

Southern Maine Astronomers  
Club Meeting  
December 5, 2024 7:00 p.m.

Attending were members Howie Marshall, Dave Crocker, Russell Pinizzotto, George Bokinsky, Al DiSabatino, Craig Snapp, Dean Ostergaard, Bob Dodge, Dwight Burkard, Mike Mack, Russell Clark, Dave Manchester, Greg Zdenek, Joe Long, Paul Howell, Chris Parent, Kevin Berry, Jim Coyle, Mike Efron, Jeff Van Fleet, David Gay, Mark Miller, Scott Lovejoy, John Saucier, Paul Sasso, Doug Lund-Yates, new members Stephen Turner, Jenna Buckingham, and Bill Denig, and Rob Burgess and guests Ben \_\_\_ and our guest speaker, Prof. Fe McBride.

Rob Burgess opened the formal portion of the meeting and welcomed new members David Crooks, Fredderick Wallace, Adam Lee, Jasmin Robinson, Bill Denig, Jesse Garcia, Maxine Secskas, Domantas Mikonis, Jenna Buckingham and James Burke. Rob noted that there were nine additional persons appearing to apply for membership, growing the club to an unprecedented level. Membership now stands at 116, the highest level in club history!

**Recent activities by members:**

- David Crocker reported that a sub-group of members interested in solar observing has coalesced. It includes him, Russ Pinizzotto, Ron Thompson and Jon Wallace. The group is interacting through email at this point. If interested, club members are asked to email him (dcc04444@gmail.com).
- Russ Pinizzotto is organizing a sub-group of those interested in AL Observing Programs. They will be meeting soon via Zoom. Notice will be provided to members (zzotto@icloud.com).  
Russ reported he is about 70 objects into the AL's Hershel 400, Part 2 observing challenge.

**Announcements:**

- Rob stated he intended to start a "President's Blog" via the website. It is hoped this will inform the membership about plans and activities in the club, particularly where only about 25% of the members attend meetings where these topics are covered.
- The next Director's meeting will be Wednesday, Dec 18 at 7 pm, via zoom. Agendas can be obtained from Rob (rburgess250@comcast.net).
- The next club meeting will be Thursday, Jan 2, focusing on observing and telescope basics. Members were encouraged to submit ideas on topics to be covered and to volunteer for 5-10 minute segments that particularly interest them and would be helpful to someone new to astronomy. If interested, or to offer suggestions, please contact Russ Pinizzotto (zzotto@icloud.com).

- Jeremy Wright and Dean Ostergaard are working on organizing and field testing equipment the club has for sale. As items are vetted notice of their availability will be posted on our website.
- It's membership renewal time. Renewing now through the website is a simple and efficient way to remain a member of the club. Rob encouraged members to renew as soon as they could to avoid any disruption in their Reflector subscript

**Guest Speaker: Fe McBride, Assistant Professor, Physics and Astronomy Department, Bowdoin College**

Rob introduced Fe McBride by discussing her educational lineage (undergrad, graduate and doctoral degrees) from the Dr. Karl Remeis Observatory in Bamberg in her native Germany. Fe then spent three years in Amsterdam working on the Cherenkov Telescope Array studying black holes. She then moved on to Penn State University, continuing her research before assuming the teaching position at Bowdoin. Dr. McBride is an observational astrophysicist specializing in high energy astronomy (X and Gamma Rays) with particular focus on particle acceleration near supermassive black holes.

Professor McBride's talk was about so-called "ghost particles" otherwise known as neutrinos. It was not until the late 19<sup>th</sup> century that William Roentgen discovered that the air was ionized. This led others such as Ernest Rutherford and Theodore Wolf to conduct further research, it having been assumed the ionization was the result of radioactive decay of minerals in the earth. The level of ionization should decrease as one got farther from the earth. Experiments at the top of the Eifel Tower should therefore show less ionization, but in fact showed more. This was then assumed to be the result of the metal structure. Hess then ascended to 17,400 feet in a hot air balloon and found even higher readings, confirming it was neither the earth, nor the metal in the tower, that caused this, but that the forces causing the ionization were coming from outer space.

The incoming energy sources were protons or other heavy atomic nuclei. The measurements were astounding. Even today in the Large Hadron Collider we can only achieve trillions of electron volt energies yet what was coming from space were millions of times that level!

It is hard to detect the source of particles because they are intercepted by the Earth's magnetic fields and redirected. When a high-energy proton hits a photon it produces two pions yielding two high energy X rays and multiple neutrinos. If the pions and neutrinos are aligned scientists can locate the source and then learn something about the physics of the place producing them.

Neutrinos were only recently determined to have mass. It is estimated that six million neutrinos weigh as much as one electron. Neutrinos are also produced in the Sun. It is estimated that 60 to 100 billion neutrinos pass through all tangible matter, including our bodies, every second.

To locate the origin of neutrinos they need to be "trapped" – using detectors that can record their passing through matter. Large volumes are required such as huge underground caverns filled with water or the Ice Cube Observatory in Antarctica, where more than 5,000 detectors are hung on

cables as deep as 1.75 miles in ice core holes. If a neutrino, traveling faster than the speed of light in ice, hits an atom, it will produce Cherenko radiation, a blue light in the optical spectrum, producing a nanosecond flash. Multiple sensors allow the direction to be triangulated. Scientists then use telescopes in various wavelengths to scan the skies for the potential source, giving us information about the genesis of these cosmic rays – the accretion disks surrounding black holes. By understanding these energy levels we learn much about the size and dynamic power of black holes at the center of galaxies, helping us understand the properties of these galaxies and their evolution over time.

### **Night Sky Tour** - Russ Pinizzotto

In a departure from deep sky objects visible in the current month, Russ highlighted four challenges in this winter season. They all involve some level of observing:

1. TCrB Nova Challenge – between March 27 and November 10, 2025. Deadline is one month after eruption.
2. Solar Maximum Observing Challenge – observing through March 31, 2025 with a reporting deadline of April 30, 2025. <https://www.astroleague.org/al-observing-challenge-special-obaward/>
3. Parker Solar Probe 2.0 Special Observing Challenge – observation dates Dec 17, 2024 through December 31, 2024 with a reporting deadline before January 31, 2025.
4. Hubble Space Telescope 35<sup>th</sup> Anniversary Observing Challenge – observation deadlines monthly in 2025 with a reporting deadline of January 31, 2026. <https://www.astroleague.org/nasa-observing-challenges-special-awards/>

Rob Burgess  
President, SMA