Westminster Astronomical Society Inc, of Maryland

Volume 32, Issue 4
April 2015

The Mason-Dixon Astronomer

April Meeting:

- Wed., April 8th – 7:30 pm
  Bear Branch Nature Center
- **Bill Ellis, PhD**

  "The 'Geography' of the Nearyby Universe"

Pre-Meeting Dinner

- Wed., April 8th – 6pm.
- Harry's Main Street Grill
  65 W Main Street
  Westminster, MD 21157

INSIDE THIS ISSUE:

St*r Points

Major Missions to Dwarf Worlds - Part 1

April 2015 – Curt Roelle

There are currently two unmanned U.S. space missions currently at or preparing to arrive at dwarf planets in our solar system. Their names are Dawn and New Horizons and both have been traveling for years on long journeys getting to their target destinations.

A few years back, Pluto was demoted from major planet to dwarf planet. But Pluto is not the first "planet" to face demotion. On New Year's Day in 1801 – the first day of the 19th century – a small object was discovered orbiting the sun in the gap between Mars and Jupiter. It was the culmination of a search for what was presumed to be a missing planet existing in that void. Named Ceres, the small world was heralded as a newly discovered planet. As more and more objects were discovered in the same general band around the sun, it was realized that they were all members of a new class of objects now known as asteroids. And so, all of these new planets were reclassified as "minor planets" and the number of known major planets remained at eight due to the discovery of Neptune in 1846.

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President's Message

April 2015 – Tony Falletta

Greetings WASI Astronomers,

April! With each passing day, I become more inspired to get out and enjoy the warmer nights. It's been a cool start to spring so far but I know before long I'll be breaking out the bug spray!

In observatory news, here at BBNC we continue to complete the finalization of the Blaine F. Roelke Observatory. This involves getting all the ancillary equipment that are actually quite integral. It is our intent to open the observatory as fully equipped as possible so all the membership will be able to pursue this own particular astronomical passion. Member Steve Conard has been coordinating training of the observatory and telescope and intends to administer various classes including advanced telescope operation, astrophotography, video astronomy, star hopping, general visual observing and participating in the numerous Astronomical League programs. With our wonderful telescope, the C14, our members will be able to be fully engaged. We are expecting to have a grand opening to the public sometime in April or May. Once we get the U&O for the building, the observatory becomes available to the public! Over in Taneytown, there is nothing really new to report from last month. The city and county are still working out their land transfer agreement of Bollinger Park.

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April Meeting – Guest Speaker

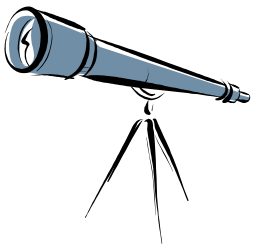
Bill Ellis, PhD (and WASI Member!)

"The 'Geography' of the Nearby Universe"

Bill Ellis (WASI) will present a talk on the "geography" of the nearby universe. We often describe celestial objects in terms of the constellation where they are found, but not by galaxy, group, or supercluster in which they are located. Cosmography locates objects in three dimensions.

Bill is a retired environmental chemist, with a PhD in organic chemistry. His interest in astronomy began a year ago when he joined WASI.

Upcoming Events From Our Calendars



- **Monthly Meeting** April 8th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Soldiers Delight Public Stargazing** April 11th, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills
- **Members Observing** April 11th, Sunset, at Bear Branch Nature Center (BBNC)
- **Planetarium Show** April 25th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Observatory Operation Training** April 25th, 5:30 p.m., at Bear Branch Nature Center (BBNC)

Join The Westminster Astronomical Society…

Joining WASI gives you a great opportunity to meet fellow astronomers and provides group memberships to the Astronomical League and the International Dark-Sky Association. Additionally, benefits include access to our Library (over 500 astronomy-related books), the ability the borrow club scopes, a subscription to the Astronomical League's *Reflector*, access to members-only observing sessions and sites, and club discounts on astronomical magazine subscriptions.

Adult Membership is still only $25 per year.

NEW THIS YEAR – JUNIOR MEMBERSHIP

Yearly Membership For Anyone Under 18 Is Now Just $5!
(YES…JUST FIVE DOLLARS!)
http://www.westminsterastro.org

St*r Points for April…

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Ceres managed to gain some ground back in 2006 with the reclassification of planets by the International Astronomical Union (IAU). Ceres was promoted from minor planet to the same "dwarf planet" status along with poor demoted Pluto.

The Dawn spacecraft was launched in 2007 from Cape Canaveral, in Florida. Sixteen months later it sailed only 340 miles above Mars at its closest point which gave Dawn a gravity assisted boost. Some two years later in 2011 Dawn entered orbit around Vesta, a giant 326-mile diameter asteroid. It analyzed the asteroid for nearly 14 months until its departure in 2012.

You may be asking yourself, if Vesta is such a huge asteroid, then why is it not considered to be a dwarf planet as well. The answer is rules, rules, rules! Vesta was considered too shapely by the IAU to be a true dwarf planet. Dwarf planets are supposed to be round, you see – "ellipsoidal" to use the precise nomenclature. Unfortunately, Vesta has a huge crater making her physically unfit and therefore is designated as one of many thousands of other minor planets even though Vesta is the 2nd largest asteroid after Ceres.

In March, Dawn entered orbit around the 590-mile diameter dwarf planet Ceres. Even during its approach Dawn was returning tantalizing views. In one crater two small bright objects were observed. Some scientists think they are specular reflections perhaps from ice deposits. After all, Ceres is thought to be one quarter ice. Dawn should remain active as it orbits Ceres until the end of the year when its primary mission comes to an end.

The Dawn spacecraft has four major scientific instruments. The Framing Camera (FC) black & white images. Color images can be produced by shooting several black & white photos through color filters and combining them. The Visible & Infrared Spectrometer (VIS) measures the intensity and bandwidth of reflected light while mapping planetary surfaces in order to determine properties such as temperature. The Gamma Ray and Neutron Detector (GRaND) maps the distribution and abundance of elements on the surface. The Gravity Science experiment measures subtle shifts in signals bounced off the surface in order to determine a body's mass and other properties.

Next month we'll talk about the New Horizons mission which is expected to fly past Pluto in July.

Observatory Operation and Training News

Observatory training classes were held for the first time in late March. Thanks to everyone who participated and made suggestions for improving training for upcoming classes. The classes also proved to be a stress-test for the observatory, and revealed a number of minor problems that needed correction. Several members stepped up and donated hardware to correct most of these problems--thanks to those who did that. Improvements include a finder scope with illuminated reticle, a new red-dot finder, focusing mechanism, diagonal, and telescope cover. As a result, the second session proved to go much more smoothly than the first.

The next training session has been tentatively scheduled for Saturday, April 25th, starting at 6 PM. We hope to confirm this at our April meeting. The training consists of three parts:

- Classroom training (no limit on attendance) 5:30 to 7:00 PM, BBNC library
- Observatory demonstration (limited to the first 8 signed up) 7:00 to 7:45 BFRMO
- Skills practical test (limited to first 4 signed up) 8:00 to 10:30 BFRMO

Additional opportunities to do the practical test will be provided. If you want to arrange a session or sign up for the April class, contact Steve Conard at steve.conard@comcast.net

Observatory tips for April:

- To get a quick estimate of the telescope's power, divide 4000 by the focal length (in millimeters) of the eyepiece being used. For example, a 20 mm eyepiece gives approximately 200 power. To get the true field of view (FOV) using your eyepiece, divide the apparent FOV of the eyepiece by the telescope power.
- If you are undecided about opening the dome's shutter for zenith objects or low objects, choose low objects, leaving the lower panel attached to the moving shutter. In general, there are more low objects than zenith objects, and any object near zenith will move out of the zenith area in an hour or two.
- Make sure the telescope is set to within a minute of actual time. A 1 minute time error will result in slews at the equator that are about 15 arcminutes off in RA. A 40 mm eyepiece with an apparent FOV of 50 degrees has an actual FOV of 30 arcminutes, so a 15 arcminute error will put your target on the edge of the field of your eyepiece.

President's Message

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The recent WASI survey is now closed. Thank you for your input. There have been many ideas and suggestions put forth, many of which are quite insightful. You have given my officers and I much food for thought.

For April, I thought I would kick things off by offering some observing basics that most of you are probably well aware of but perhaps not. To have a good night of observing, you need to be prepared and have a plan. For me, a good night begins with good weather, meaning clear dark skies with low humidity and light winds. Next, I like to have the comfort items in place. This means warm clothes, a comfortable chair, some light snacks and hot coffee or chocolate. After this, I ensure all my equipment is clean, tuned and ready to go. If you are using a reflector, an SCT or MCT, this means incorporating cool down time. Equipment is not only the telescope but the eyepieces, filters, dew fighting gear and even binoculars. If the Moon is on my plan I usually try for when it is in a crescent phase to take advantage of maximum shadowing on its surface. Finally, I make sure I have the proper charts and a list of objects I want to see. My observing plan always has a start and end point. You will find that having a list of objects to hunt for becomes essential once you get started. Following a list helps keep you on track and gives you a feeling of accomplishment when you're done. When I observe, I work on my list and when that is done and I'm still wanting more to see, I just wander the sky randomly looking for objects that catch my eye at that moment.

With all this in mind, this month I have just a short plan that starts us in the northern sky. Begin with Polaris, the North Star. At Polaris, you will see that it actually part of an asterism known as The Engagement Ring. This ring is formed by a little circlet of 8th and 9th magnitude stars with Polaris as its shining jewel. This a nice place to start out. From Polaris, head towards Ursa Major. Be sure to say hello to the big bear as you cruise past on your way to Canes Venatici, The Hunting Dogs. Just before getting here you will go past a quite stunningly red 5th magnitude star known as La Superba. Once at Canes Venatici, you'll find the Cor Caroli, The Heart of Charles. This alpha star of Canes Venatici is a bluish/white star shining at around 4th magnitude. Finally, head past Cor Caroli for Arcturus in Bootes. Just about halfway there, you'll run into M3, a beautiful globular cluster shining at about 6th magnitude. M3 is one of the brightest globular clusters in the sky. It lies about 35,000 light years from us with a size of about 150 light years across. By their nature, the stars that make up globular clusters are tightly bound together by their mutual gravitation and are all quite old. M3 is estimated to be around 10 billion years old. Astronomers have determined this is due to their composition. The stars in a globular cluster are mostly made of hydrogen and helium. In our galaxy, NASA's hunt for extrasolar planets with its Kepler mission is resulting in finding planets around most of the stars they have looked at. The latest estimate is that there are probably trillions of planets in the Milky Way. In the early formation of the galaxy, the largest stars ended their lives in brilliant supernova explosions. The formation of star systems with planets come from material from these supernovae. Heavy elements like carbon and iron are found in stars like ours and are needed for planets to form. The lack of heavy elements in the stars of globular clusters indicate that they formed before any supernovae occurred. This makes globular clusters truly a look way way back in time…..cool.

Clear Skies,

Tony Falletta

Member's Observing Returns

Our monthly member's observing will restart for the year on Saturday, April 11th. Sunset will be at about 7:40 PM, and moonrise is well after midnight. This will be an opportunity for members to practice observatory operations, while getting some observing in at the same time. Note that no official skills demonstrations for score will be done that night.

We would like to have several members' telescopes in use, as well the observatory's C-14--so bring a telescope if you can. Note that the observatory is well equipped with power outlets on the outside for you to power your telescope with, and a concrete pad has also been provided on the south side that can accommodate 2 or 3 telescopes. Feel free to move the picnic tables if they are on the pad.

Since spring is galaxy season, we'll spend some time viewing interesting galaxies in the vicinity of Leo and Ursa Major, as well as other well-placed objects. Please bring a list of targets to look at. Doughnuts will be provided, bring your own beverage.

NASA's Space Place

The Cold Never Bothered Me Anyway

By Ethan Siegel

For those of us in the northern hemisphere, winter brings long, cold nights, which are often excellent for sky watchers (so long as there's a way to keep warm!) But there's often an added bonus that comes along when conditions are just right: the polar lights, or the Aurora Borealis around the North Pole. Here on our world, a brilliant green light often appears for observers at high northern latitudes, with occasional, dimmer reds and even blues lighting up a clear night.

We had always assumed that there was some connection between particles emitted from the Sun and the aurorae, as particularly intense displays were observed around three days after a solar storm occurred in the direction of Earth. Presumably, particles originating from the Sun—ionized electrons and atomic nuclei like protons and alpha particles—make up the vast majority of the solar wind and get funneled by the Earth's magnetic field into a circle around its magnetic poles. They're energetic enough to knock electrons off atoms and molecules at various layers in the upper atmosphere—particles like molecular nitrogen, oxygen and atomic hydrogen. And when the electrons fall back either onto the atoms or to lower energy levels, they emit light of varying but particular wavelengths—oxygen producing the most common green signature, with less common states of oxygen and hydrogen producing red and the occasional blue from nitrogen.

But it wasn't until the 2000s that this picture was directly confirmed! NASA's Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite (which ceased operations in December 2005) was able to find out how the magnetosphere responded to solar wind changes, how the plasmas were energized, transported and (in some cases) lost, and many more properties of our magnetosphere. Planets without significant magnetic fields such as Venus and Mars have much smaller, weaker aurorae than we do, and gas giant planets like Saturn have aurorae that primarily shine in the ultraviolet rather than the visible. Nevertheless, the aurorae are a spectacular sight in the evening, particularly for observers in Alaska, Canada and the Scandinavian countries. But when a solar storm comes our way, keep your eyes towards the north at night; the views will be well worth braving the cold!

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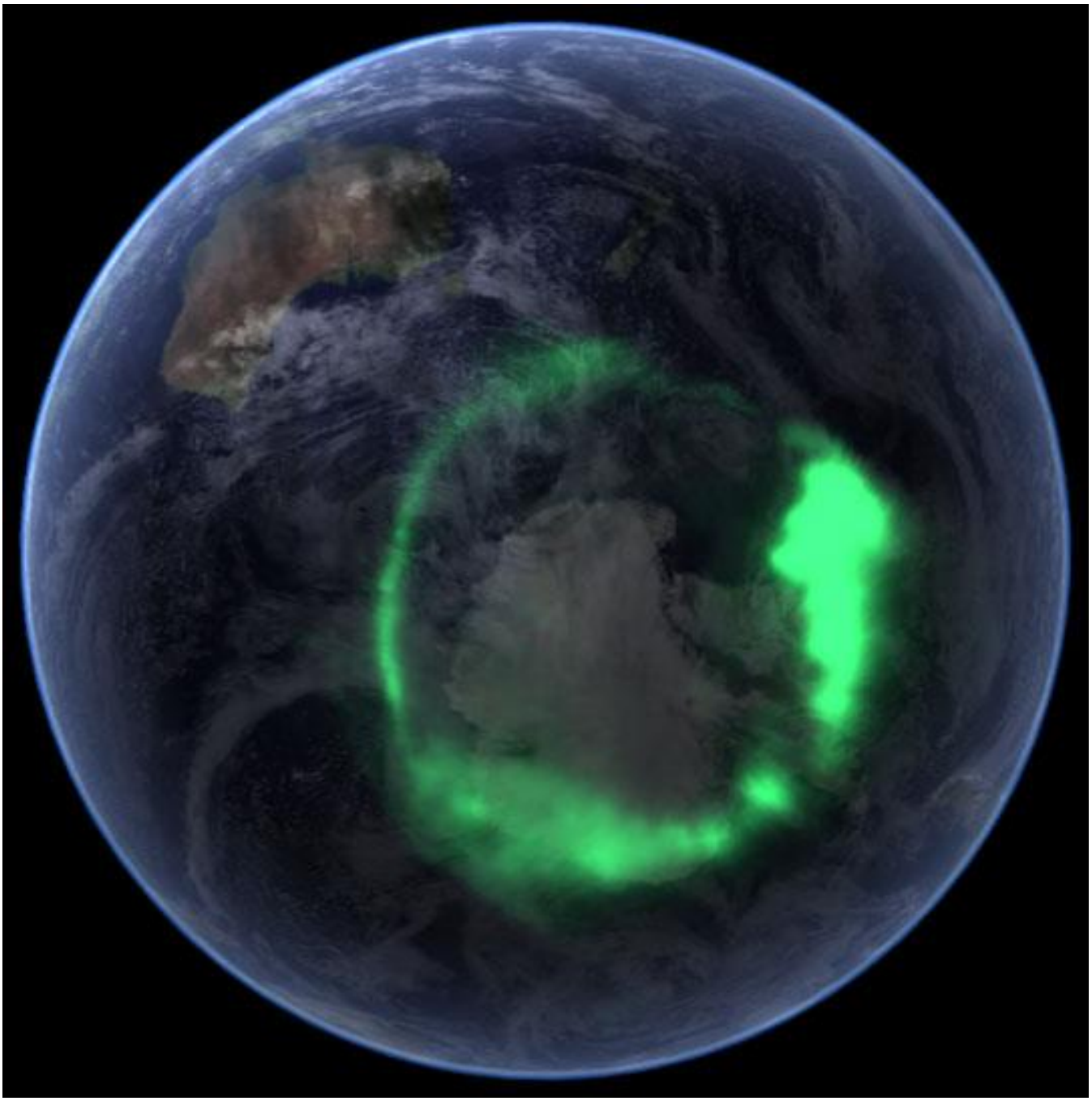

Auroral overlays from the IMAGE spacecraft.

Image credit: NASA Earth Observatory (Goddard Space Flight Center) / Blue Marble team.