**First Light Lite**

June 1st, 2017

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

**Website**

Even though it is still a work in progress, there is much useful information on the current CCAS website! In your browser, bring up www.ccas.ws . The Website Ad Hoc committee continues to work hard and is making significant progress. We will continue to get updates from them at each monthly meeting.

**May CCAS Meeting Speaker(s)**

We'd like to thank Dr. Stella Kafka of the AAVSO for her very well received presentation "Discussing the Elusive SNeIa Progenitors." A precis of her talk can be found in the meeting notes below.

**Upcoming Speakers and Topics**

June - Gary Derman, CCAS. "What is electricity? What is magnetism? A discussion."

Most of us grow up thinking the prime driver in the formation of the universe as we know it has to do with gravitational attraction. The forces associated with electricity (and magnetism) play a much larger role in both forming and maintaining our world. Just what electricity and/or magnetism are, as well as the formation of electromagnetic waves and their significance will be discussed (at least to the extent we can fit into a one hour session).

July - Jim Lynch, CCAS. "The Drake Equation, with emphasis on the 7th term."

The Drake Equation, to quote Wikipedia, "is a probabilistic argument used to estimate the number of active, communicative extraterrestial civilizations in the Milky Way galaxy." Written in 1961 by Frank Drake, the director of the Arecibo Observatory, as a way to stimulate scientific dialogue at the first SETI conference, the equation has seven deceptively simple terms that are multiplied to get the number of such civilizations, N. The seventh term, L, is "the length of time over

which such civilizations release detectable signals." As we have not yet received an extraterrestial signal, we have only one civilization to study at present - ours! There are aspects of our civilization that should be universal, and others that may be specific to us, and that is what makes the problem interesting. A small warning - some of the possible N outcomes are a bit scary, so you might need to use Vulcan dispassion in considering some of the talk!

August - Dr. Tony Stark, HSCfA. "Star Formation in the Milky Way and Beyond"

September - TBD

October - TBD

November - 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 - TBD

* On May 31, a WHOI talk will be given that extends a previous CCAS talk. Specifically, Jim Lynch will present "Is the Universe Stringy, Loopy, or just an Entangled Mess?" 1215, Smith Conference Room. Public lecture, all invited.

* 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 rest of the year's "TBD" slots above, and they are on a first come, first served basis.

**Note From Bernie Young**

**(April notes - May continues these)**

We have a Canon Power Shot 8MPx camera circa 2007 which will be good for wide field astrophotography (i.e., without a telescope). There is a plexiglass shoe in the dome that can be used to mount it on the 16" for time exposures. Images suitable for this camera are retrograde motion of the naked eye planets, meteor showers, circumpolar motion, and Iridium flares. It can take movies from video rate to 2 second time lapse. Mr. Goodwrenches is working on a way to capture spectra with it using our diffraction grating. A handout with suggestions for the Jupiter retrograde project are with it; they may be used as a guide for still shots of other subjects. The MANUALS folder in the Administrator directory of the Lenovo contains a PDF of the manual for those who are interested. Once you get the hang of it, it's easy to use.

**May notes from Bernie**

Retrograde Motion of Jupiter

We're getting near the westerly elongation of Jupiter's retrograde motion for 2017 which occurs on May 30. If you haven't tried photographing it every clear night, you've only missed part of the story. After it turns it will wander to the east, so there's time to get some experience with the skills of planning, executing, and processing images of retrograde motion.

As it makes its turn, Jupiter will appear to slow down, so I have begun zooming in to the full optical telephoto mode of the Canon Power Shot camera. I'm using my camera on a tripod in the front yard usually taking 5 second exposures at ISO 200, but varying those values so I have backup exposures to cover varying seeing conditions. We have the same model camera at the WSO if anyone wants to try it. See last month's First Light for more about the camera and its manual.

The accompanying image is a stack of photos taken on May 10, 17, 18, 19, 20 and 21. The three stars above Jupiter are magnitudes 3.7, 2.8, and 4.0. The middle of the three is theta Virginis. Zoom in around the cluster of Jupiter images and identify the stars using your favorite planetarium software.

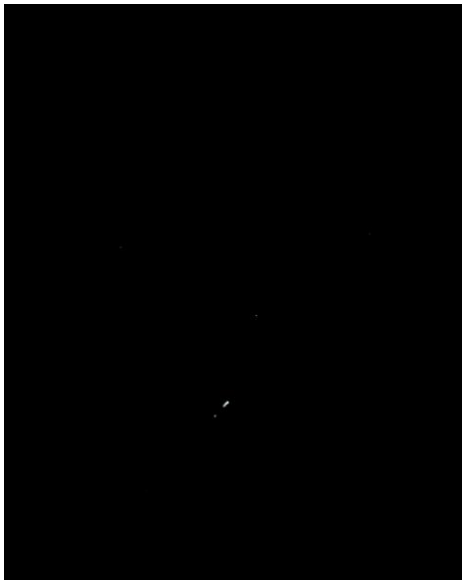

Figure 1. Bernie's images (enlarge the JPG that is enclosed with mailing)

**May CCAS Meeting minutes (Including Main Speaker talk precis)**

Thanks again go to Christine Lynch for standing in for Society Secretary Gus Romano and taking the following notes!

Meeting called to order at 7:30 pm with invocation "May the 4th be with you."

**Speaker: Stella Kafka, Director** of the American Association of Variable Star Observers (AAVSO)

**Discussing the Elusive Supernova IA Progenitors**

Based in Cambridge, MA the AAVSO is an international nonprofit organization that welcomes citizen astronomers to help collect and analyze data on stars that change in brightness, known as variable stars. CCAS Member George Silvis has participated in this organization for many years and suggested Dr. Kafka come to our meeting to speak.

Dr. Kafka said the AAVSO mission is to enable anyone, anywhere to participate in scientific discovery through variable star astronomy. AAVSO provides training, manuals, courses offered both in the school and online, and celestial charts. They also have data analysis tools, a publications library, and mentoring (for information email mentor@aavso.org). In time for the August 21

solar eclipse, she mentioned the AAVSO has a new guide on Safe Solar Observing with resources for safe eclipse viewing.

Dr. Kafka then turned to her main topic, the fundamental properties of supernovae: SneIA have the same light curve, a brightness magnitude of about ]-19.3 +/- 0.3. Spectroscopy of their elements reveals **no** hydrogen. When astronomers get to study an actual explosion, each has a similar light curve and spectra. She called these eruptions "the universe's recycling bin" because this loose matter eventually will create new stars.

There are some possible steps to viewing Progenitors, those conditions that should result in supernovae. 1) A supernova can start with two stars in a binary orbit with one being a white dwarf (WD), high in carbon and oxygen. It will grow in mass to about 1.4 solar masses (the Chandrasekhar limit). 2) Two WDs in proximity with gravity driving binary evolution. Might result in a neutron star. 3) Giant star and a WD high in carbon/oxygen. Their rotation forms an accretion disk. Eventually, also a neutron star.

**Observations**

Lack of hydrogen is a defining characteristic of a supernova. It takes around 500 years for the matter to clear and expand. Her group has been observing remnants in the vicinity of the supernova probably observed by Tycho Brahe in 1572. Shocks from the star ejecta shows a possible special signature - a sodium line.

She stressed that AAVSO needs citizen astronomers to help them sort through data to understand mass growth/mass loss of the WD. People can subscribe for alerts/campaigns by emailing AAVSO@AAVSO.org

She said typically there are hundreds of supernova in a year. The main action happens in zero to 20 days. To get timely evidence, astronomers go through the process of elimination in their observations. Watching for promising combination of mass, pressure, temperature in stars helps them to make rough predictions of when events will occur. However, predictions are hard, and events can be irregular. As an example, observers have noted T Pyx flare ups in 1890, 1902 , 1920, 1944, and 1986 - but then it skipped 2011. Nonetheless, they now are

making predictions for the next eruption. She said this information is part of the huge collection of information available for research use in the AAVSO database.

**The Business Meeting**

Bernie Young followed the talk by mentioning that the AAVSO Solar Observing information is very helpful. One CCAS member requested a talk on scientific notation.

Joel Burnett gave a quick update on the progress of the new CCAS website.

Mike Hunter reminded people they can borrow scopes and other equipment for use at home. Also, some of the equipment is available to purchase.

More CCAS members are needed to help out with the school groups that will be descending on the observatory in the next few weeks. Contact Joel Burnett or Bernie Young. CCAS elections are coming up in July.

For the Society: Jim Lynch is willing to stand again for president, Mike Hunter said he'd be willing to be the treasurer. Gus Romano will have to step down as secretary due for medical reasons, so that slot is open. The Vice President slot also is open. For the Foundation: There's one opening for a 5 year term.

Lease negotiations coming up in 7 years.

The meeting was adjourned at 9:00 pm.

**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 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).