



November, 2020

December Meetings

In December, the MAS **will not have Board and Membership Meetings**. Also, due to the COVID-19 pandemic **we will not have Christmas Party** this year.

The next Meetings will take place on Monday, January 18th, 2021 via Zoom videoconference. Program will be announced in the December issue of the newsletter.

The **Astrophotography Interest Group** will meet on Wednesday, December 9th at 7 PM through Zoom videoconference.

The **First Wednesday meeting** will be held through Zoom videoconference on December 2nd, from 7:30 PM. This is an informal meeting to discuss technical aspects of astronomy, however, any astronomy-related topic can be brought up. New members are especially encouraged to attend this meeting.

Invitations will be sent out prior to meetings.

The MAS Google Group is as active as ever. Learn about the astronomical news, follow equipment related discussions, or just check out the latest images taken by fellow Club members.

We wish everybody happy and safe holiday season!

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Membership Renewal

The Membership renewal period is underway. There are several renewal methods you can choose from. If you prefer to do it online just follow this link: <http://milwaukeeastro.org/renew>. The renewal form can also be printed out and send it back along with a check made payable to The Milwaukee Astronomical Society.

Do I need to renew my MAS membership? Simply look for your name on this list: <http://milwaukeeastro.org/membership/membersRenewed.asp>. If your name is there, your membership is active through 2021.

Thank you for being a member of the Milwaukee Astronomical Society.

Observatory Director Report

The new box for the outdoor water spigot was completed and installed. Restrooms have been taken care of with fans turned off and the thermostats set to 55°, note on that temperature, I have found heaters turned way up! Please DO NOT adjust the temperature. We are also planning on adding heat tap to the pipes since we had some freezing pipes last winter.

The touch pad door entry for the Quonset's back door has arrived, it will be installed shortly. Speaking of entries, there is the new combination lock on the front gate. If you need the combination just send an email to me.

The door to the B- Scope has been locked from the inside and now we cannot enter with the key. A couple of options have been discussed by the Observatory Committee and we have about ready to try one. This could turn into a lot of work and could become costly.

Respectfully Submitted,
Paul Borhardt, Observatory Director

Treasurer's Report

\$7,737.98	Starting Balance as of 10/17/2020
	<u>Expenditures</u>
\$9.38	PayPal fees
\$494.32	Fire extinguisher
\$74.36	WE Energies
\$578.06	TOTAL Expenditures
	<u>Revenue</u>
\$90.28	Private donations
\$652.00	Membership dues
\$201.00	Grants
\$943.28	TOTAL Revenue
\$7,903.20	Ending Balance as of 11/14/2020

Respectfully Submitted,
Sue Timlin, Treasurer

Membership Report

Since the last Report we received 7 new applications. We welcome Andrea Ferguson, David Ingold & family, Matthews Phillips, Bill Bowen, Robert Scott, Tim Burrus, Jennea Denner. The total number of active members is 202.

Respectfully Submitted,
Jeff Kraehnke, Committee Chair

Minutes

Due to the COVID-19 it was held via Zoom videoconference on November 16th. The meeting was called to order at 7:03PM by Tamas Kriska President.

Minutes, and Treasurer's Report electronically submitted ahead of the meeting were approved.

Observatory Director's Report electronically submitted ahead of the meeting was approved.

Membership Committee Report was electronically submitted ahead of the meeting. Membership applications of Bob Mueller, Andrea Ferguson, and David Ingold & family were approved.

Old Business – Display box: Yet to be purchased.
Bathroom access: The combination bolt was purchased and will be installed soon.

Laser collimator: The Observatory Committee will continue investigating the issue and will make suggestion.

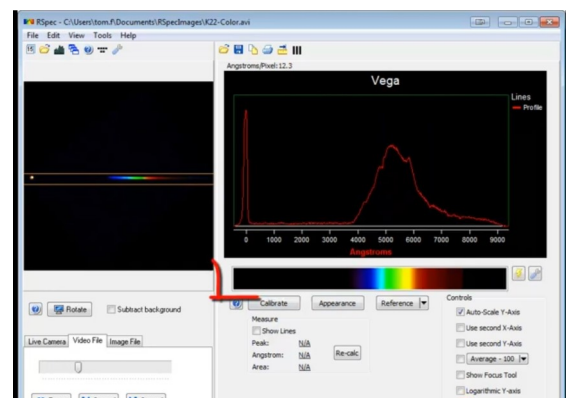
New Business – Members' Nights: There was a discussion whether we should close the Observatory due to the spiking COVID-19 infection in WI. The Board decided to keep the Hill open for members with extra precaution: mask, disinfection, small groups, open air observation. Keyholders who don't feel comfortable may opt out and will be removed from the rotation while they may keep their key.

Meeting schedule: We won't have meetings in December. After that, the Board and Membership meetings will stay on the third Monday of each month schedule.

Astronomy Calendar: This year we don't do calendar fundraising.

Announcement – The next meeting will be on Monday, January 18th, 2021 via Zoom.

Program – Tom Field, President of Field Tested Systems LLC and Contributing Editor of Sky & Telescope Magazine gave a presentation entitled You can almost touch the stars.



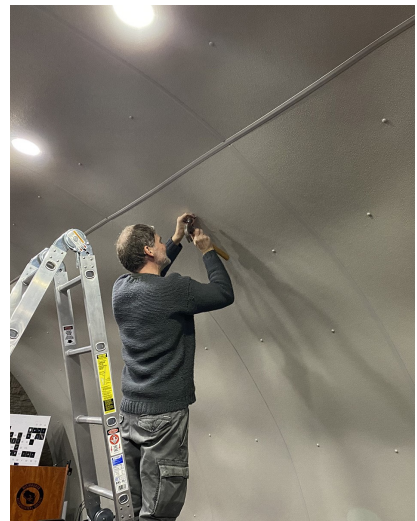
Respectfully Submitted,
Agnes Keszler, Secretary

Maintenance

The damaged J-trim on the north wall of the Z-building was fixed.

The new PVC box housing the yard hydrant was repositioned to allow better access to the handle and secured down with concrete anchors.

Some of the badly drooping wall panels in the Quonset were reinforced. The panels around the vent were also re-attached. The insulated cover was installed.



Maintenance

The B-dome's door has been accidentally locked from the inside and we could not enter with a key. Out of several options that have been discussed the Observatory Committee choose to cut the old hinges and then replace them with new ones. Mike and Jeff successfully performed the task without damaging the door. The B-dome entrance is functioning again. To avoid this from happening again Mike immobilized the safety pin by gluing it place.



Member's Story

Star Party at Ottawa Lake

Thanks to the 8-10 people (and the cayotes) that joined me at Ottawa Lake on Saturday, November 7th for a clear, mild but breezy evening under the stars. We saw constellations and thanks to my 10" f/4.5 GOTO computerized telescope, all the visible planets (including Uranus & Neptune) and a variety of objects including globular and open (Pleiades) clusters, planetary nebulae (Ring, Dumbbell, Blinking, Cat's Eye), supernova remnants (Veil Nebula), galaxies (Andromeda) and learned a little astronomical history as well as what to look for in a telescope and how light pollution filters work. Despite the party breaking up around 9:30-10PM, most people got a good 3-4 hours of observing in because despite the sunny and warm weather this week, it is still November and it gets dark very early (around 5:30). (see *Arlo & Janis* in today's comics!) We did see the Orion Nebula with binoculars but it was too low in the trees to see with the telescope and the Last Quarter Moon was rising nearby.

Around 10PM as the Moon rose over a hill in the east, I took the 10" scope off the mount and replaced it with my planetary imaging telescope, a 180mm (7.1") diameter f/16 Maksutov-Cassegrain. I then imaged Mars and packed up myself.

I picked that night because it has to be the last mild clear night this year, but we will do this again next year. I had a wonderful time and I hope others will come out next time!

Lee Keith

Imaging Mars at the Observatory

There was a traffic jam at the observatory on October 30th! Three, yes three, imagers braved the cold to image the spooky Red Planet on Halloween Eve. Tamas, Paul and yours truly took turns trying our luck with the God of War. Tamas was especially ambitious and used both "A" (Planet Killer") and "B" scopes.

The night was very transparent and the wind died down to calm so I was expecting a good night and it delivered! The view is of Solis Lacus ("Lake of the Sun" of "Eye of Mars") front & center with the straight & horizontal Vallis Marineris just below it. Below Solis Lacus is the Tharsis plain where several large extinct volcanoes reside, including Olympus Mons, the largest volcano in the entire Solar System! The volcanoes are difficult to image but if I use some imagination, I believe I see something where the volcanoes should be. The large dark area just to the left of Solis Lacus is Mare Ehythraeum and to its right, beyond the arc of spots on the far edge is Mare Sirenum.

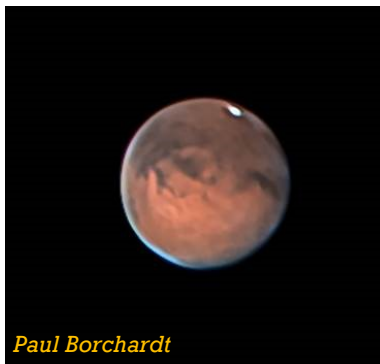
Paul used the club's Skyris 618 mono and the filter wheel with a 2X barlow on A-scope. The stacks are 5% of the 8000 frames shot per filter. The exposure was 1/250 sec.

Tamas's image was taken using B-scope, his ASI462 camera with a 2x Barlow lens. 7% of the 10,000 recorded frames were stacked with Autostakkert3. Postprocessed with Registax, Pix-insight, and Photoshop.

Lee Keith



Lee Keith



Paul Borchardt



Tamas Kriska

In the Astronomical News

Voyager Spacecraft Detect an Increase in the Density of Space Outside the Solar System

In November 2018, after an epic, 41-year voyage, Voyager 2 finally crossed the boundary that marked the limit of the Sun's influence and entered interstellar space. But the little probe's mission isn't done yet - it's now sending home information about the space beyond the Solar System. And it's revealing something surprising. As Voyager 2 moves farther and farther from the Sun, the *density* of space is increasing.

It's not the first time this density increase has been detected. Voyager 1, which entered interstellar space in 2012, detected a similar density gradient at a separate location. Voyager 2's new data show that not only was Voyager 1's detection legit, but that the increase in density may be a large-scale feature of the very local interstellar medium (VLIM).

The Solar System's edge can be defined by a few different boundaries, but the one crossed by the Voyager probes is known as the heliopause, and it's defined by the solar wind. This is a constant supersonic wind of ionized plasma that streams out from the Sun in all directions, and the heliopause is the point at which the outward pressure of that wind is no longer strong enough to push into the wind from interstellar space. The space inside the heliopause is the heliosphere, and the space outside it is the VLIM. But the heliosphere isn't a round sphere. It's more like an oval, with the Solar System at one end, and a streaming tail behind; the "nose" is pointed in the direction of the Solar System's orbit in the Milky Way. Both Voyagers crossed the heliopause at the nose, but with a difference of 67 degrees in heliographic latitude and 43 degrees difference longitude.

Space is generally thought of as a vacuum, but it isn't, not completely. The density of matter is extremely low, but it still exists. In the Solar System, the solar wind has an average proton and electron density of 3 to 10 particles per cubic centimeter, but it grows lower the farther out you go from the Sun. The mean electron density of the interstellar medium in the Milky Way, out among the stars, has been calculated to be around 0.037 particles per cubic centimeter. And the plasma density in the outer heliosphere is around 0.002

electrons per cubic centimeter. As the Voyager probes crossed beyond the heliopause, their Plasma Wave Science instruments detected the electron density of the plasma through plasma oscillations.

Voyager 1 detected a plasma density of 0.055 electrons per cubic centimeters. Voyager 2, measured the plasma oscillations on at a distance of 119.7 astronomical units (17.9 billion kilometers), finding a plasma density of 0.039 electrons per cubic centimeter. And both instruments reported an increase in density. After travelling

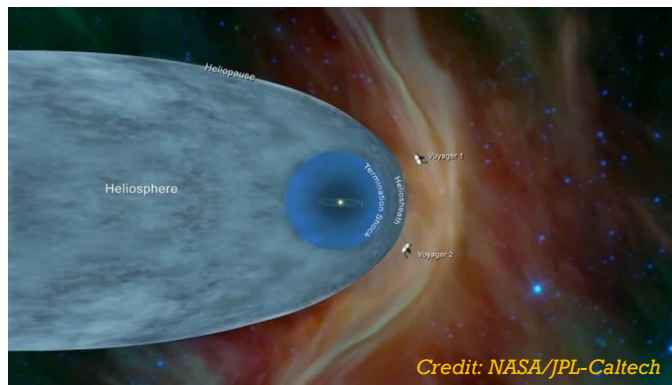
another 20 astronomical units (2.9 billion km) through space, Voyager 1 reported an increase to about 0.13 electrons per cubic centimeter. But detections made by Voyager 2 in June 2019 showed a much sharper increase in density to about 0.12 electrons per cubic

centimeter, at a distance of 124.2 astronomical units (18.5 billion units).

Given that plasma at Earth's atmospheric pressure has an electron density of 10^{13} per cubic centimeter, those amounts may seem tiny, but they're significant enough to warrant our interest - especially since it's not clear what causes them. One theory is that the interstellar magnetic field lines become stronger as they drape over the heliopause. This could generate an electromagnetic ion cyclotron instability that depletes the plasma from the draping region. Voyager 2 did detect a stronger magnetic field than expected when it crossed the heliopause. Another theory is that material blown by the interstellar wind should slow as it reaches the heliopause, causing a sort of traffic jam. This has possibly been detected by outer Solar System probe New Horizons, which in 2018 picked up the faint ultraviolet glow resulting from a buildup of neutral hydrogen at the heliopause.

It's also possible that both explanations play a role. Future measurements taken by both Voyager probes as they continue their journey out into interstellar space could help figure it out. But that might be a long bet to take.

Michelle Starr, sciencealert.com



Adopt a Telescope Program - Signup Sheet

	Adopter	Scope	Location
1	Sue Timlin/John Hammetter	18" F/4.5 Obsession	Wiesen Observatory
2	Steve Volp	12.5" F/7.4 Buckstaff	B Dome
3	Robert Burgess	12.5" F/9 Halbach	A Dome (Armfield)
4	Russ Blankenburg	18" F/4.5 Obsession	Albrecht Observatory
5	Jeff Kraehnke	14" F/7.4 G-scope	Z Dome
6	Lee Keith/Tom Kraus	12" F/10 LX200 EMC	Tangney Observatory
7	Herman Restrepo/Colin Boynton	10" F/6.3 LX200	Ray Zit Observatory
8	Tamas Kriska	Stellarvue SVQ 100 F/5.8	Jim Toeller Observatory
9	Paul Borchardt	Solar scope	SkyShed POD

At Your Service

Officers / Staff

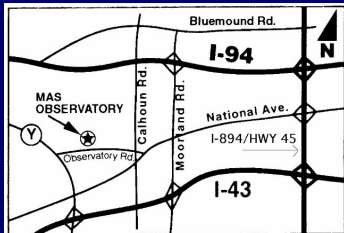
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Jim Schroeter	414-333-3679
Gabe Shaughnessy	262-893-4169
Steve Volp	414-751-8334
Mike Wagner	262-547-3321

December Keyholders

12/05	Paul Borchardt	262-781-0169
12/12	Russ Blankenburg	262-938-0752
12/19	Jim Bakic	414-303-7765
12/26	Observatory closed	



MAS Observatory

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