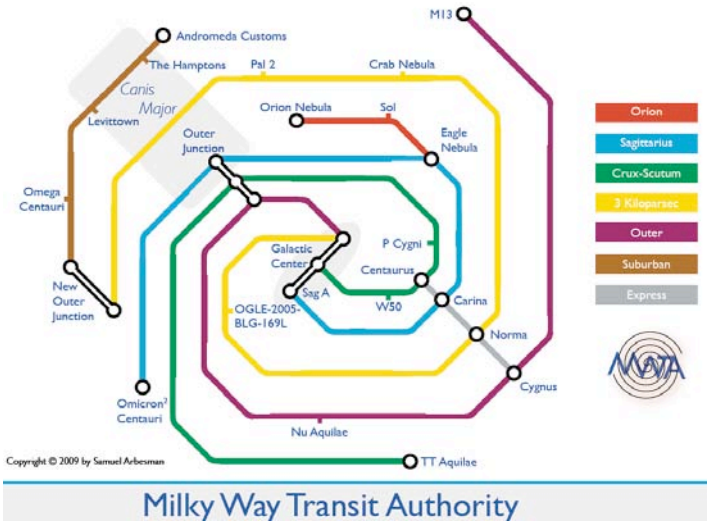
STAR FIELDS

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

Vol. 23, No. 2 February 2011



Milky Way Transit Authority

This Month's Meeting…

Thursday, February 10th, 2011 at 8:00 PM
Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics
Parking at the CfA is allowed for the duration of the meeting.

Member's Presentation Night and Swap

This month's meeting will feature four members speaking on different astronomy- or telescope- related topics. This is a good chance to see what your colleagues have been up to.

Also, bring your old equipment and accessories you may want to off-load at the mini-swap meet. If you're looking to buy, this is a great place time to get some deals!

President's message…

Next Stop Sol… There are many ways to look at and enjoy the cosmos. In our club, some members like to learn about cosmological theory, some love observing under cold and clear skies, while still other members enjoy the challenge of designing and building their own instrument. There are also members who like the outreach of our club star parties, when they can show children the celestial sights and describe them in terms the children can understand.

In this spirit, Samuel Arbseman, a Harvard researcher in the fields of network science and applied mathematics, has found a new and interesting way to describe our galaxy. Dr. Arbseman recently drew a novel map of the Milky Way in terms of the familiar subway map like those on the MBTA. Like a normal subway map, the Milky Way Map is meant to show connections and interrelationships, and disregards actual distance.

On his web site, Dr. Arbesman notes that "Urban transit maps are wonderful tools: they are guides to traveling, they serve as mechanisms for distilling and abstracting a city down to a set of linkages and interconnections, and they are beautiful." and that "these maps have been used to understand other, more idea-based, inter-relationships."
His subway map attempts to be accurate, showing the various spiral branches of the Milky Way as we understand them and putting actual places on these arms. Our Sun is the next-to-last stop on the Red Orion line. Take a look, and judge for yourself how well Dr. Arbesman succeeded. He would welcome your ideas and comments- his email address is on his website www.arbesman.net/milkyway.

This month we are having our semi-annual Member's presentations- short talks by some of our members on their recent activities. This gives us a way to see our club a little differently than the usual presentations by professionals- maybe a little like the Subway Map shows our galaxy in a different way.

Although all the presentation slots are filled up for the February meeting, we'll have other Members meetings in the future. So while you are listening to the presentations this month, why not think about possibly doing your own presentation at some future meeting? This is entirely optional on your part, of course, but sometimes a goal like making a presentation can add some structure and purpose to our activities- and it can be fun to describe our work to a supportive group of fellow members!

Keep looking up-

~ Bernie Kosicki, President ~

January Meeting Minutes . . .

Lecture:

"Probing the Universe with Galaxy Clusters: New Windows from New Technologies"

Photo by Al Takeda

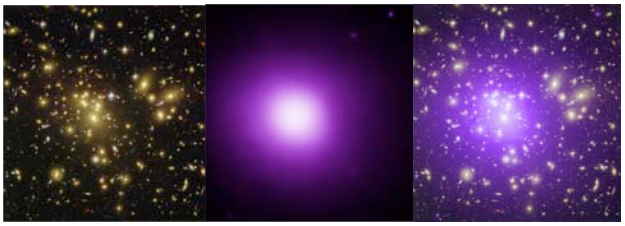
The January meeting of the Amateur Telescope Makers of Boston featured, Dr. Mark Bautz, who discussed recent observations of galaxy clusters that are beginning to provide new information about the history of the cosmos. A key to this progress has been the study of these objects using telescopes operating at millimeter, visible, infrared and X-ray wavelengths. Dr. Bautz outlined the potential impact of these results on our understanding of cosmology, and review some of the new technologies that have made them possible, concluding with a summary of future prospects for this line of research.

Dr. Mark Bautz is a Senior Research Scientist at the MIT Kavli Institute for Astrophysics and Space Research, where he serves as Associate Director. He has been developing instrumentation for X-ray astronomy for over twenty years, and has worked on X-ray cameras for a number of space observatories, including NASA's Chandra X-ray Observatory. His current research interests concern new X-ray imaging detector and observational studies of clusters of galaxies.

Galaxy clusters in a nutshell - From X-rays to Cluster Mass
X-ray Spectral Image → Density & Temperature vs Radius → Cluster Mass vs Radius

We can see, when we look at the difference between what we can observe in visible and what we observe in x-ray, that in gravitationally bound galaxies, most of the mass is not in the galaxies. For example Abell 1689 (pictured next column):

The largest 'bound' structures in the Universe. Mass: $10^{14\text{-}15}$ M_{sun} Luminosity: Visible: $L_{vis} \sim 10^{11\text{-}12}$ L_{sun} X-ray: $L_x \sim 0.1$ L_{vis} Size: $10^{24.5}$ cm (~ 1 Mpc ~ 3 Mlt-yr) Composition (roughly): 85% (non-baryonic) dark matter 13% plasma at $10^{7.5\text{ - }8}$ K (3-10 keV) --> X-ray emission 2% stars, mostly in $10^{1.5\text{-}3}$ galaxies. Other galaxy clusters used as examples – Abell 2218 showing lensing and Abell 370



Optical Credits: NASA/STScI
X-Ray credits: NASA/CXC/MIT/E-H Peng et al
Abell 1689 in visible light, x-ray, and both visible and x-ray.

X-ray – $l_X \sim 1$ nm = l_{vis}/1000 Instruments
X-ray observations must be done from space because the Earth's atmosphere is opaque to X-rays. Photon-counting imaging measures energy of each photon. X-ray "spectral images" provide density & temperature (and therefore pressure) of hot (10^8 K) plasma filling the cluster. The plasma is confined by gravitational attraction of the cluster, so cluster mass can be inferred from pressure. NB: Some assumptions required!

X-ray CCD Characteristics – X-ray sensors can build multi-color (different energy) image while integrating. Also, they are responsive to visible wavelengths so an aluminumized plastic filter is used. They are very similar to visible-band CCDs for astronomy. Pixel size: 10-40 microns. Read noise: 2-5 e^- RMS. Size: ~5 cm^2 , ~few Mpix. Thicker than visible CCDs to absorb energetic X-rays. Spectral band: ~0.1 – 10 keV. Cost: $100k - $1000k each

Chandra: 4.5 Tons, F=10m NASA 1999. ACIS Sensor 10x 1 Mpix (MIT, PSU, MITLL). Best X-ray mirror ever built. Very good angular resolution (.5 arc/sec)

XMM-Newton, 3.8 T, F=7.5m ESA 1999. EPIC 2 x 7 x 0.36 Mpix (MOS) + 1 x .16 Mpix (PN) (Leicester, MPE,SRON, E2V). 15 arc/sec resolution. 3 Telescopes cover more area.

Suzaku, 1.7 T F=4.5m Japan 2005. XIS Sensor 4x 1 Mpix (MIT, Osaka,MITLL). Smaller and cheaper.
Swift: 1 Mpix (PSU, Leicester, E2V)

Millimeter – $l_{mm} \sim 1$ mm = l_{vis} x 1000 Instruments:
Millimeter wave observations require a dry high altitude site (or space) because the Earth's atmosphere only partially transparent due to water absorption. "New" cryogenic bolometers enable new surveys. Galaxy clusters are seen as tiny distortions (1 part 10^4) in the all-pervading Cosmic Microwave Background (at 3K) ("Sunyaev-Zeldovich" Effect). Surprisingly, the signal is nearly independent of the cluster's distance! It is ideal for finding very distant clusters. These instruments use arrays of superconducting Transition-Edge Sensor Bolometers, which are very low noise bolometers. They also employ photolithographic & thin-film fab technology. Can be multiplexed in large (~10^3-element) arrays. Operate at ~0.25 K

South Pole Telescope, 10m at 3000m elevation
Atacama Cosmology Telescope 6m at 5000m elevation
Planck Mission 1.5m at 1.5 x 10^9m "elevation"

Clusters as probes of cosmology
The Universe is expanding! A basic goal of cosmology is to measure the rate of expansion throughout cosmic history. The rate depends on the density of matter and energy (including "dark energy" – negative pressure) in the cosmos. The rate may be the only clue we have as to the nature of dark energy. So cosmology is a tool to probe fundamental physics. There are many ways to measure the expansion history, a(t), e.g.: Supernovae redshift/distance relation and galaxy distribution over cosmic time. All methods are difficult and fraught with assumptions so we need to measure in different ways. Getting the same answer from different measurements confirms the values independent of assumptions. Galaxy clusters can provide several independent constraints on a(t).

Clusters Trace Structural Formation: Cosmic structure grows via gravitational instability (driven by dark matter) and initiated by quantum fluctuations during inflation leading to small density differences (see YouTube link below). The rate of growth is sensitive to the cosmic expansion history & thus to the cosmological model. The cluster population (clusters/volume) depends on cosmology over time. NB: a = 1/(1+z) Key observational requirements: Count clusters at over cosmic history, Measure cluster masses
The Cluster Population & Cosmology: The cluster mass distribution evolves rapidly so cluster counts are sensitive to cosmology (dark energy characteristics). Cluster Cosmology Progress to Date: 40 clusters. ROSAT detections & Chandra follow-up, X-ray cluster data (+WMAP) yield dw ~ 0.1 at fixed W_M. To get a better idea of dark energy, we need to improve the measurement by x 10 or more.

Future prospects:
South Pole Telescope promises to offer observations of more distant clusters and wider x-ray surveys as early as 2013

The Large Synoptic Survey Telescope (8.4m) will offer better measurements of cluster masses, with an anticipated launch date of 2014. Combined with masses from "lensing" and *Astro-H*, with 20x better spectral resolution.

However: Better tools don't always provide better answers; but they usually provide better questions. One assumption frequently used is that the gas is "at rest." However, observations of the Perseus Cluster in X-rays seen by ROSAT (early 1990s) at ~30" resolution is smooth but when seen by Chandra (2006) at 0.5" resolution is not uniform at all.

Q&A Results: How "stable" is the gas? What might the disruption timeframe be? At least on the order of 100M years. "We know absolutely nothing about dark energy." The number of clusters is continuing to grow in the current universe.

Links
MIT Kavli Institute Page
http://space.mit.edu

Dr M. W. Bautz Publications
http://en.scientificcommons.org/m_w_bautz
http://pubget.com/profile/author/M Bautz?page=2&q=authors%3A"M+Bautz"

Structure Formation in the Universe
http://www.youtube.com/watch?v=8C_dnP2fvxk

Abell 1689
http://chandra.harvard.edu/photo/2008/a1689
http://iopscience.iop.org/0004-637X/701/2/1283/fulltext

Magellan Telescopes
http://www.lco.cl/telescopes-information/magellan

Hubble Telescope
http://hubble.nasa.gov
http://hubblesite.org
http://www.stsci.edu/hst
http://www.nasa.gov/mission_pages/hubble/main/index.html

Spitzer Space Telescope
http://www.spitzer.caltech.edu
http://ssc.spitzer.caltech.edu

Chandra X-Ray Observatory
http://chandra.harvard.edu/about/specs.html

XMM-Newton XRT
http://xmm.esac.esa.int/external/xmm_user_support/documentation/technical/Mirrors/index.shtml

Suzaku XRT
http://www.jaxa.jp/projects/sat/astro_e2/topics_e.html
http://heasarc.nasa.gov/docs/suzaku/astroegof.html

Swift XRT
http://www.swift.psu.edu/xrt

South Pole Telescope
http://pole.uchicago.edu

Atacama Cosmology Telescope
http://www.physics.princeton.edu/act/about.html

Planck Sat.
http://www.rssd.esa.int/index.php?project=Planck
http://planck.caltech.edu

eRosita
http://www.mpe.mpg.de/heg/www/Projects/erosita/index.php

Large Synoptic Survey Telescope
http://www.lsst.org/lsst

Astro-H XRT
http://astro-h.isas.jaxa.jp

January ATMoB Business Meeting: (9:00pm)

Bruce Tinkler provided the Secretary's Report.

Bernie provided the Treasurer's Report forwarded by Nanette Benoit.

No Membership Report was available

Bruce Berger provided the Observing Committee Report. Glenn Chaple and Neil Fleming are fleshing out the Observing Awards Program. Categories to include: Clusters (globular and open), Messier, Double Stars, Galaxies. There will also likely be levels such as Beginner, Intermediate, and Master/Expert. Equipment criteria to be determined (telescope size/goto). No time limits on observations. New Equipment donations: a newer C-14 with improvements and a Celestron Nextar 5" go-to reflector (to be

lent out). Neil Fleming also indicated that he would provide Astrophotography Training. The first session would be internet based. Then there will be a follow up session on-site at the clubhouse. Dates to be announced. John Boudreau will also provide training on planetary imaging.

March 5th Messier Marathon – There was discussion about doing both a spring and a fall Messier Marathon this year, or possibly "half Marathons" depending on the stamina of those attending. There may be a pre-marathon session in February. These are generally star hop marathons, not go-to.

Steve Clougherty provided the Clubhouse Report. He indicated the report in the newsletter provides all the details. The next work party will be January 22nd and be generally inside work in the new telescope room and some electrical work. The Dall–Kirkham telescope has been taken off line because of bad tracking.

Club Events and Announcements were given by Bernie Kosicki:

Jan 17	Executive Board Meeting, Clubhouse, 7:30PM
Feb 8	Butler Middle School Star Party, Lowell MA
Feb 10	Monthly Meeting- Members Presentations including: Haldun Menali, Eclipse Trip; Mike Hill, New Shop for members; Bernie Volz, Australia Eclipse Preview; and others. There will also be a Membership Swap Table.
Feb 14	Veritas Christian Accademy Star Party, Wayland MA
Feb 16	6th Annual Chenery Star Party, Belmont MA
Jan 22	Clubhouse Work Party, 10AM
Feb 28	9th Annual Acton Star Party

Jan 7- Feb 11	Fridays 7pm: Video Course: Dark Matter, Dark Energy: The Dark Side of the Universe, Clubhouse http://www.teach12.com/tgc/courses/course_detail.aspx?cid=1272

Mario Motta indicated that the Dark Sky Bill (Energy and Light Polution Bill) was not passed again. This was the 9th try in 15 years. We will try again. The bill has been re-written and will be submitted with bi-partisan co-sponsors. Members will be asked to get local co-sponsors. An email will be sent including samples to enlist support. We will have until February 6th to get the initial co-sponsors. The bill name and number will be sent out once it is official. Mario also commented that local efforts are still needed since when one town in an electric company's region enacts such legislation, then generally the company purchases and installs street lights matching the legislation in surrounding towns as well.

Ross Barros-Smith asked Bruce Tinkler to announce that the deadline for the February newsletter will be January 23rd.

Bernie Volz announced the sale of Astronomy Calendars to benefit the club.

Additional comments were made by John Boudreau. He presented images of Jupiter and an animation of a Saturn storm.

Refreshments were provided by Mike Hill. (9:25pm)

~ Bruce Tinkler, Secretary ~

Clubhouse Report . . .

Coordinating snow removal has been close to a full time effort this month for John B. with repetitive storms requiring removal. Our goal is to keep the observing field clear for our intrepid cold weather observers. Snow blower and shovels were required for the Saturday January 22nd Work Session to clear paths to pads, observatories, and storage sheds. The task was made possible by the support received earlier from our neighbors in moving snow as it fell allowing access to the clubhouse, parking lot and observing field. Paul C. cleared the area needed for access to the snow blower and his pad for solar observing. The sun was observed in visible and hydrogen alpha light until fading behind afternoon high cirrus clouds. Steve C. shoveledthe clamshell observatory clear assisted by John B. and Todd F.Efforts to clear the Ed Knight observatory were stalled by the iceand snow roof covering.

Once the clamshell was opened, the Dall-Kirkham mount was tested with a torque measuring system by Steve C., Glenn M., Al T., Dave P., John M., and Todd F. The disassembled mount head was removed to the machine shop where Glenn M., Steve C., and John S. were observed cleaning all components of accumulated grease and grime. Covered with a new coat of light weight oil the head was assembled and remounted in the clamshell assisted by Paul C. The Dall Kirkham is back on line allowing further testing and continued refining of the balance situation.

The attempt to open the big roll off roof proved this should wait for either warmer weather or a non-destructive ice removal system; it took more than two men to close the roof and secure the observatory. With access to the metal shed, John S. and Sergio S. finished the electrical circuit renovation and tested the new GFI system. The gas supply was replenished and is ready for the next snowstorm. Inside, Ed B. continued to work on updating the archives of ATMoB historical information in the upstairs library. Meanwhile the rented random orbital sander was used to complete the floor sanding of the old machine shop wood floor with 24, 40 and 80grit discs by Dave P. The edges had previously been sanded by Paul C. and John R. The old southern yellow pine flooring now sports three coats of water based polyurethane, including the heat duct coverings sanded to bare metal by Eileen M. and Nina C. Dave P. waited for each coat to dry before applying the next, as per instructions; however it will take several weeks with NO TRAFFIC to cure properly. That area is off limits until Dave tests the floor the first weekend of February.

Lunch was again prepared/presented/cleaned up by our team of Sai V.,Eric J., Art S., Eileen M., Nina C. with supplies collected by John R.Sai's salad complimented with his toasted garlic bread, matched with the broiled/baked bbq'd chicken, went well with the aldenti whole wheat spaghetti/rotini covered in Bailey Hill sauce. But we continue to puzzle over the reason so many comments were received about that sauce; what made the improvement over the past concoctions. It may well take the rest of the month to figure this out. So come on out andjoin us for the February full moon Work Party on Saturday, February 19th, and help us test whether next month's spaghetti sauce matches the others. We could use your help! John M. probably will have some pretty good DVD's to share if the temperature is too low again, to stay out observing. Consider it.

We thank seventeen members for making this session a success: John Blomquist, Ed Boynton, Paul Cicchetti, Steve Clougherty, Nina Craven, Todd Frase, Eric Johansson, John Maher, Mike Mattei, Glen Maurer, Eileen Myers, Dave Prowten, John Reed, Sergio Simunovic, Art Swedlow, Al Takeda, and Sai Vallabha. Joined later by Bruce Berger, Bern Kosicki, Phil Rounseville, and Dave Siegrist who stopped by to assist; with Saturday night duty staffed by Brian Maerz and Glenn Meurer. John Maher's DVD's kept us warm as the temperatures dropped later that evening, after Phil showed views through his new six inch Ritchey-Chretien.

~ Clubhouse Committee Chairs ~
~ John Reed, Steve Clougherty and Dave Prowten ~

Clubhouse Saturday Schedule

February 5	Panaswich	Small
February 12	Berger & Hill **Winter Star Party**	
February 19	Leacu & Rounseville **Work Party #2**	
February 26	Myers	Nugent
March 5	Clougherty & Mock **Messier Marathon #1**	
March 12	Budreau	Burrier
March 19	**CLOSED**	

Thoreau on Astronomy . . .

[Higginson] Told of a person in West Newbury, who told him that he once saw the moon rising out of the the sea from his house in that place, and on the moonlight in his room the distinct shadow of a vessel which was somewhere on the sea between him and the moon!!

Journal, 14 February 1857

Editor's note: Yes, Thoreau actually did use two exclamation marks in this entry. This was checked!!

~ Submitted by Tom Calderwood ~

Membership Report . . .

Membership count as of 1/24/2011- 277
Same time last year – 311

Do you have questions about your Astronomy Magazine or Sky & Telescope subscriptions? Drop me a line @ Tom_McDonagh@yahoo.com and I will be happy to look into your subscription status.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the fullest extent allowed by law. Consider making a tax-deductible contribution to the club today.

Donations made to the Clubhouse Fund help to defray the cost of special projects such as the building of a new dome to house our robotosized 14-inch Schmidt-Cassegrain Telescope. This instrument and all of the telescopes housed at the clubhouse are available for use by all members.

Please seek out and welcome our new members:

John Lescher
Kevin Dowling
Crystal Ainge
Jeffrey Allen
Neil Perlin
Ken Kaplan

New and not so new members,

Please feel free to contact me with any questions rearding your club!

~ Tom McDonagh, Membership Secretary ~

New Year's Thank You . . .

A good time was had by all at the 2011 New Year's Eve Party. Thank you to co-hosts Al Takeda, Art Swedlow, Eileen Myers, Eric Johansson, John and Monique Reed, and Sai Vallabha.

Thank you to musicians Ed Los on fiddle and Claude Galinsky on mandolin for the lively Scottish music. Thank you to Julie Kaufmann for all your help during the evening. Partygoers brought delicious food, plentiful and varied.

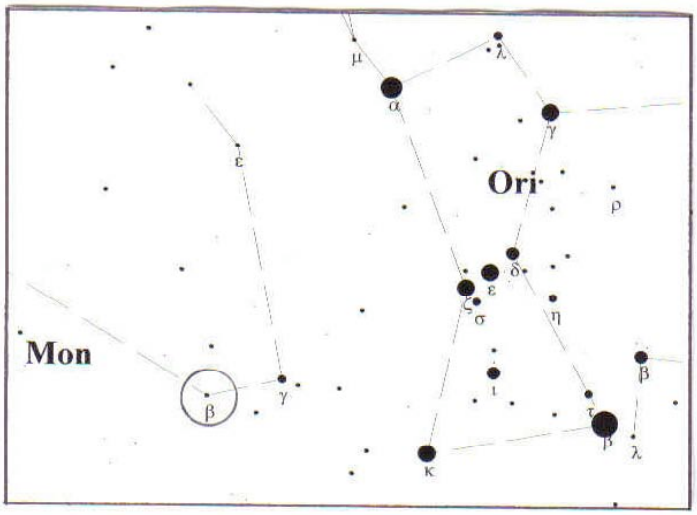
The temperature outdoors stayed above freezing, and there was some fog, so two groups of folks took nighttime walks "up the hill." Binoculars came out instead of telescopes for a bit of observing. It was a very pleasant way to welcome in the New Year.

Photo by Al Takeda

Last revelers at New Year's Eve party. Clockwise from back left: Vlad Vudler, Howard LeVaux, Karen Swedlow, Art Swedlow, Sai Vallabha, Elieen Myers, Monique Reed, John Reed and a Spock wig (atop John's head).

Sky Objects of the Month . . .

Sky Object of the Month – February 2011
beta (β) Monocerotis



Finder chart for beta (β) Monocerotis
From *Touring the Universe with Binoculars(TUBA) Star Atlas*
Dean Williams and Phil Harrington

It's an annual ritual. Go outside on a crisp, clear February evening. Aim telescope towards a misty patch of light in Orion's Sword. Gaze in awe and wonder at M42 – the Orion Nebula.

I suggest that, after your pilgrimage to the Orion Nebula this year, you travel 12 degrees eastward into the obscure constellation Monoceros. There, you'll find the finest triple star in the night sky – beta (β) Monocerotis.

Described by its discoverer William Herschel (1781) as "one of the most beautiful sights in the heavens," beta Mon is a dazzling trio of pure-white stars. What separates beta Mon from most triple stars is the closeness of its components and their similarity in brightness.

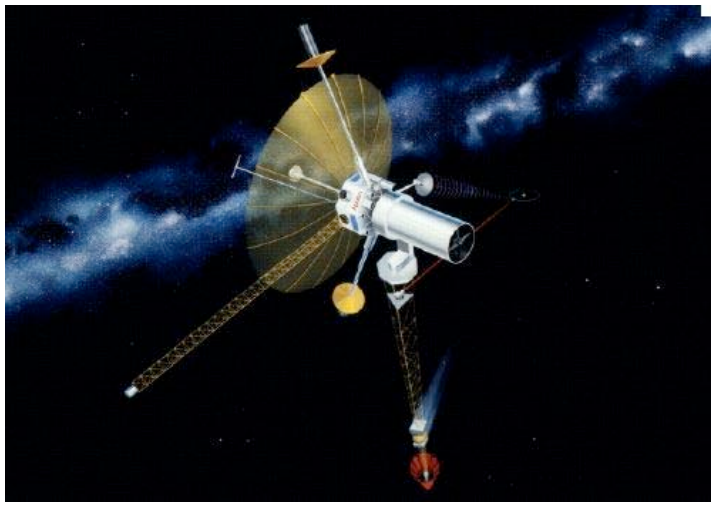
Viewed with low power, beta Mon an attractive double star whose magnitude 4.6 and 5.0 components are separated by 7 arc-seconds. Ramp up the magnification (100X with an ordinary 60mm refractor will do the job), and you'll see the third star (magnitude 5.3) a mere 3 arc-seconds from the 5.0 magnitude component. The three form a curved row 10 arc-seconds across.

I've always written that double stars are twice the fun. As for triple stars – well, you get the idea! Triple your observing fun with a visit to beta Monocerotis.

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

~ Submitted by Glenn Chaple~

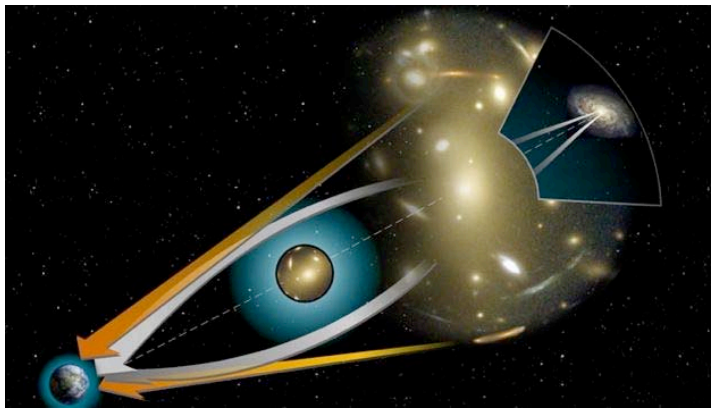
Using the Sun As A Magnifying Glass



In previous blogs I've lamented that it would take incredibly large telescope arrays to try and see any details on planets orbiting nearby stars. Even space telescopes envisioned for the next 20-30 years from now could only tease out information about a planet by studying how its light fluctuates, and what colors of light it reflects or absorbs. But the planet will remain a dot of faint light in the largest imaginable telescopes.
However, astronomers have exploited "God's zoom lens" in space to see details in some a the farthest galaxies every detected. It's called a *gravitational lens*.

First predicted by Einstein's General Relativity, gravity warps space like a funhouse mirror. This result is that the gravity of a foreground galaxy will amplify -- and distort -- the light from a very distant background galaxy. When chance alignments do happen, astronomers can peruse the details of very distant galaxies that would be unreachable with conventional large telescopes.

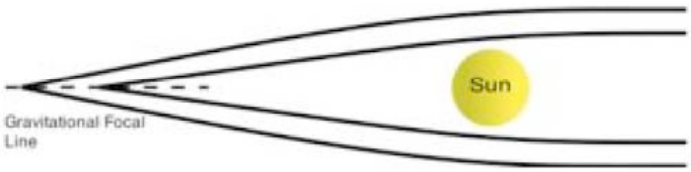
You can simulate a gravitational lens by looking at Halogen desk lamp through the base of a wine glass. The curved glass is an analog to the warping of space. (It helps the experiment if you fill the glass with wine first, drink it, and proceed to make the observation.) The bulb will smear into bright arcs around the glass base.



For years astronomers have toyed with the idea of using the sun as a gravitational lens for spying on nearby stars. The trick is that the sun needs to be reduced to a pinpoint on the sky rather than a blinding photosphere. This means placing a space telescope very far from the sun, about 50 billion miles.

Getting the telescope there would take a while depending on the propulsion system. 100 years might be a safe bet except the project would span at least two generations. Engineers would be motivated to build something moving fast enough to complete the trip within a career lifetime.

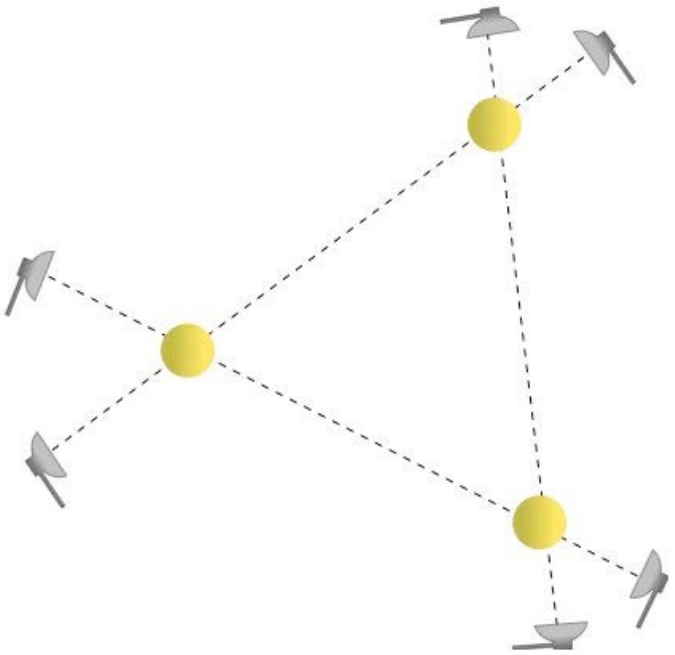
The beauty is that the telescope would not have to decelerate to stay at that location but continue racing away from the sun and a radial trajectory. Unlike a conventional lens everything would stay in focus regardless of distance.



A specific target on the sky than lines up precisely on the opposite side of the sun from the telescope's path would have to be picked for the first experiment. My bet is on the Alpha Centauri binary system. This is the closest star system to Earth. Within a few years we'll know if one or both sunlike stars have accompanying planets. Building a gravity lens telescope for scrutinizing Alpha Centauri's planets would be the next big step before trying to travel there.

An even more ambitious use of the sun's lensing abilities would be to locate a radio or optical transmitter 50 billion miles out to send a SETI message, or eavesdrop on the communications of an alien civilization. The advantage is that the transmitter would not need much power because of the sun's amplification. The disadvantage is that only one nearby star system could be targeted, at least for starters.The amplification by the sun could yield detailed images of planetary surfaces. Like a kid perusing an ant colony with a magnifying glass, the space telescope would have to slightly shift it position relative to the sun to scan the Alpha Centauri system. It might trace out a search spiral pattern that is perpendicular to its direction of motion.

Transmitter/receiver probes could be mass-produced so that they are stationed all around the sun to have various sightlines to specific stars. Taking this idea a step further, two neighboring stellar civilizations might set up pairs of antennas at their respective gravitational lensing points. You might even imagine a galactic Internet where gravity lens amplified transmissions are a common strategy among chit-chatting civilizations.



An extraterrestrial probe visiting Earth might drop off an interstellar transmitter that exploits the sun's gravitational lensing. This would efficiently serve as a power-saving transponder for relaying information the probe collects about us to the home civilization. Even extraterrestrials may worry about being energy frugal.

Image Credits: NASA, ESA, British Interplanetary Society

~ By Ray Villard, Discovery Space (http://news.discovery.com/contributors/ray-villard)~

For sale . . .

10" LX200 classic for sale. Has field tripod and works great. Comes with laptop

Call for details Mike Bova 781-643-4513 or mobile 617-285-8608. $1500 or best offer

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February *Star Fields* DEADLINE
Noon, Sunday, February 20
Email articles to the newsletter editor at newsletter@atmob.org
Articles from members are always welcome.

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POSTMASTER NOTE: First Class Postage

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c/o Tom McDonagh, Membership Secretary
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2008-10	Steve Beckwith	(978) 779-5227
2006-08	Virginia Renehan	(978) 283-0862
2005-06	Bernie Volz	(603) 968-3062
COMMITTEES		
CLUBHOUSE :	John Reed	(781) 861-8031
	Steve Clougherty	(781) 784-3024
	David Prowten	(978) 369-1596
NEWSLETTER:	Ross Barros-Smith	(978) 263-6599
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OBSERVING AND 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.

Sky For February 2011

Feb 2 New Moon at 9:31pm, EST
Feb 6 and 7 Jupiter near crescent Moon these nights
Feb 11 First Quarter Moon at 2:18am, EST
Feb 18 Full Moon at 3:36am, EST
Feb 21 Saturn 8° N of Moon this morning
Feb 24 Last Quarter Moon at 6:26pm, EST
Feb 28 Venus pairs with crescent Moon this morning

Planets in February **Mercury** slips into the glare of the rising sun early this month.
Venus bright in SE sky before dawn.
Mars is not visible this month (conjunction on 4th).
Jupiter sets in mid-evening.
Saturn rises in mid-evening.