



STAR FIELDS

Newsletter of the
Amateur Telescope Makers of Boston
Including the Bond Astronomical Club
Established in 1934
In the Interest of Telescope Making & Using

Vol. 25, No. 5 May 2013

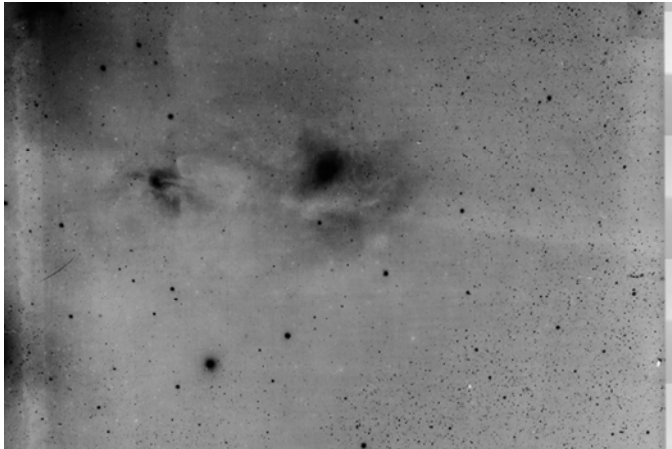
This Month's Meeting...

Thursday, May 9th, 2013 at 8:00 PM

Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at the CfA is allowed for the duration of the meeting



Rho Ophiucus Complex, Plate a03690, DASCH, Harvard University

DASCH: Back to the Future with the Harvard Plates

This month's speaker will be Professor Jonathan E. Grindlay from Harvard University, who will be speaking to us about DASCH: Digital Access to a Sky Century @ Harvard. This project was started over ten years ago when Dr. Grindlay encouraged Alison Doane, the new Curator of the Harvard Astronomical Plate Collection, to look into the feasibility of digitizing the collection. In May 2003, Alison and Dr. Martha Hazen, former Curator, gave a talk to our club about the project, which resulted in several ATMoB members volunteering to help. Bob Simcoe has been responsible for the development of the hardware, a very sophisticated high speed digitizing machine. Ed Los has been volunteering much of his time and expertise to help develop the software. This talk will be an update on the status of the project and the results that are already being derived.

Please join us for a pre-meeting dinner discussion at [Changsho, 1712 Mass Ave, Cambridge, MA](#) at 6:00pm before the meeting.

President's Message...

Public outreach has many flavors. We all participate in it in some form or another I'm sure; some of us more so than others or should I say more deliberately. If you've ever pointed your telescope skyward and shown a friend or family member a quick view - well you've done public outreach! If you've been to a star party or organized one on your own you've definitely done public outreach. There are other avenues of course. Some of you give talks to various interested groups about the night sky, the latest hot astronomy news, or maybe even the topic of light pollution. Some of you write articles for magazines or newspapers. Some of you teach others how to use their new telescopes and some of you help others build their own new telescopes. I myself fall into that category.

Just recently I have been helping a couple of high school kids make telescopes, which has been fun and rewarding. Younger telescope making enthusiasts do need a good deal of help and guidance. They don't have the experience with tools and techniques, nor do they have the basic background of what is required for a usable telescope. What they do have is a burning desire to make something with their own hands, to make a telescope if someone would just show them how. That is where we come in. One must be careful however not to overwhelm them. I've found the best tactic is to make sure they build something relatively simple for their first project, just to get their feet wet. In fact more recently I've come to the conclusion that if I can provide an old beat up telescope that needs a serious amount of refurbishment this turns out to be a great telescope making project to start out with and has a shorter time scale more suited to first timers.

Our biggest public outreach activity by far, however, is the star party and there are so many members of our club that are very dedicated to these events both in terms of organizing them, and in terms of attending one or more (or all) of them. We do a fair number of star parties every year, some one-off events, some more on a recurring annual basis. One of the annual events that attracts a very big crowd and one that our club has collaborated with for many years now is the Astronomy Day event held at the Clay Center Observatory at the Dexter school in Brookline, MA. Astronomy Day as a national event was started in 1973 by a man named Doug Berger of the Astronomical Association of Northern California and takes place on the Saturday in April nearest the first quarter Moon. In 2007 a matching fall date was added. This year's spring Astronomy Day was on April 20th and the fall event will be on October 12th. The Dexter School/ATMoB Astronomy Day event will be on May 18th this year. Why was it not in April you ask? It's done that way to avoid conflicting with NEAF, another public outreach event albeit a more commercial leaning one which is an event that a lot of amateur astronomers want to go to. Our local Astronomy Day celebration is therefore planned around that to avoid a conflict. Please consider coming to the Clay Center on Saturday the 18th. Bring a telescope or just bring your knowledge to share with others. It's a great chance to do

some public outreach and there is guaranteed to be a lot of people wanting to see the sky or hear about telescopes, astronomy and of course telescope and mirror making.

~ Mike Hill – President ~

April Meeting Minutes . . .



Dr. Leon Golub. Image by Al Takeda

Minutes of ATMOB meeting held April, 11, 2013.

Meeting held in Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics.

- Mike Hill, President: called the meeting to order at 8:00 PM.
- The Secretary's Report of the March 14, 2013 meeting was given by Sidney Johnston.
- President Mike Hill gave the treasurer's report which was prepared by Nanette Benoit.
- Glenn Chaple gave the Observing Committee Report:
- Old Business: None
- New Business: An election to appoint a nominating Committee to nominate candidates for club offices for the next year was held. The following were elected to the nominating committee: Bernie Kosicki; Bruce Berger; Steve Clougherty.

President Mike Hill introduced Dr. Leon Golub as the invited speaker. Dr. Leon Golub is a Senior Astrophysicist at the Harvard-Smithsonian Center for Astrophysics (CFA). Dr. Golub is a principal investigator in the Solar & Stellar X-Ray Group in the High Energy Astrophysics Division of the CFA.

The talk described telescopes for observing the Sun in wavelength ranges of 100 – 300 angstroms (Å). The telescopes provide resolution of solar processes, including plasma interactions with magnetic fields of the Sun, with much greater resolution than possible with visible light.

Observations of the Sun made by the NASA High Resolution Coronal Imager (Hi-C) were discussed. The mirrors of the Hi-C were made to reflect extreme-ultraviolet light (EUV), also known as Soft X-Ray light (SXR). As described by Dr. Golub, the

mirrors were made by a technology pioneered by the semiconductor industry to use the EUV/SXR wavelengths in semiconductor lithography manufacturing.

Very accurate glass surfaces were coated by multiple layers of reflecting material of thickness of around 10-100 angstroms. The number of layers is between 20 –500 layers. Constructive interference between reflections from different layers provides a total reflection coefficient sufficient to form images with a CCD semiconductor detector. The range of wavelengths which have constructive interference determines the passband of a particular mirror.

A typical Hi-C High Resolution EUV/SXR Solar Coronal Imaging telescope has the following Telescope characteristics: Telescope Type: Cassegrain; Focal Length: 23.9 meters; Field of View: 7 x 7 arc-minutes; Plate scale: 116 μm/arc-second; Camera: 4096 x 4096 CCD camera with 12μ square pixels; Camera pixel resolution: 0.1 arc-seconds; Operating wavelength, 193 Å; Clear aperture diameter: 220 mm; Image resolution: 0.1 arc-second (FWHM); Filters: Thin-film multi-layer front aperture and focal plane filters; Guide camera: Co-aligned H-α imager with full sun field of view; Flight: Black Brant IX sounding rocket.

The Extreme Ultraviolet Normal Incidence Spectrograph (EUNIS) sounding rocket program is a sequence of rocket launches by NASA from White Sands, New Mexico. The rockets carry an Imaging Spectrometer having multilayer mirror instruments. In a spectrometer, the primary mirror places an image on a slit, and two concave gratings having different radii of curvature and fixed to an adjustable backing, receive photons from the slit. The adjustable backing provides focusing. Photons diffracted by the two gratings are focused onto two separate CCD detectors to provide two channels of spectroscopy in the Extreme Ultraviolet or Soft X-Ray wavelength region. One of the CCD detectors in a recent flight operated in the 250-290 Angstrom wavelength range and the other operated in the 170–210 angstrom wavelength range.

The rocket trajectory gives about five (5) minutes of observing time. Dr. Golub pointed out that five (5) minutes is infinitely better than zero (0) minutes. There are plans to place the multilayer telescopes in an orbiting observatory.

Dr. Golub showed the first published image taken at a wavelength of 44-angstroms of a solar active region with a 4-centimeter diameter multilayer telescope, which image was published in 1987. A further full image was shown of the Sun taken with Fe emissions in the wavelength range of 171-175 angstroms, which was published in 1988. An image taken at the eclipse of 11 July 1991 showed the Sun with the Moon approaching the Sun, and revealed that scatter in the multilayer mirror structure was reasonable, as predicted.

The Imaging Spectrometer provides images of the Sun at many different wavelength bands. Each wavelength band gives an image of the corona at a different temperature. These images permit a detailed analysis of the corona.

Also, Doppler shifts of known photons emitted by elements such as Fe permit calculation of velocities of the particles making up the corona. The velocities and images provide direct observations of Coronal Dynamics best seen in the Extreme Ultraviolet (EUV) and in the Soft X-ray (SXR) wavelength regions. Structure smeared out in longer wavelength images is clearly visible in these shorter wavelength bands.

In a recent flight in 2012 the Hi-C resolved a braided loop in complex plasma flow within magnetic fields of the Sun, with multiple wrappings. The structure changed during imaging. The structure simplified during the observational time of the flight, with consequent energy release. That is, detailed changes in the interaction of solar plasma and magnetic fields were imaged. Bi-directional mass flows along the strands, at the local sound speed, were observed coming from apparent “knots” in the braided loop. A long time series indicated ongoing energy release events in the observed structure.

Results of the observations with the multilayer mirrors are giving new insight into plasma and magnetic field events within the corona.

The NASA missions are further described at the link:
<http://www.cfa.harvard.edu/news/2012/pr201221.html>

The meeting was adjourned by President Mike Hill at 9:30 PM.

~ *Sidney Johnston, Secretary* ~

Clubhouse Report . . .

APRIL 2013



Bill Toomey adding gravel to the observatory entrance. Image by Al T.

Our monthly work party was held on Saturday, April 27 and a total of 20 members and friends volunteered for a host of projects. The weather was perfect. One group of volunteers spread gravel in front of the new observatory while Bruce Berger tackled the dome rotation problem. The C14 scope and the automated Paramount German equatorial mount are an impressive sight, and club members who have not yet seen this equipment will be very pleased when they make the trip to the

clubhouse, hopefully this season. Thanks again to John Blomquist who hauled his tractor-mower to the clubhouse and spent the morning mowing the entire grounds. Earlier, a crew removed the snow fence. Dave Prowten fabricated a shelf which is now attached to the refurbished 17" Dob. We are now able to carry a large 18-amp-hour battery on the Dob mount, which now supplies “juice” to 4 heating elements. Dave spent the remainder of the afternoon and evening repairing a 4-foot section of the barn sill that had decayed over time.

Al Takeda continued working in the electronics room. The electronic components and hardware are being organized and sorted to Al's very high standards! Thanks to Al for handling this labor intensive project. Paul Cicchetti and John Reed pulled storm windows from our storage area above the barn. Some windows will eventually be installed on the second floor of the clubhouse, and the remainder will be given away. This project is a first step in line with President Mike Hill's clubhouse cleaning and organizing initiative. Other such projects will be started at the next work party. Thanks to Eileen Myers for sorting and storing cans of paint and brushes in the clubhouse.

We now have two pairs of binoculars (15X70 and 20X80) and a wide field eyepiece which we purchased at NEAF with money from our coffee and soda fund. We also received a very generous donation in the form of a pristine 8" Orion IntelliScope Dobsonian Telescope from Richard Guild. This new equipment is stored in the newly refurbished telescope room on the first floor of the clubhouse for all members to enjoy.

The Clubhouse Committee met during the afternoon to outline a budget for the upcoming year. The large observatory projects are mostly completed and funds will be requested for various Clubhouse needs this coming year. Thanks to those members who gave input for the budget priorities. And finally, a very big thank you to the cooking and clean-up crew of Art Swedlow, Sai Vallabha, Cheryl Rayner, Nina Craven and Eileen Myers. Once again, a job well done!

In addition to the aforementioned members, we would also like to extend our thanks to the following members and friends for helping us during the month of April: Joshua Ashenberg, Bill Toomey, Sam Anuta and Mike Anuta, John Maher, Tom Wolf, Phil Levine, Bernie Kosicki and Steve Clougherty.

Join us for our next work party on Saturday, May 25.

~ *Clubhouse Committee Directors* ~
~ *John Reed, Steve Clougherty and Dave Prowten* ~

Clubhouse Saturday Schedule

May 4	Steve Clougherty	Neil Fleming
May 11	Nina Craven	Eric Johansson
May 18	CLOSED – ASTRONOMY DAY	
May 25	Cicchetti+ Reed WORKPARTY #5	
June 1	Tom McDonagh	Tom Wolf
June 8	Chuck Evans	Tom Lumenello
June 15	Dave Prowten	Brian Leacu

Membership Report . . .

Membership count as of 04/24/2013 is at 288 individuals.
Same time last year: 299.

Having problems with Sky & Telescope or Astronomy Magazine subscriptions? Please feel free to contact me and I will be happy to help you.

A number of members have experienced problems with Mailing List subscription. If you believe you have experience an issue with this function, please contact me via email at tom_mcdonagh@yahoo.com. Please don't forget to update your personal information such as email and mailing addresses. Send me a note or log into the ATMob website to edit your personal information today.

No new members this month!

The Amateur Telescope Makers of Boston, Inc. is an IRS designated 501(c)3 public charity organization. Donations are gladly accepted and are tax deductible to the extent allowed by law.

~ Tom McDonagh – Membership Secretary ~

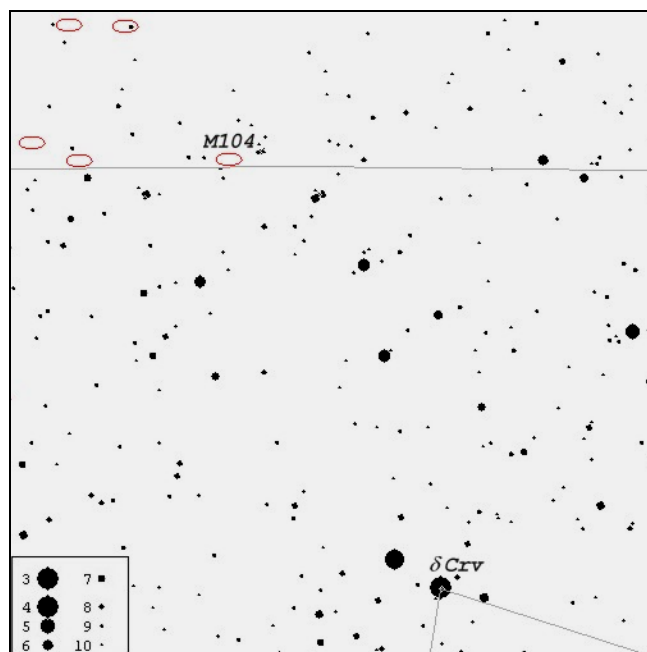
Congratulations to Sara Schechner and Ken Launie on Their Wedding !



Sara and Ken's Wedding Cake. Image by Dick Koolish

Sky Object of the Month . . .

May 2013: Messier 104 – the “Sombrero Galaxy” in Virgo



One of the more noteworthy examples of an edge-on spiral galaxy bisected by a dark dust lane is M104, the Sombrero Galaxy. The nick-name arises from the galaxy's resemblance to the traditional Mexican headwear, the bright nuclear bulge forming the hat and the spiral arms/dust lane the wide brim.

Although M104 is located in Virgo, the best launch point for a star-hop is from the 3rd magnitude star delta (δ) Corvi (refer to the accompanying chart). About 2½ degrees north and slightly east of delta is a one degree long arrowhead outlined by a trio of 5th and 6th magnitude stars. The arrowhead points to M104, about 2 degrees further northeast.

At 8th magnitude and possessing a high surface brightness, M104 can be glimpsed in binoculars on a clear moonless (a dark-sky location helps). A small-aperture scope reveals its elongated 8' by 4' shape. The visibility of the dust lane is dependent on telescope aperture and sky transparency. From regions of truly dark skies, it can be glimpsed with a 4.5-inch telescope. If you live in a suburban area with light-polluted skies, you'll need an 8-inch or larger scope. Even then, the dust lane may be an averted vision feature. The Sombrero Galaxy is one deep-sky object that fairly screams for ultra-dark skies and wide aperture!

If you view the Sombrero with a wide angle eyepiece that magnifies 75X or more and captures a 1½ degree field, you'll see two interesting stellar groupings to the west. The first is a hockey stick shaped arrangement of four 8th magnitude stars that forms the teeth of the shark-shaped asterism Jaws. Further west and slightly south is an amazing triangle-within-triangle arrangement

called the Stargate. Visible in small aperture scopes, it's a stunning sight in large instruments.

M104 was discovered by Pierre Mechain in 1781 and independently by William Herschel three years later. Estimates of its distance vary, with recent findings hinting at about 30 million light years. In diameter, it's roughly half the size of our Milky Way.

↑N W→



(L to R) M104, Jaws, Stargate (Photo by Pat Freeman [www.astro-pat.com])

Your comments on this column are welcome. E-mail me at gchapple@hotmail.com.

~ Glenn Chaple – Member at Large ~

Astronomy Day 2013 - May 18 . . .

Can you believe this will be the Clay Center Observatory's 10th year partnering with ATMob to host the annual National Astronomy Day for the greater Boston public?

Over a thousand people attended in the past three years, and last year's total count exceeded 2,000. Astronomy Day 2013 is Saturday, May 18 this year, and with no conflict with NEAF, we hope you will join us. We need your help to provide outdoor telescopes, solar and night, as well as indoor science exhibits.

We open rain or shine, so please join us indoors even if the weather is not favorable. You can register your exhibit, telescope or other, on the website so we may plan for what you need – tables, electricity, food, etc.

Go to www.claycenter.org, Astronomy Day page, Exhibitor sign-in. Thank you for your participation!

2013 Astronomy Day Schedule

- 4:00 - Outdoor events begin with rockets, kites, solar telescopes
- 5:00 - Indoor events run from 5:00 pm to 8:30 pm – science exhibitors
- 7:00 - Indoor Kite Flying in the Hockey Rink 7-9 pm - kites that need no wind!
- 8:00 - Sunset, night telescopes set up
- 8:30 - Viewing of the first-quarter moon, Venus, Saturn, Jupiter, and Mercury
- 10:00 – Adjourn

~ Submitted by Robert Phinney ~

Harvard Star Party . . .



(L-R) Eileen Myers and Julie Kaufmann. Image by Al Takeda

After the first session was clouded out, a clear and relatively warm night greeted students, teachers and parents of the 3rd grade classes of Harvard on March 26th. The ATMob members in attendance wowed the crowd by showing them many springtime astronomical wonders.

As darkness fell, Jupiter and its moons were a big attraction for all of the attendees. Later the Orion nebula, the Pleiades star cluster and other assorted open clusters became crowd pleasers.

A few lucky individuals were able to get a glimpse of Comet PanSTARRS in John Blomquist's telescope before it disappeared behind the trees.

Later club members were treated to pizza and homemade cookies by our host, Judy Moore and the PTO.

Thanks go to John Blomquist, Neil Fleming, Joe Henry, Julie Kaufmann, John Maher, Eileen Myers, Art Swedlow and Al Takeda for setting up their telescopes and binoculars. Thanks to Bruce Tinkler for setting up his astro education and demo tables.

~ Submitted by Al Takeda – Newsletter Editor ~

June Star Fields DEADLINE
Sunday, May 26th

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed May 1, 2013

Amateur Telescope Makers of Boston, Inc.
c/o Tom McDonagh, Membership Secretary
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Acton, MA 01720
FIRST CLASS

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Steve Clougherty (781) 784-3024
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OBSERVING: Bruce Berger (978) 387-4189

NEWSLETTER Al Takeda newsletter@atmob.org

PUBLIC OUTREACH

STAR PARTY COORDINATOR:
Virginia Renehan starparty@atmob.org

How to Find Us...

Web Page www.atmob.org

MEETINGS: Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION listen to WBZ (1030 AM)

CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.

Heads Up For The Month . . .

To calculate Daylight Saving Time (DST) from Universal Time (UT) subtract 4 hours from UT.

- May 5 Eta Aquarid Meteor Shower Peaks
- May 9 New Moon
- May 18 First Quarter Moon (Moonset at midnight)
- May 24 Mercury 1.4-deg. N. of Venus
- May 25 Full Moon
- May 28 Venus 1-deg. N. of Jupiter
- May 31 Last Quarter Moon (Moonrise at midnight)
- Jun 8 New Moon