

First Light Lite

November 1st, 2017

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

Website Committee

To repeat our usual message: our new website is coming along, and there is a wealth of information on it. In your browser, bring up www.capecodastronomy.org to see the latest info. We will continue to get updates from the committee at each monthly meeting.

Joel Burnett also had some important info on our old website last month:

"The original website may have some content of interest to you. I have added a link to it from our website www.capecodastronomy.org by going to "links" and then "vintage ccas".

You can also go directly to the site <http://www.ccas.ws/oldwebsitetemp.html>. Please gather what interests you from there as it will be retired on Dec 1st. If you feel any content there would be helpful to bring onboard to our new site, please contact cca@capecodastronomy.org and let us know. Also, if you have suggestions for the new site, please let us know that as well."

This will be closed soon (December 1st), so act soon if you wish to!

Communications Committee and Overall Efforts

Rather than paraphrasing the progress made by the Communications Committee, a posting of the 10/12/17 conference call meeting will probably be much more efficient, so here it is!

1) Chris Lynch described her newspaper and radio advertising efforts, which will be monthly. She contacted WCAI, who confirmed, for radio. For newspapers, she contacted the Cape Cod Times, and the Bulletin. Online, she contacted Capecod.com and Capecodtoday.com. Meetup.com was suggested as a pay site. The CapeCod.com ad has already appeared, and even flashes a map up, in addition to our text.

- 2) PowerPoint posters featuring the speakers, Star Parties, and any special CCAS events will be distributed to a list monthly. Jim Lynch volunteered to do the poster, and Ed Swiniarski will also work on it. Chris Lynch is developing an email list for this. Bridgewater State, 4C's, and Barnstable HS were suggested by Charlie as possible distribution sites, as well as local libraries and perhaps churches. The nonprofit status of the Society should be noted on the poster.
- 3) We should try to get 3-4 news stories about CCAS per year, and develop a list of contacts. We did well this year with the eclipse event. The same venues should be interested.
- 4) Having a possible Astronomy Day in the spring, with a day long program for the public, would be a draw. Hank mentioned this is done by other organizations. We will look into a past event CCAS held to see what was done.
- 5) Jim, Chris, and Charlie said they would work on redoing our brochure, and developing a distribution strategy for it.
- 6) Katie contacted Jim after the meeting, and they will work on a social media strategy at the next Thursday meeting.

Katie Sisson also chipped in some work afterwards on a Facebook page...her message on that is as follows:

<https://www.facebook.com/Cape-Cod-Astronomical-Society-948442561984897/>

"This is the bare bones of the Facebook Page. It will be up to me to enhance and create the site with pictures, information etc. We can discuss what may or may not be appropriate for this site at our next PR/advertising group conference call."

If you *are* interested in joining in these efforts (which do not require great amounts of time), again, please email Jim Lynch at jlynch@whoi.edu. You can join in our (half-hourish) conference calls for free, and see if there is some facet of this work you would like to help with!

October CCAS Meeting Speaker

We'd like to thank Mr. George Silvis for giving the October talk on "Rømer and the Speed of Light." A description of this talk can be found in our "meeting minutes" section below.

Upcoming Speakers and Topics

November 2 - Dr. Larry Marschall, Gettysburg College. "Tiny bit of shakin' going on: Gravitational waves and the universe."

On September 14, 2015, two unusual observatories, one in Louisiana and another in Washington State, recorded the near-simultaneous arrival of gravitational waves. This was the first time these subtle distortions of space had been detected, though their existence was predicted by Albert Einstein a century earlier. The discovery, perhaps the most remarkable and challenging astronomical measurement of the century, opened up a new way for astronomers to study the universe. We'll give some background on the nature of these odd ripples in the cosmos, and explain how, by observing changes on the earth's surface that are smaller than the nucleus of an atom, astronomers are now able to study some of the most powerful events in the universe-- the collisions of black holes millions of light years away.

December - Dr. Mike Hunter, CCAS. "A History of Science." Beginning with an examination of the essential elements of science, Dr Hunter will lead us through time, applying those elements to known discoveries, events, writings, etc which may or may not represent science.

January – Dr. Frank Primini, HSCfA. Title TBA.

February - Dr. Kenneth Brink, CCAS. Title TBA

March - Dr. Jim Lynch, CCAS. Spectroscopy - Basics, With a Demonstration.

April - Dr. Anastasia Fialkov, HSCfA. Fast Radio Bursts.

May - TBD

June - Dr. Marion Dierickx, HSCfA. Galaxy Satellite Collisions.

October 5 CCAS Meeting minutes (Including Main Speaker talk precis)

Attendance: 21

The meeting was held at the Dennis-Yarmouth High School Library.

Tonight's speaker was George Silvis on the topic of Ole Romer, Io, and the Speed of Light

The speed of light is perhaps one of the most fundamental constants in physics and astronomy. Danish astronomer Ole Romer (1644–1710) was the first to calculate its value using theory and observations. In this presentation George examines how this experiment was designed originally, and how we can make our own modern-day observations to arrive at the same conclusion as Romer.

At the turn of the 17th century the world's first telescopes were coming into use. This new astronomical instrument greatly helped Romer in observing the eclipses of Io, Jupiter's closest moon. As Io revolved around Jupiter, Romer would observe exactly when it disappeared behind Jupiter's shadow, and when it emerged on the other side. The periodic orbits of Jupiter's moons can be thought of as a giant cosmic clock that ticks with every eclipse. The eclipses of Io are also useful to in determining one's longitude on Earth. In the late 1600s Cassini used this information to establish a universal time.

Romer postulated that the time between eclipse events would depend on the relative distance between Earth and Jupiter. The period of an eclipse is apparently longer when the Earth is farther away from Jupiter than when it is closer. If the distance between these two relative positions of Earth is known we should therefore be able to use the time differential to easily calculate the speed of light. Romer's calculated value of 220,000 km/s is within 26% of the presently accepted value of 300,000 km/s. Not bad for 1676!

Today, we can more accurately calculate the speed of light using the same physical phenomenon (Io eclipses) and an O-C diagram. O-C stands for Observed - Calculated. As the name implies, this type of diagram is a powerful diagnostic tool that compares the actual timing of an event to the moment we expect the event to occur based on a model of constant periodicity. These models are created using past eclipse data found in an ephemeris - an astronomical almanac. Fitting the data

to the model is then a simple application of the sum of least squares. Once we have obtained a reliable time differential between when the Earth is closest to Jupiter and when it is farthest away, our next problem is to determine the distance between Earth and Jupiter. Today, we can simply look up the value in a database. In the 1600's Romer relied on trigonometric relationships between the Earth, Sun, and Jupiter and Kepler's third law to determine the distance. Now, with a measurement of distance and time, we can duplicate Romer's calculations for the speed of light.

There are several ways in which error can be introduced into this problem. Firstly, the data assumes that all orbits are circular and all bodies lie in the same plane. Additionally, the moons of Jupiter do not always move at constant speeds due to orbital resonance as well as Jupiter's position relative to the Sun. Also, the accuracy of the data can be improved by taking more measurements.

In conclusion, it appears that simple tools can be used to give rather precise measurements. The determination of the speed of light would be an excellent project for any high school student studying astronomy.

Business:

The Website Committee requests that members take a moment to inspect the old website and suggest links or information that they think is important to be included on the new site @ capecodastronomy.org. The new website now has a 24-7 live feed camera for observing current weather conditions.

The Communications Committee met on 10/12 to discuss outreach and advertisement efforts for the society. The minutes for this meeting can be found above.

The Foundation is working on getting a bathroom facility up and running at the Werner Schmidt Observatory.

The November speaker will be Larry Marshal on the topic of gravitational waves.

The meeting was adjourned at 8:45

Respectfully submitted,
Katie Sisson - Secretary

Star Parties

Winter season once per month "QUARTER MOON SATURDAY STAR PARTIES", **all open to the public**, begins September 23rd, 8:30-10:30PM.

From September thru June, we will have one regularly scheduled Star Party each month taking place at 8:30-10:30pm on the Saturday closest to the date of First Quarter Moon (about 7 days old).

From July through August, we will have three or four regularly scheduled Star Parties each month taking place on Thursdays at 8:30-10:30pm.

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 "Star Parties" through December, 2017; **the public is invited:**

Saturday, December 23

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).