First Light Lite

April 1st, 2017

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

CCAS Disbanded Due to Lack of Interest

Next time, read the date at the top! ☺

Website

Even though it is temporarily frozen, there is much useful information on the current CCAS website! In your browser, bring up www.ccas.ws . The Website Ad Hoc committee is working hard and making progress, and we should get an update from them at the April meeting.

March CCAS Meeting Speaker

We'd like to thank our March 2nd speaker, Dr. Frank Primini of the Harvard Smithsonian Center for Astrophysics. His title was: "Probing the nucleus of M31 with the Chandra X-ray Observatory".

ABSTRACT: M31 is the closest giant spiral galaxy to us, and we believe it's similar to our own Milky Way. It contains hundreds of compact x-ray sources, believed to be the remnants of stellar evolution. In this talk, I'll review some of what we've learned about M31's x-ray population from the Chandra X-ray Observatory and other x-ray telescopes, with particular emphasis on the nucleus of the galaxy. Because of Chandra's superb angular resolution (for an x-ray telescope), it offers a unique perspective on the crowded environment of the nucleus, where we believe lurks a black hole with a mass about 200 million times that of the Sun.

Detailed report on talk by Christine Lynch (standing in for Secretary Gus Romano)

Circa 1807, when Charles Messier was studying the Great Nebula in Andromeda (M31), galaxies were known as nebulae (ala Hubble's famous book "Realm of the Nebulae.") Their structure, seen in later and better instruments, led to an argument over whether or not they were “Island Universes”, and not mere gas clouds. Henrietta Leavitt's study of Cepheid variables allowed astronomers to eventually determine distances to distant galaxies. When combined with spectral Doppler shifts, this led Hubble to formulate his famous law about the expansion of the universe. Using Cepheids as a "standard candle", it has been determined that M31 is about 2 1/2 million light years distant from us.

M31 is a giant spiral, subtending a huge three degrees of arc. It’s made up mostly of older, redder stars with newly formed stars, gas, and dust located out on the spiral arms. Dr. Primini began working on M31 in 1990 and at that time a colleague told him: “Once you get into M31, you never get out.” He continues to this day to work on M31, using x-rays as probes.

The temperature range of x-rays is around 10,000 degrees, and their wavelengths are around 5-10 angstroms. The energy of x-rays is measured in kilo-electron volts (KeV), in contrast with normal light, which is only a few electron volts (eV).

What in the universe can achieve x-ray temperatures? Dr. Primini first mentioned shock heating from the ejecta of supernova explosions, which move at highly supersonic speeds. X-rays can also be produced by other sources, for example: binary star activity, accretion disks, black holes, and others.

In 1962, x-ray astronomy first was done from space using solid fuel rockets that quickly went up and back down. When retrieved, the onboard Geiger counters caught evidence of x-rays from outside the solar system. The researchers claimed evidence of seeing emissions, but could not determine the sources of the x-rays.

One of the modern satellite probes sent up to take capture x-rays is the "Chandra X-Ray Observatory", named after the famous astronomer Subramanyam Chandrasekhar, who provided some of the initial, basic understanding needed to

explain their x-ray research..Chandra's elliptical orbit has a period of four days. In the instrument, the x-rays run at shallow angles down tubes having both parabolic and hyperbolic surfaces, uniting rays at the focal point on the far end.

A question from the audience was: Can optical imaging show the same views compared to x-rays, and what does the comparison reveal? His answer was Yes and No, and that the information when available was often complementary..

He then went on to talk about the presence of black holes in most every galaxy: oftentimes there are more than one present. He said researchers believe that super massive black holes are at the center of most galaxies they've studied. He covered Kepler's 3rd Law, and how the distances and periods of nearby stars indicated the presence of these black holes. He then pointed out that they've found a double black hole nucleus in M31, designated P1 and P2, which are in close proximity. A third black hole, P3, has also detected recently at a short distance.

Chandra's Source Catalog revealed an entire image of M31. He said that P1, P2 and P3 show up very faintly and mentioned they're still seeking answers to why that is.

Dr. Primini said that all their archival data is open to the public. He said that information is online at ChandraHarvard. Edu and at NASA's HEARARC. Both offer portals to the data. This actual data is available to anyone interested along with software to manipulate the Chandra Interactive Analysis of Observations (CIAO). A Help Desk also is available.

Upcoming Speakers and Topics

April - Observatory and Foundation Report,
May - Stella Kafka, AAVSO.
June - TBD
July - TBD
August - Dr. Tony Stark, HSCfA
September - TBD

If you would like to give a talk, either as the main speaker of the evening, or as an ancillary speaker, please notify Jim Lynch at jlynch@whoi.edu. We are working now to fill the "TBD" slots above, and they are on a first come, first served basis.

Note From Bernie Young

TAKE A HIKE !

Drive Route 6 to the Eastham traffic circle and take the exit to the Court House. When you see the overpass for the Cape Cod Rail Trail, look for a small parking lot before driving under the bridge. It has picnic tables and a bicycle rack. But to get to the trail, walk back to the road, walk under the bridge, and take the paved walk up to the bridge. Just a few feet away, at the end of the bridge is something the authorities just had to suppress: the beginning of a walk through the solar system.

It begins by identifying the sun, and establishing a scale of one foot on the path equals one million miles of our solar system. You may be able to see, about 35 feet away, more graffiti, the astronomical sign for Mercury, the planet nearest the sun. You need to walk a little, 67 feet from the sun to find the marker for Venus. By now you should be catching on; 93 feet from the sun is mother earth. You need to walk another 50 feet to find Mars.

If you're up to it, a walk of about 1-3/8 miles (a half hour's walk) will get you to Pluto. Along the way you'll find Jupiter, Saturn, Uranus, and Neptune. The local authorities tried to thwart this educational experience by taking a roller and some asphalt sealer and painting over the markers. Alas, the original artwork was pretty substantial and it's showing through!

The railroad was pretty straight out there. Like it is in Yarmouth and Dennis. Wouldn't it be nice if someone in our society with a hankering for political activism could convince the Department of Conservation and Recreation to approve some permanent markers along the rail trail to educate the public about our solar system. And what a great source of publicity for our society it would be to sponsor these markers. (Before you say "No way", note that the Harwich

Conservation Trust erected a marker for the river herring where the trail crosses the Herring River.)

March 2 CCAS Business Meeting minutes

Mike Hunter said that a telescope purchased by CCAF in 2009 is ready for use. It can be used for positioning and re-positioning; the tracking is very accurate for up to about 20 minutes unguided. The old Dell desktop computer has software and is dedicated to running that scope. He cautioned that a minimum of two people should set it up because it is a bit unstable.

Next, Joel Burnett and Charlie Burke said they attended an interesting talk given by Dr. Martina Hart through the Bridgewater State University's satellite campus, right on Route 28 in South Yarmouth. This is part of their "Ask the Professor Lecture" series open to the public. She spoke about her many years tracking solar eclipses around the globe.

The next solar eclipse is going to happen over North America on August 21, 2017. It will run from Oregon down to the Carolinas with Kansas seeing the total eclipse.

Joel will be in Nashville for the viewing. On Cape, the eclipse will last 2 hours and 31 minutes; however we won't see the full corona.

Information is available at: GreatAmericanEclipse.com and Eclipse2017@NASA.gov.

Jim Lynch covered an update on the work done by Ad Hoc committees. He mentioned that, as Education was being done by the Foundation and being done well, there was no need for an Ad Hoc committee for it at present.

The Website committee is going ahead full steam with Mike Hunter, Joel Burnett, and Gus Romano all contributing. The new website will be accessed by CapeCodAstronomy.org when it's ready. Mike Hunter mentioned they changed the name to reflect how people have told them they searched for us online, simply searching for Cape Cod Astronomy.

The CCAS newsletter First Light will eventually be available through the new website when it's up and running.

The Communications committee is figuring ways to get the word out to local media, that is newspapers, TV stations, public radio, bulletin boards both in print and online. This committee will also coordinate with Joel and Charlie's efforts to publicize the August eclipse, and make it a key event for CCAS.

Outreach is working on getting new members. It was suggested that both Bridgewater State University and Cape Cod Community College should have students and faculty that might want to attend. Jim Carlson also mentioned that he'd like to continue the practice of taking scopes out to other sites, such as schools, museums, and other cultural events, i.e. the Barnstable County Fair. That would be great exposure for the group and possibly bring people to special events and the regular meetings.

Star Parties

Winter season once per month "QUARTER MOON SATURDAY STAR PARTIES", **all open to the public**, began September 10th, 7:30-9:30PM.

From September thru June, we will have one regularly scheduled Star Party each month taking place usually ** at 7:30-9:30pm on the Saturday closest to the date of First Quarter Moon (about 7 days old).

(** In May and June, these events start at 8:30 because of later sunset times.)

When the moon is near its First Quarter, the terminator (the line dividing light from dark) is favorable for viewing sunlight or shadow on the sides of craters. This time is also favorable for observing the dark side of the moon occult (visually cover) stars in the sky as the moon moves in its orbit. Depending upon the calendar, we may also be able to observe planets and other celestial objects.

Here is the remaining schedule for "Quarter-Moon Saturday Star Parties" thru June, 2017; **the public is invited**:

Saturday April 1st

Saturday May 6th

Saturday June 3rd

POSSIBLE CANCELLATIONS for Star Parties: Cancellations will be very rare since we have lots to do "inside" as well as outside. Even if the forecast is "iffy"; the Staff Leader for the night may elect not to cancel in spite of possible clouds. If clouds arrive after staff and guests have convened, a virtual Star Party will usually take place indoors to include overviews of the sky for that night using computer simulations with our big screen TV, videos of interesting sky events recorded previously, demonstrations and/or training on the use of scopes and other equipment, and consultation/discussions on things astronomical, etc.

However, sometimes a solid forecast for overcast or rain or a storm will result in cancellation of a given Star Party. IF IN DOUBT ABOUT THE WEATHER AND THE STATUS OF A STAR PARTY, CALL THE OBSERVATORY AT 508-398-4765 AFTER 7:45 pm. No answer means the event has been cancelled.

Directions to Dennis Yarmouth HS and Schmidt Observatory

For information on the location of our Dome behind Dennis-Yarmouth High School, click on the purple button "Old Website" and once there, click on "Meeting Location" viewing the two maps that are there: external for the Dome, and internal to locate the high school library where meetings are held.

For meetings, drive in the south entrance road and go around behind the main building. Park in the lot about half way down the building and go in the back door and turn down the hall to your left to find the library.

For Star Parties at the Dome, drive in the north entrance road all the way past the north side of the main high school building, through a gate, and on to park near our Dome.

H&K directions

Please be reminded that Gus Romano or his delegate “host” a dutch-treat dinner gathering for members and friends each CCAS meeting night (before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) The speaker for each meeting is always invited. Please join the group to dine and talk about all things interesting, including astronomy, each month before our meeting. The H&K is at 1196 Rt 28, South Yarmouth, about a half mile west of the Station Avenue/Main Street intersection with Rt 28 (stop light).