

First Light Lite

April 1st, 2018

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

March News

March was a good month for CCAS speakers (Dr. Frank Primini of HSCfA giving a talk on Gravitational Lensing, see below) and committee meetings, but not so great for seeing, with 3 1/2 Nor'Easter's chewing up our weather pattern. Our 3/24 Star Party got limited viewing due to thin clouds, which also gave a strange set of snow showers the next day. Hopefully, Spring, which has formally arrived, will also arrive in the meteorological sense in the not-too-distant future.

April 5th CCAS Meeting Speaker and Topic

Due to Dr. Anastasia Fialkov of HSCfA being required to travel, her talk on Fast Radio Bursts, scheduled for April 5th, is cancelled and will be rescheduled. The future date will be announced when available. As a replacement speaker, Jim Lynch has volunteered a talk on spectroscopy, a topic CCAS is interested in pursuing observationally. The title and abstract appear below. Also, Dr. Marion Dierickx, of HSCfA, who was scheduled in June to talk about Galaxy Satellite Collisions, will also reschedule. Stay tuned!

Spectroscopy - Basic Theory and What It Tells Us About the Universe.
Dr. Jim Lynch, CCAS.

CCAS members are, at this point in time, familiar with using simple diffraction grating spectrometers to look at the line spectra of stars to obtain their properties. This is, in essence, a simple pattern recognition exercise, like fingerprinting. But what can spectrometers do past there? To answer that question, we need to dig a bit deeper into the physics of atomic and molecular spectra and of the astronomical objects that create them. In this talk, I will try to show in as simple terms as possible what we can learn about the universe when we take this somewhat deeper dive into things.

Upcoming Speakers and Topics

May - DY HS student honors projects (tentative)

June - TBD

July - Dr. Jim Lynch, CCAS. Spectroscopy - Observational Basics, With a Live Demonstration.

NOTE: Drs. Larry Marschall will be repeating his LIGO talk at WHOI in early May, on 5/2/18. The seminar will be held in the Smith Building seminar room at 1215 PM on a Wednesday. The seminar room is right by WHOI's main desk in Woods Hole Village, and is very easy to find. Parking is metered - bring quarters! You are cordially invited to attend!

March Speaker

The March CCAS speaker was Dr. Frank Primini from the Harvard-Smithsonian Center for Astrophysics speaking on the topic: "Adventures in Gravitational Lensing."

Gravitational lensing is a phenomenon in which light from distant stars is bent by very massive objects and appears to us as distorted rings of light. One of the first persons to suggest that such a thing could happen was Newton in his book "Optiks" in 1704. In 1804 Johann Soldner calculated the actual value for the angle of deflection. However, Soldner's value was only "half right". In 1911 Einstein first correctly calculated the deflection angle. The first lensed object to be discovered was "Twin Quasar" found by Dennis Walsh in 1979.

There are two ways to detect lensing. If the lensing object is sufficiently large, the displacement of light will be measurable with very accurate photometry. If the lensing object is small (like a planet or a brown dwarf) and the angle of deflection very small, the lens angle can be calculated from the increase in magnitude of the star. This is called a microlens. Microlenses are particularly

helpful in the search for dark celestial objects such as planets, brown dwarfs, low mass stars, black holes, and neutron stars. The occurrence of gravitational lensing is transient due to the random motion of the Earth.

There are a number of organizations collecting data on lens events.

MACHO project – MAAssive Compact Halo Objects – dark stellar bodies - planets and brown dwarfs

EROS – Expérience pour la Recherche d'Objects Sombres

OGLE – Optical Gravitational Lensing Experiment – dark matter – difference imaging

Chandra data

XMM Newton Survey group

MOA – survey group – Microlensing Observations in Astrophysics

Micro-FUN – using lensing to find planets

CTIO – SMARTS

AAVSO – American Observation of Variable Star Observers

Spitzer – space based observer

Amateur astronomers can also get involved in the data acquisition. There are many lensing events that can be observed with even moderately sized telescopes.

50 planets have been detected by lensing (at least)

An anecdote: The Swift satellite chases gamma ray bursts (Gehrels) For 3/2/2014. Frank and his colleagues anticipated a lensing event. He got viewing time for three hours on Swift but they didn't find what they were looking for. (Even professional astronomers need some luck!)

Caustic curves (highly focused parts of the light received) are useful data in gravitational lensing, and play an important role in determining the distribution of the masses of dim objects and the presence of dark matter.

Meeting Minutes

Foundation Business:

We have 2 permanent mounts outside the observatory. We now have a new 16” Ritchey–Chrétien direct drive, plane wave telescope. Bernie is currently looking into new cameras. The goal is to have a more “professional quality” observatory. Additionally, this setup will make it much easier train new operators on the equipment because it is easier to use.

Society Business:

A conference call was held on 2/26. The following initiatives were addressed:

- Getting more organized with regards to membership – create a system to track membership
- Organize 2-3 “days of astronomy” at the observatory (recommendations welcome)
- Create an eye-catching brochure to attract new members
- Reach out to local colleges, scouts, civic groups and organizations
- Sell excess equipment

These initiatives will take time and effort to organize. Our society leaders will need some help. If anyone is interested in taking even a minor role on any of these projects, it would be greatly appreciated.

The meeting was adjourned at 8:30

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 schedule for “Star Parties” through June, 2018; **the public is invited:**

Saturday, April 21st

Saturday, May 19th

Saturday, June 16th

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).