



## 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. 21, No. 2 February 2009

### This Month's Meeting...

Thursday, February 12<sup>th</sup>, 2008 at 8:00 PM  
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics  
Parking at CfA is allowed for duration of meeting

The February meeting of the Amateur Telescope Makers of Boston will host **Dr. Russell F. Pinizzotto, PhD** talking about **The Colors of Stars**.

All stars are not white! They are a wide range of colors from deep ruby red to brilliant blue-white. These colors are not only beautiful, they give us clues to the stars' sizes, ages and life cycle status. This talk will discuss the birth, life and death of stars.

Stellar lifecycles were brilliantly summarized in a single chart by Ejnar Hertzsprung and Henry Norris Russell early in the Twentieth Century. The HR Diagram is one of the most important and intriguing graphs in all of science. It relates the color of a star to its brightness. Both change during a star's life, so it is possible to track the life of a star as a path through the HR diagram. We observe stars at only single points in their lives, but we can see so many of them that we can develop excellent models of how they evolve. While stellar life is interesting, stellar death results in many of the objects that amateur astronomers love to observe including planetary nebulae, supernova remnants and black holes. Discovering a supernova can even make you famous! Finally, it is true that we humans are all made of stardust, the elements that are formed in stellar cores and supernova explosions.

This talk we try to make sense of all of stellar history in less than hour.

Dr. Russell Pinizzotto is currently the Dean of the Faculty of Science and Engineering at Merrimack College in North Andover, MA. Since he joined Merrimack, the number of

science and engineering majors has increased from 340 to 520. Dr. Pinizzotto is a Professor of Physics teaching astronomy and musical acoustics.

Prior to joining Merrimack in 2004, Dr. Pinizzotto was the founding Dean of the Missouri Academy of Science, Mathematics and Computing at Northwest Missouri State University. He previously was the founding chair of the graduate Department of Materials Science at the University of North Texas, where he was a professor of Physics and Materials Science for 13 years. His most interesting research used DNA as a template for building mesoscale electronic structures.

In 1983, Pinizzotto founded an electron microscopy service company, Ultrastructure, Inc., in Dallas, Texas. He was a senior member of the technical staff at Texas Instruments' Central Research Laboratories and spent a year as a post-doctoral scientist at IBM's T.J. Watson Research Center in Yorktown Heights, NY. Before attending graduate school he worked as a scientist for Structural Composites Industries in Azusa, California and as an undergraduate, he worked in the Physics Division of the Jet Propulsion Laboratory in Pasadena, CA.

Dr. Pinizzotto received his Ph.D. in Materials Science from UCLA in 1978, an Engineer's Degree from UCLA in 1977, and a B.S. in Chemistry from the California Institute of Technology in 1972. More recently, he just completed an M.S. in astronomy from the Swinburne University of Technology in Melbourne, Australia, to be awarded in March 2009.

His non-academic interests include music (he plays drums and vibes in the Merrimack College Jazz Ensemble), astronomy, boating, golf, flying and go. He is a voracious reader of everything from history to science fiction.

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...

On occasion, I get inquiries from prospective members about how to join the club. When I answer the questions regarding dues, I inevitably get the follow-up question of "what do I get for my \$25.00)? So let's see, what DO we get for our annual dues? Well, let's start with the monthly meetings where we usually have speakers who are leaders in their particular area of expertise of astronomical research. Many times you will see them on PBS or in the news because of their work. I don't know about you, but I've been confused by some of the smartest people in the world!

We also have a great club that offers both novice and expert members a place to learn. Have a question about the sky, your telescope, or instrumentation. You just need to attend the meeting, send an email or go to the clubhouse and get an answer or help. Speaking of the clubhouse... The farmhouse

sure has come along ways since we've moved in. We have three (soon to be four) permanently mounted telescopes for member use. The clubhouse could be considered the "kitchen" of the club in terms that it is the place in the house where everyone gravitates at a party. It is THE place to be if you want to learn about astronomy, meet other people and have some fun. It is also where you can go for the weekly astronomy class, observing nights and various seminars that help you increase your skill and knowledge in astronomy. You can even attend a Thursday night mirror grinding session and get expert help as you build your own telescope. There is also a wealth of written information in the library.

We also get a ten percent discount from Sky Publishing on their products and due to relationships have direct input into what we'd like to see in Sky and Telescope.

Hey, what about the website and the discussion group? This is a great way to get alerts to outings, astronomical events or have a great discussion about astronomy and science (Paul Valli posted a great link on the day I wrote this message). Of course the website is getting better each year. You can now join or renew on-line. You can post events and update them – it's just amazing. Last week I received a phone call from a sales person who wanted to sell us software that will give our website features that we already had. When I told him we were covered and he inquired on whom our vendor was, he was astounded to hear it was our volunteers (Thanks Bernie and Peter!).

All of this didn't "just happen". It has developed over years by dedicated members who have graciously volunteered their time and expertise to make the club better.

So we get a lot for our dues and there are more that I have not been mentioned. My question to all of you is "What can we do to make our club even better"? We're holding and Executive Board Meeting on February 17<sup>th</sup> and if you've have any suggestions. I'd like to hear them. They don't have to be grandiose (much progress can be made by simple changes). Call me or send me an before the meeting if you have any thoughts in this area.

- Steve

~ Stephen Beckwith, President ~

## January Meeting Minutes . . .

The January meeting of the Amateur Telescope Makers of Boston had Engineer Peter Cheimets talk about the construction of the Solar B X-ray solar Telescope.

To show that he has some amateur telescope experience, Cheimets first spoke about his 6 inch home built refractor. Trying to impress his kids about how great the telescope performed, he aimed the scope at the sun and allowed the focus point to land on a large dried up potted plant. The plant spectacularly caught on fire but he didn't realize that the pot

was made of plastic sitting on a wooden deck. They did manage to prevent the house from burning down.

The Hinode Solar B satellite is a solar x-ray telescope and to prevent the coefficient of thermal expansion (CTE) from being too large the team built a conical tube out of graphite epoxy. Graphite has a negative CTE and shortens when heated but when mixed with epoxy, which expands, they cancel each other.

X-ray scopes cannot use a "normal incident" mirror but must instead use a "grazing incidence" one. "The actual wavelength of the spectrum is smaller than the distance between the molecules of the packed material in the glass. Most of the x-ray photons would actually run into the crystal lattice of the normal incident mirror and never come out." The grazing incident mirror has an angle such that the x-ray "skips" on the surface. Harder x-rays require a shallower angle but a balancing act is performed to allow the optics to fit into the spacecraft. Since the system cannot be folded, the focal length is the length of the tube which is 2.7 meters.

The glass is Zerodur and is composed of two reflective surfaces called a "higher order polynomial" (Walter2 system). Cheimets noted that they wanted to "optimize the shape of the mirror so that we would get, we would get a broader focus across the entire Sun. So we actually backed away, so what we did we gave up the perfect focus at the central image and we picked up the wings." The mirrors, which took over 2 years to grind and polish, had a major issue with a correction that was specified in millimeters instead of meters. They were made by Goodrich Aerospace, formally Perkin-Elmer of Danbury, Connecticut.

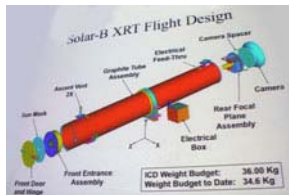
A lot of the discussion focused on the support structures and how the CTE affected each piece. The telescope had graphite-epoxy, Zerodur, titanium, aluminum and Invar. Each had its own expansion rates and had to be dealt with.

There are filters in the front and back that attenuated the visible light down by 12 orders of magnitude and only allowed x-rays to pass. Each filter had 50 angstroms of aluminum deposited on their surface and each cost \$7000 and only one company makes them in the world. There are also two filter wheels and a shutter near the CCD detector.

"The CCD is a backside illuminated, thin E2V, 2Kx2K with 13 $\mu$  pixels on the chip. This gives about half an arc second of the sky."

Solar B was launched into a sun synchronous polar orbit. Cheimets explained that "this particular orbit travels over the South and the North Pole. I think I am the only one that calls it a dawn skimmer... it just rides the day/night divider...The particular inclination of the orbit is 98° and incorporates the Earth's out of sphericalness precisely to tip the orbital plane 1° per day so it is always looking at the sun. So it is at a great orbit for looking at the sun."

After launch an overheating condition caused the paraffin linear actuator to open the door of the front of the tube prematurely. The first light image was also smeared because a command was sent to read out the data before the shutter was closed. Not realizing the problem at first they decided to reboot the telescope “and everything was beautiful.”



(L-R) Peter Cheimets– Solar B XRT Flight Design

Steve Beckwith gave credit to John Small for helping to get Peter Cheimets as a speaker for January.

Al Takeda gave the Secretary’s report.

Steve B. gave the Membership Secretaries report for Tom McDonagh. He reported that there are 199 active members.

Nanette B. presented the Treasures report. She also stated that she had acknowledgment letters for each member that made a monetary donation to ATMoB in 2008. For those that did not pick it up that evening the letters will be mailed. The total amount that was donated was \$3079.

Steve B. gave the Observing Committee report and mentioned that a few seminars will be held at the Clubhouse soon. On Sat. Jan 17th, John Maher will be teaching a class on “How to use your Meade Telescope”. Many new members have requested these classes since using these go-to scopes are not intuitive. The class on “Finding Constellations” hopefully will take place on January 31st if the weather cooperates.

Steve Beckwith would like the membership to think about how the group can extend the Star Party experience for the young people so that it will last longer than the single event.

Steve also is also proposing a “Youth Night” once a month at the Clubhouse for member’s families. He is asking for a volunteer to get involved in this area. Please contact Steve Beckwith.

The Clubhouse report was given by Steve Clougherty. He mentioned that in addition to Bruce Berger, Mike Hill and Glenn Meurer; Dave Wilber and Scott Crist also helped with the work shop construction. Even though it was cold the Maksutov, electrical circuits and a lock were removed from the Dennis DiCicco observatory. The lock will be used on the Clamshell to secure the switch that will allow the dome to be opened on the outside. The Dall-Kirkham has been installed but the electrical system is not finished. Work is also being performed in the basement and Evaporator room. John Reed gave a report on the Clubhouse oil heater maintenance work and service. The heater is now constantly set to 42 degrees F. in hopes that it will prevent a premature failure and constant maintenance.

Some upcoming events: Visit [www.atmob.org](http://www.atmob.org) and log-in for details.

Clubhouse workparty on February 7<sup>th</sup>.

Seminar on goto Telescopes - Clubhouse

Star Party Coordinator, Virginia Renehan talked about Stargazing at Halibit Point – ATMoB and the Gloucester Astronomical Club (GAC) and the Healy School star party. Volunteers are needed since only 3 members have signed up. There is also a Lowell event at the Butler School in February.

Bruce announced that Fred Ward is cleaning out his basement and he has a number of computer equipment including hard drives, DVD recorders, video capture cards and etc. for sale. All proceeds from the sale go to the club. Bruce has collected \$100 so far. He also noted that permission has been granted from MIT to allow WIFI at the Westford clubhouse. Bruce has been talking with MIT and we will be fully compliant with the equipment, procedures and security.

Bruce B. has contacted Software Bique and have identified a component on the Paramount GT-1100 that could be the cause of the mount failure. He has the part and will replace the part and will test it. Steve B. will be calling an Executive Board Meeting soon to discuss the mount and other options to purchase a more reliable one.

Gary Jacobson has a few unclaimed Royal Astronomical Handbooks that he ordered. Please see Gary if you are interested.

Bernie Volz announced that there is a dark Sky bill in New Hampshire that is being put through the NH political process. Bernie will keep the membership informed about this bill. Fed Ward also mentioned that the New Hampshire Department of Environmental Services has this as part of their agenda.

John Small has offered disk drive packs (cases) to anyone before he throws them away.

Ken Launie has just gotten back from the American Astronomical Society (AAS) meeting that had a kickoff for the International Year of Astronomy. Ken has picked up a DVD of The 400 Years of the Telescope produced by PBS that will be broadcast in April 2009. He also mentioned that a new book, Eyes on the Sky: 400 Years of Telescopic Discovery is available. He also talked about another book, The Guidebook for the Scientific Traveler. At the meeting, vendors were giving away toys and Ken picked up a little windup. It was so popular that the vendors had to hide them.

Bruce Tinkler talked about his radio telescope that he built using a surplus commercially available TV satellite dish that he uses to demonstrate the concept of radio astronomy. One of the demonstrations is a daylight exercise to “see” the Sun. You can also detect a human body if the signals are initially nulled out. Tree branches can also be detected as you scan across the

horizon. There is a sensor that reads out the signal and providing a tone that varies depending upon the signal strength. It is an interactive device that lends itself to a "hands on" experience with the kids.



~ Al Takeda, Secretary ~

## Clubhouse Report . . .

This winter weather pattern continues to bring excessive cold and snow accumulations. However a minor break in the weather allowed the January 10th work session to take place under clear skies with temperatures in the 20's. A big thank you to members Bruce Berger, John Blomquist, Paul Cicchetti, Mike Hill, Dick Koolish, Glenn Meurer, Eileen Myers, David Prowten, John Reed, Junichi Sano, Dave Siegrist, Art Swedlow, Al Takeda, and Sai Vallabha for donating their Saturday to the clubhouse.

### Happenings:

\* Al T. and Eileen M. connected and configured the digital converter box purchased by John R. with the \$40 discount coupon obtained by Bernie Kosicki. Everyone was amazed at the clear digital images obtained using the old rabbit ear antenna with the new converter box.

\* Dave P. and Paul C. continued the building of the external switch box for the clam shell observatory.

\* John B. and Dave S. chopped the observing pads free of ice as they warmed under the winter sun's rays. This will make future snow removal possible.

\* Junichi S., Dick K., Paul C., and John R. sorted and boxed electrical supplies from the basement shelves and relocated them in the barn loft. Basement moisture had taken its toll.

\* Bruce B., Mike H., Glenn M., and Dave P. reconfigured the near barn walls, added structure to allow installation of ceiling insulation, and continued installing vapor barrier. Wall board installation was carried out during subsequent work sessions.

\* The Bailey Hill spaghetti lunch, assembled by Art S., Sai V., Eileen M., and John R., was devoured by the hungry crew.

The furnace was cleaned and repaired by Healey Oil Co. on January 8th. The entire exhaust pipe was replaced, a new transformer was installed for more reliable ignition, and a new furnace operating plan was implemented. We will now turn the thermostat in the grinding room down to 45 degrees before closing the house. This low level heating is being tested to check oil consumption while observing if this reduces metal

deterioration due to condensation. This will also allow faster warm up for mirror polishing since we are using the clubhouse three evenings each week. Stay tuned.

The next work session will take place on (the Saturday closest to the February full moon) February 7, 2009 at 11am. Snow removal will be high on the priority list. Come join us for as long as your schedule allows.

~ John Reed, Steve Clougherty and Dave Prowten ~



Bruce Berger working on the new Far Barn Workshop. Image by Al Takeda

### Clubhouse Saturday Schedule

Feb 14	Bruce Berger,	Mike Hill
Feb 21	Rich Burrier	John Panaswich
Feb 28	Ed Budreau	John Reed
Mar 7	P. Cicchetti, Glenn Meurer-Work Party	
Mar 14	Henry Hopkinson	Eric Johansson
Mar 21	Bernie Kosicki	Rich Nugent
Mar 28	Steve Clougherty	Steve Mock
Apr 4	Al Takeda	Tom Wolf

## Membership Report . . .

Membership as of 2/1/2009 - 302 members.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the extent allowed by law. While the deadline for 2008 charitable donations has past, please consider making a tax-deductible contribution to the club when planning for 2009 and beyond.

All members are encouraged to seek out and welcome our new and returning club members:

Chester Freeman  
John Kemeny  
Steven Jenner

Diane Savickas  
Michael Ingemi  
Martin LuSoto

Welcome

[membership@atmob.org](mailto:membership@atmob.org)

~ Tom McDonagh, Membership Secretary ~



## Executive Board Meeting . . .

An Executive Board meeting will be held on Tuesday, February 17<sup>th</sup> at 7:00 p.m. at the ATMob Clubhouse. The meeting will end at 9:00 p.m. The meeting is open to the membership.

### Reports:

Secretary - Last EB Meetings minutes  
Membership Secretary  
Treasurer  
Clubhouse Committee  
Observing Committee

### New Business:

Library Plans  
Member Recognition Awards  
Club Historian

~ *Stephen Beckwith, President*

## Thoreau on Astronomy . . .

The old ice is covered with a deep, powdery snow about one inch deep, from which, as I walk toward the sun, this perfectly clear, bright afternoon, at 3:30 o'clock, the colors of the rainbow are reflected from a myriad fine facets. It is as if the dust of diamonds or other precious stones were spread all around. The red and blue predominate. Though I distinguish these colors everywhere toward the sun, they are so much more brilliantly reflected to me from two particular directions that see two distant rays, or arms, so to call them, of this rainbow like dust, one on each side of the sun, stretching away from me and about half a dozen feet wide, the two arms including an angle of about sixty degrees. When I look from the sun, I see merely dazzling white points. I can easily see some of these dazzling grains fifteen or twenty rods distant on my side, though the facet which reflects this light cannot be more than a tenth or twelfth inch at most. Yet I might easily, and commonly do, overlook all this.

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~ *Submitted by Tom Calderwood* ~



John Briggs' Antique Refractor at the Clay Center. Image by Al Takeda

## Barlow Bob's 2009 Calendar of Events . . .

- Jan 24 Kopernik Observatory Winter Star Party Vestal, NY  
Feb 21-28 Winter Star Party Florida Keys, FL
- Apr 4 Virginia Solar-Lunar Convention & Imaging  
Conference Goochland County, VA  
Apr 16-17 NEAIC 2009 Northeast Astronomical Imaging  
Conference Suffern, NY  
Apr 18-19 NEAF 2009 NEAF Solar Star Party Suffern, NY  
Apr 23-26 Delmarva Star Gaze Star Party Tuckahoe SP, MD  
Apr South Jersey Spring Star Party Belleplain SF, NJ  
Apr Spring Stokes Star Party Stokes SF, NJ  
Apr Zombie Party Atlanta, GA
- Jun 6 StarConn Middletown, CT  
Jun 12-13 Apollo Rendezvous Dayton, OH  
Jun 18-21 Cherry Springs Star Party Cherry SP, PA  
Jun 19-21 AOS StarFest Roxbury, NY  
Jun 24-27 Green Bank Star Quest Green Bank, WV  
Jul 24-26 The Conjunction 2009 Northfield, MA  
Jun 25-28 Almost Heaven Star Party Spruce Knob, WV
- Jul 17-18 RocheStar Fest Rochester, NY  
Jul 24-26 Mason Dixon Star Party York County, PA
- Aug 2-8 ALCON Expo 2009 Hempstead, NY  
Aug 13-16 Stellafane 2009 Springfield, VT  
Aug 14-23 Rockland Summer Star Party Savoy, MA  
Aug 21-23 Arunah Hill Days Cummington, MA
- Sep 17-20 Delmarva No-Frills Star Party Tuckahoe SP, MD  
Sep 18-20 Connecticut Star Party Ashford, CT  
Sep 18-20 Fall Stokes Star Party Stokes SF, NJ  
Sep 18-20 Hidden Hollow 2009 Mansfield, OH  
Sep 26 Custer Institute Jamboree Southold, NY  
September Astroblast Oil City, PA  
September Black Forest Star Party Cherry Springs SP, PA  
Sep RAC Club BBQ Harriman SP, NY
- Oct 16-18 Mason Dixon Star Party York County, PA  
Oct 18-25 Peach State Star Gaze Sharon, GA  
October Astro Assembly North Scituate, RI  
October Jersey Starquest Star Party Hope, NJ  
October Mid Atlantic Star Party Robbins, NC
- Oct /Nov Star Gaze Manassas, VA  
Nov Arizona Solar Conference Tucson, AZ

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**March Star Fields DEADLINE**  
**Saturday, February 28<sup>th</sup>**

**Email articles to Al Takeda at**  
**secretary@atmob.org**

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**POSTMASTER NOTE:** First Class Postage Mailed Feb. 9<sup>th</sup>, 2009

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

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Mike Mattei (978) 264-0017  
John Maher (978) 568-1253

**How to Find Us...  
Web Page [www.atmob.org](http://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 Eastern Standard Time (EST) from Universal Time (UT) subtract 5 from UT.*

Feb 16 Last Quarter Moon  
Feb 24 New Moon  
Mar 4 First Quarter Moon  
Mar 8 Daylight Saving Time begins  
Mar 8 Saturn at Opposition  
Mar 10 Full Moon  
Mar 18 Last Quarter Moon  
Mar 20 Vernal Equinox