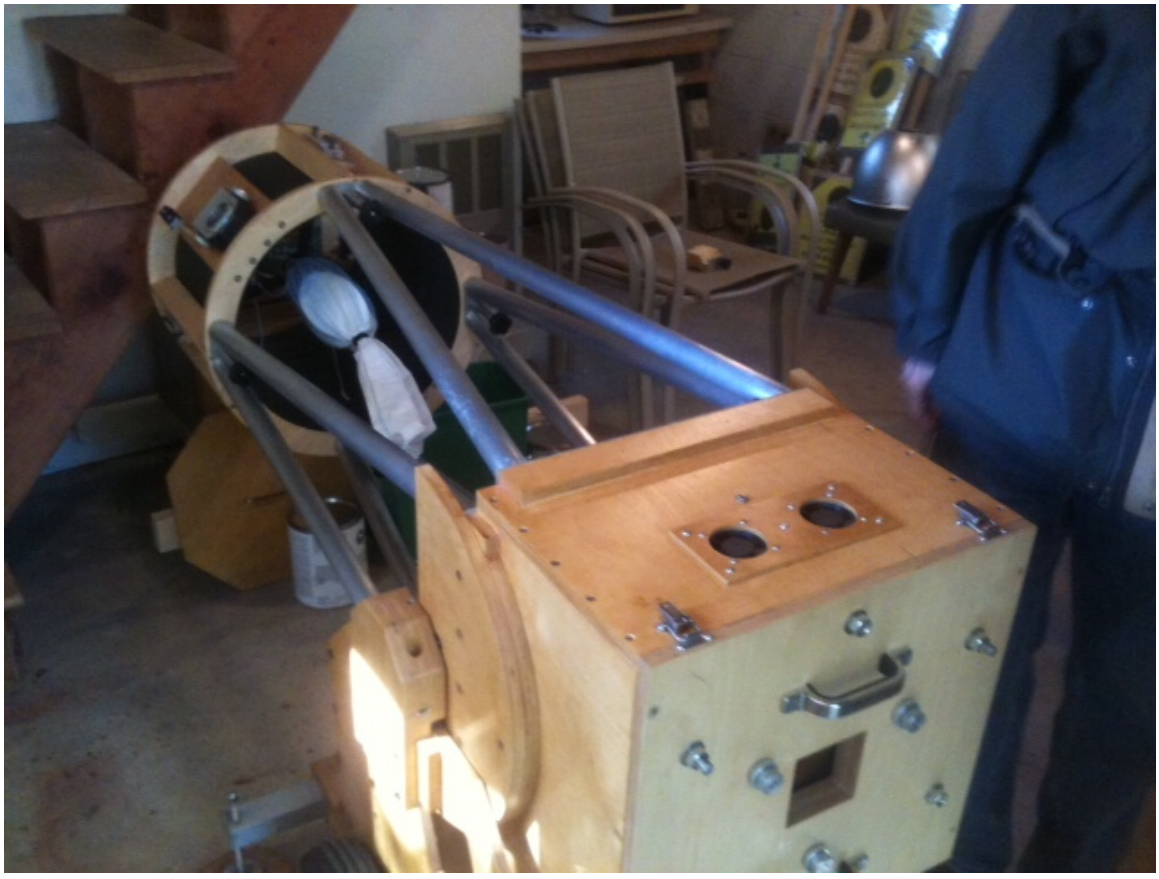


Left: Alan supervises the unloading of the telescope's rocker box.

Below: The fully assembled telescope, with a plastic bag protecting its secondary mirror.

The "Bromboscope", as Hopewell's members refer to it, has already seen use at Hopewell's Open House last month.

It promises to be a useful addition to the observatory's existing telescopes, especially for Messier marathons and public outreach.



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 and Planetary Occultations

Date	Day	EST	Star	Mag.	Asteroid	dmag	dur. s	Ap. "	Location
Nov 10	Sat	21:06	TYC12091621	11.0	Pierretta	2.5	4	7	sNJ,DE,MD,VA;DC?
Nov 11	Sun	22:06	2UC45122176	11.9	Interamnia	0.1	30	7	NE, Mid-Atlantic
Nov 24	Sat	20:29	SAO 164184	9.3	Sibylla	4.7	6	4	central Florida
Nov 29	Thu	20:48	2UC36061094	10.9	Gunhild	3.0	4	6	seNC,nwSC,nAL
Dec 7	Fri	19:30	TYC18811547	9.6	McDonalda	6.5	2	4	UK,seVA,eNC,SC

Lunar Grazing Occultations (*, Dunham plans no expedition)

Date	Day	EST	Star	Mag.	%	alt	CA	Location
Nov 9	Fri	5:18	ZC 1605	6.0	25-	39	9S	*nRoanok&Skiprs,VA;OR-Inl,NC
Nov 17	Sat	17:56	SAO 162699	7.3	22+	27	10S	*ChplHl,NC;Jarrat&Wilmsbg,VA
Nov 20	Tue	17:25	ZC 3259	7.4	53+	41	10S	*Bedford, PA & Queensbury,NY
Nov 24	Sat	20:15	ZC 211	8.3	89+	60	9S	*Frdrksbrg,VA;LaPlata,MD;sNJ
Dec 6	Thu	3:46	SAO 118450	8.2	52-	44	7S	HopewelObs,Woodb,VA;Husvil,MD
Dec 9	Sun	5:22	ZC 1919	6.9	21-	22	7S	Corning,NY; wCaldwell,NJ; NYC

Interactive detailed maps at http://www.timerson.net/IOTA/

Total Lunar Occultations

DATE	Day	EST	Ph	Star	Mag.	%	alt	CA	Sp.	Notes
Nov 9	Fri	5:37	R	62 Leonis	6.0	25-	40	41S	K3	ZC 1605
Nov 9	Fri	5:57	R	SAO 118640	7.8	25-	43	50S	F8	Sun alt. -9 deg.
Nov 10	Sat	6:12	R	ZC 1726	6.7	16-	34	67N	F5	Sun alt. -7 deg.
Nov 11	Sun	4:32	R	SAO 138978	7.6	9-	6	40N	K2	Azimuth 107 deg.
Nov 15	Thu	17:18	D	ZC 2509	5.8	6+	13	47N	K0	Sun -5, Az. 229
Nov 15	Thu	17:34	D	SAO 185389	8.4	6+	10	85S	G3	Sun -8, Az. 231
Nov 15	Thu	18:06	D	SAO 185402	7.2	6+	6	70N	K4	Azimuth 237 deg.
Nov 16	Fri	18:10	D	ZC 2684	8.0	13+	15	57N	K0	Azimuth 228 deg.
Nov 17	Sat	17:11	D	SAO 162685	7.7	22+	30	70S	F*	Sun alt. -4 deg.
Nov 17	Sat	17:42	D	SAO 162699	7.3	22+	27	32S	K1	Sun alt. -10 deg.
Nov 18	Sun	21:31	D	ZC 3002	6.1	33+	6	21N	G0	Azimuth 247 deg.
Nov 19	Mon	18:06	D	SAO 164354	8.4	43+	40	64S	F8	
Nov 20	Tue	18:38	D	SAO 145957	7.9	54+	45	45N	F5	
Nov 20	Tue	18:38	D	SAO 145965	7.8	54+	45	89N	G0	
Nov 20	Tue	19:26	D	SAO 145973	7.8	54+	43	41N	G5	mg2 10,sep. 0.7",PA 280
Nov 20	Tue	20:37	D	44 Aquarii	5.8	54+	36	59N	G6	ZC 3272
Nov 21	Wed	22:27	D	SAO 146526	7.4	65+	30	75N	F5	
Nov 22	Thu	21:14	D	ZC 3518	7.3	74+	50	81S	K0	
Nov 23	Fri	0:30	D	SAO 128509	7.9	75+	19	89S	K5	
Nov 24	Sat	17:33	D	ZC 203	6.8	89+	34	22N	K0	Sun alt. -9 deg.
Nov 25	Sun	1:59	D	100 Psc	7.3	90+	24	48N	A3	ZC 230,mg2 8, 16",PA 77
Nov 26	Mon	22:19	D	UW Arietis	6.1	98+	68	83N	B1	ZC 455, close double?
Nov 29	Thu	19:51	R	ZC 837	6.2	98-	22	69N	B6	Axis Angle 303
Dec 1	Sat	2:19	R	22 Gem	7.1	94-	70	68N	A0	AA 300,ZC1006,spec.bin.
Dec 2	Sun	0:55	R	ZC 1116	7.2	88-	58	76S	B9	
Dec 2	Sun	23:42	R	ZC 1234	6.2	82-	35	45S	A1	maybe close double??
Dec 3	Mon	21:46	R	60 Cancri	5.4	74-	3	90N	K5	Az. 77, ZC1332, double?
Dec 4	Tue	3:08	R	SAO 98338	7.6	72-	58	69S	K2	
Dec 4	Tue	5:24	R	kappa Cnc	5.2	72-	58	66N	B8	ZC 1359, close triple?
Dec 7	Fri	4:27	R	SAO 138280	7.8	42-	39	19N	K0	
Dec 8	Sat	3:07	R	ZC 1778	7.0	31-	15	59S	K0	Azimuth 113 deg.
Dec 9	Sun	3:42	R	ZC 1913	7.3	21-	9	13N	A2	Az113,mg2 11 3.5",PA274
Dec 9	Sun	3:52	R	SAO 157848	7.6	21-	11	62S	A0	Azimuth 115 deg.

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

National Capital Area Skeptics

www.ncas.org/

Life Beyond Earth: The Search is on, and the Results are Tantalizing

Saturday, Nov. 10, 2012, 1:30pm

National Science Foundation, Room 110
4201 Wilson Boulevard
Arlington, VA

Since the earliest days, humans have looked up to the skies and thought they saw life. It may have been in the form of gods and angels, djinns and flying saucers, but virtually all societies have projected life onto the heavens.
Marc Kaufman, a science writer for The Washington Post, will explore the many ways that researchers are trying to understand what life beyond Earth might be like, where it might be found, how it might be found, and whether intelligent life is even possible (likely?).

FREE admission –
Everyone welcome, members and non-members. Refreshments and socializing after the talk.

Smithsonian's Stars Lecture Series

airandspace.si.edu/events/lectures/stars/

The Dynamic Sun
Mark Weber, Astrophysicist,
Smithsonian Astrophysical Observatory

Saturday, November 17, 5:15-6:45 pm

Albert Einstein Planetarium
National Air & Space Museum
Washington, DC
Admission: Free, Tickets Required

As children, we learn to think of the Sun as a yellow ball. As students, we're taught that the face of the Sun is occasionally blemished by sunspots. As adults, we hear about solar storms that can affect us here on Earth. But the Sun is even more dynamic, mysterious, and beautiful than you probably imagine. Explore this incredible star with observations from some of the most advanced telescopes. Learn what scientists have discovered and what they are only beginning to understand.

APS Mid-Atlantic Senior Physicists Group

www.aps.org/units/maspg/

November 2012 Event

Date: **Wednesday, November 14, 2012**

Speaker: Michael E. Fisher, Institute for Physical Science and Technology, University of Maryland

Topic: Pictures, Models, Approximations, and Reality:
Phase transitions and our understanding of the physical world

Time and Location: 1:00 PM, with Q&A to follow; in a 1st floor conference room at the American Center for Physics (www.acp.org), 1 Physics Ellipse, College Park, MD -- off River Rd., between Kenilworth Ave. and Paint Branch Parkway.

Abstract: Ways in which theoretical physicists look at the real world and try to understand it will be explored. Through the medium of a domino game on a large checkerboard, the rapier-like specific heat of superfluid helium, and the visual effects seen when a liquid and its vapor merge to form a supercritical fluid, the talk will address the question: “What is the role of the theorist in modern science?” The power of analogy based on physical pictures and simple models will be illustrated in the context of ideas concerning phase transitions and critical phenomena in fluids and magnets, in alloys and plasmas. The significance of the concepts of shape and singularity in the search for universality will be explained; the role of symmetry and dimensionality in our insights will be touched upon.

Biography: Since 1987, Distinguished University Professor and Regent's Professor of the University of Maryland System. Previously: Cornell University: Professor of Chemistry and Mathematics, 1966-1973; Horace White Professor of Chemistry, Physics, and Mathematics, 1973-1989; Chairman, Department of Chemistry 1975-1978.

Prof. Fisher has won an exceptional number of prizes and other distinctions; we list just a few:

The Irving Langmuir Prize in Chemical Physics, 1970; The New York Academy of Sciences Award in Physical and Mathematical Sciences, 1978; The Guthrie Medal and Prize of the Institute of Physics (U.K.), 1980; The Wolf Prize in Physics, 1980; The Boltzmann Medal, of the IUPAP Commission on thermodynamics and Statistical Mechanics, 1983; The Hildebrand Award of the American Chemical Society, 1995; The Hirschfelder Prize in Theoretical Chemistry, from the University of Wisconsin, 1995; The Royal Medal of the Royal Society of London, 2005; The 2009 BBVA Foundation Frontiers of Knowledge Award in Basic Sciences, 2010. He was appointed Life Member of the Board of Trustees of the Weizmann Institute of Science, in 2010.

Prof. Fisher has given many special lectures at distinguished venues all over the world. Beyond the US, these include Japan, Canada, Israel, England; Ireland, Norway, The Netherlands, and India.

As recent news, Prof. Fisher was awarded the Honorary Doctoral Degree by the École Normale Supérieure de Lyon on October 11, 2012.

Directions to Mulligan's Grill and Pub

- mulligans.umd.edu/directions
- Take I-66 East -or- I-270 South to the Washington, D.C. Beltway (I-495).
- Proceed East on I-495 toward Baltimore / Silver Spring.
- Take Exit #25 (US 1) South toward College Park.
- Proceed approximately 2 miles on US 1.
- Exit right onto route 193 West (University Blvd).
- Second stop light (Golf Course Road); turn right.
- Proceed into the Golf Course parking lot.
- If using a GPS unit you can input: the intersection of 193 and Stadium Dr or 38.990987, -76.954399.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Tuesdays Nov. 6, 13, 20, 27 and Fridays, Nov. 2, 9, 16, 23, 30, 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.). Details: www.astro.umd.edu/openhouse

Dinner: Saturday, Nov. 10 at 5:30 pm, preceding the meeting, at *Mulligan's Grill and Pub* at the University of Maryland Golf Course.

Montgomery College Planetarium:
7621 Fenton Street, Takoma Park, MD (240) 567-1463. Saturday, 17 Nov. 2012 at 7:00 pm. "Black Bubbles (Holes), Gravity to the Max" in the Planetarium.
http://www.montgomerycollege.edu/Departments/planet/planet/BlackH.htm

Owens Science Center Planetarium: "Journey to the Stars: Return to Tiwanaku" Fri. Nov. 16 at 7:30 pm. http://www1.pgcps.org/howardbowens

Upcoming NCA Meetings at the University of Maryland Observatory

Nov. 10 2012	**Michael Lowenstein** (UMD / GSFC) – What X-Rays Tell Us about Dark Matter and Clusters of Galaxies
Dec. 8, 2012	**Dennis Bodewitz** (UMD) – Ultra-Violet Observations of Asteroids
Jan 12, 2012	**Abderahmen Zoghbi** (UMD), X-ray Echoes Map the Environment of a Black Hole

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ____-____-_____ **E-mail:** _____ **Print / E-mail Star Dust (circle one)**

Membership (circle one): Student….. $ 5 Individual / Family…..$10 Optional Contribution…..$__

Please indicate which activities interest you:

Attending monthly scientific lectures on some aspect of astronomy ____
Making scientific astronomical observations ____
Observing astronomical objects for personal pleasure at relatively dark sites ____
Attending large regional star parties ____
Doing outreach events to educate the public, such as Exploring the Sky ____
Building or modifying telescopes ____
Participating in travel/expeditions to view eclipses or occultations ____
Combating light pollution ____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

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

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

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First Class
Dated Material

Next NCA Mtg:

Nov. 10

7:30 pm

@ UMD Obs

Michael Loewenstein (UMD)

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