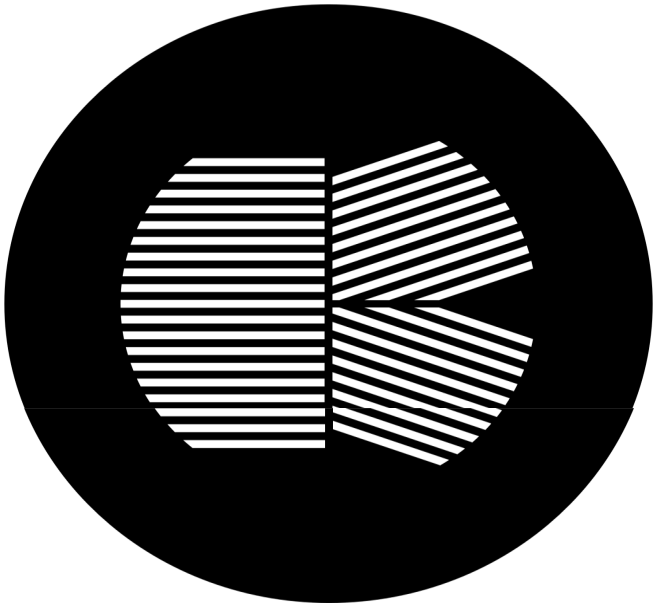
REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

August 2018

VOLUME 42, ISSUE 8



Making a Custom Bahtinov Mask

by Brian F. Close, A.B., J.D., LL.M., M.A., T.N.*

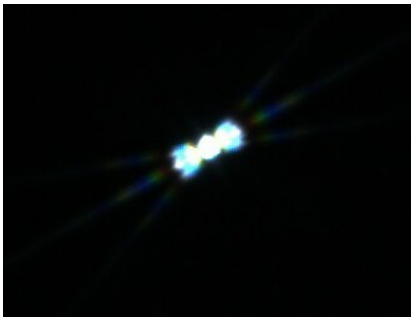
*Telescope Nut

Joesph Franz Hartman developed the first focusing mask for telescopes circa 1900. Since then various focusing mask designs have been developed. In 2005 the Russian amateur astrophotographer Pavel Bahtinov developed a very accurate mask. The mask consists of three separate grids, positioned in such a way that the grids produce three angled diffraction spikes at the focal plane of the instrument for each bright image element. As the instrument's focus is changed, the central spike appears to move from one side of the star to the other. In reality, all three spikes move, but the central spike moves in the opposite direction to the two spikes forming the "X". Optimal focus is achieved when the middle spike is centered between the other two spikes. Small deviations from optimal focus are easily visible. For astrophotography, a digital image can be analyzed by software to locate the alignment of the spikes to sub-pixel resolution. It is important that a focusing mask be designed to match the aperture and focal length of your telescope. Fortunately, there are several mask generating programs on line.

I used http://astrojargon.net/MaskGen.aspx. The output file is “SVG” but you can print it to “PDF”

There are commercial masks out there, some particularized to standard SCTS and newtonians. However, there were no commercial masks for my 12.5" f/6 newtonian. I first printed out my mask on 14" legal paper and taped it to a piece of fiberboard. It work o.k. but not really with the definition I wanted because the fiber board really did not have sharp edges. Also, there are a lot of lines to cut! And it hung off the tube with tape. So I ordered a 24" 1/10th inch thick square sheet of kydex from Amazon and took that with the computer PDF design to a local trophy maker who has a laser cutter. Most trophy makers now have laser cutters. $60 later I have a nice custom cut Bahtinov Mask. (Thinner kydex would not have required double cuts, so I could have done this at half the cost. On the other hand, the mask has no flexture!) I had him cut it slightly oversized so I could mount it on the tube with three nylon cylinders (keeping the tube paint nice). I used nylon screws and nuts as well as I don’t want loose metal around the telescope mirror.

Right -
Image of star near focus
(Editor Cropped Photo)



Left -
Image of star at focus
(Editor Cropped Photo)

Making a Custom Bahtinov Mask
Continued

Photo of Mask on telescope

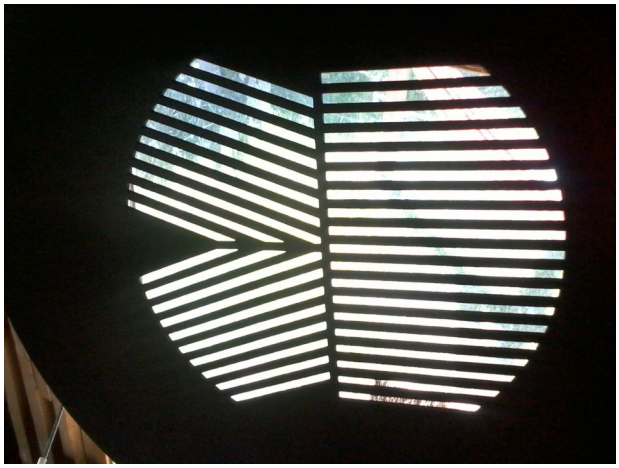


Photo looking through Mask

A Run-In With A Local In Hudson
by Joy Poling

I should have known not to park so close to the woods. It was the only empty spot on the night of July 17, 2018, out at Lake Hudson Recreational Area. *I'll have the place to myself* , I had thought.

After parking right next to the public restroom and setting things up, my evening went on pretty uneventful. Lost in my own world I failed to notice cars leaving, I realized suddenly that I was completely alone. I was happy, as now I was free and able to be as loud and/or annoying as the mood struck me.

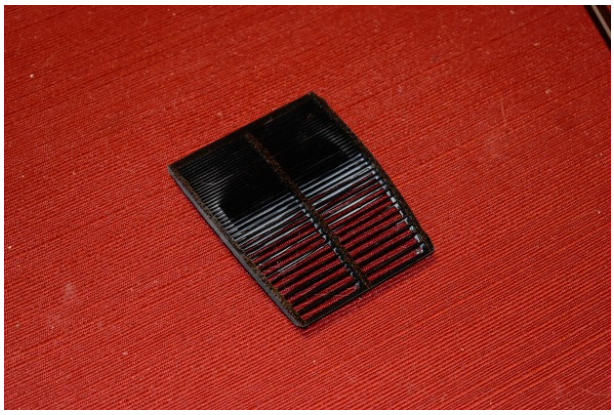
It was some time after that when I was standing at the eyepiece viewing an object almost directly overhead. Unexpectedly I felt something touch my unused hand hanging limply at my side. I jumped back screaming and blubbering incoherently. I could make out a 'fat cat' sized shadow perched up on the round rotating base of my scope. To my surprise it was not scared of me or my ridiculous noise display. It started climbing further up my scope. An image of King Kong scaling the Empire State Building popped into my head, then morphed into my off balance scope crashing to the ground. That seemed to pull me back and so I started to yell at it threateningly as I got as close as I was willing to get to it. I shined my laser pointer on its fur and then down thinking maybe it would follow it like a cat. That's when I see it was a raccoon... and in case you were wondering, no raccoons will not follow laser pointers. Then it apparently decided that no food stuff was on my scope and slowly climbed down and walked off into the darkness. Very slowly! As if to say to me that it was not at all threatened by anything I did.

I took a look all around me. I suddenly felt incredibly alone and thought, *It's probably about time to get going.*

Carriage Lamp Baffle Project
by Charles Steele

The Lowbrows recent speaker suggested installing lights with total cut-off of upward light. There seem to be two current popular designs that do this, shown below.

However there are a wide variety of decorative lights on the market which home owners seem to like. Years ago I brought Brass Carriage style Lamps for the outside of our home. They add a decorative element to our house but much of the light goes up into the night sky. Recently I purchased a 3D printer which allows me to design create objects molded in plastic. I decided to design a louvered light baffle that would allow light to illuminate the surrounding ground area while blocking most of the photons from going above the horizon.



Plastic Louver panel designed to fit inside the Carriage Lamps. Top louvers allow light to go horizontally while lower louvers are angled progressively downward. The outward facing louvers are black to reduce upward reflec-tionswhich the inside facing surfaces are painted white so as not to absorb photons.

Light Baffles installed in the Carriage Lamp appear black, adding a modern look to the old style Carriage Lamps. I didn't think it necessary to extend the light baffle below the bulb, leaving the bottom area open to maximum the light to the ground.

I wanted the lamps to be seen from the street but without the glare of a naked bulb, so the top louvers above the bulb allow light to go out horizontally but the lower louvers where the light bulb is progressively cut off the light directing more and more to the ground. This allows nearly the same amount of light to reach the ground while drastically cutting glare into the eye of the driver. The louvers go from a horizontal alignment at the top with a sharp cut off, to a 45 degree downward angle at the bottom. Each louver is designed with a horizontal cut off, so once you go above the light the bulb is not visible.

Carriage Lamp Baffle Project
Continued

The unshielded light blasts the motorist with lots of glare which reduces visibility. Note the light going upward from the lamp on the wall. (Both photos taken at same exposure to show the difference.)

With light baffles installed glare to the eye is greatly reduced, while the area on the ground well illuminated. Note no light is going upward on the wall.

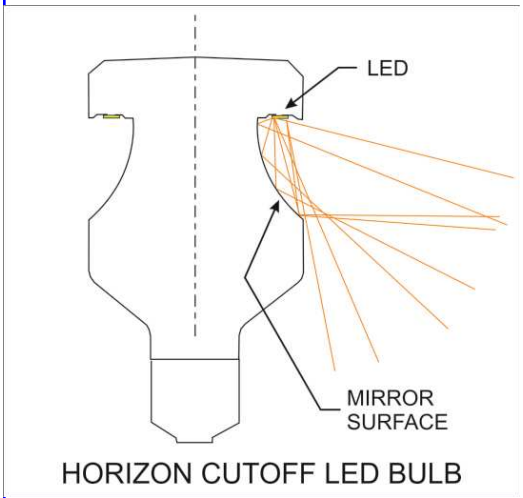
From above the lamp the electric bulb blast the night sky with its bright light.

From above the shielded lamp, the bulb iseffectively blocked and little light goes upward.

Inexpensive light baffles could be manufactured and retro-fitted to existing lights or installed into new lights. The question is will people do it? Would people object to the new look and extra expense? Is the extra effort worth it to once again be able to enjoy the beauty of the night sky? I think many people would like to see the stars at night but most are unaware of why we have lost this glorious spectacle of nature. It seems to me that it will take a major effort to educate the public to the advantage of better lighting which could dramatically darken our night skies. We need to approach light manufactures to encourage them to design and market Dark Skies friendly lights.

Probably the easiest and quickest way to move lighting to zero horizon Dark Sky friendly lights would be the introduction to the market of directional light bulbs. LED light bulbs could be made which would direct light downward, so that light baffles would be unnecessary. Just the bulbs themselves would do the job. Homeowners would only need to buy a Dark Friendly bulb and install it in their existing lamp. See the section view of an LED bulb that has a bottom screw base and cast its light downward

Carriage Lamp Baffle Project
Continued



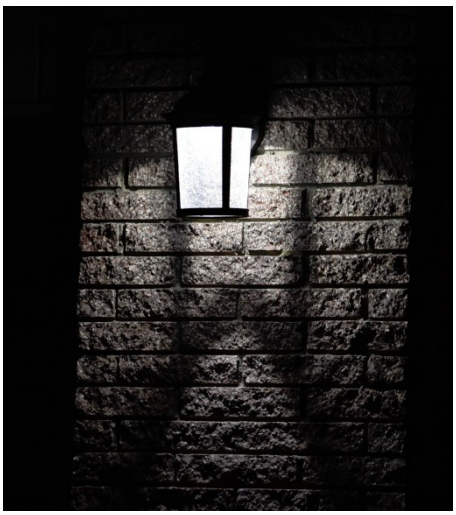
HORIZON CUTOFF LED BULB

I designed a LED horizontal cut - off light bulb and modeled it in a 3D program which allows ray tracing. Bulbs could be designed for both top and bottom screw base lamps. If these types of bulbs came on the market the change over to Dark Friendly Lighting could be rather quick, as it would only require the changing of a light bulb. But money needs to be put into ad campaigns to make the public aware. Promotional Ads would be a key to making this happen. Ads should promote the advantage of not wasting photons, electricity and money. Improving the environment with Dark Skies, and a smaller carbon foot print will resinate with the public. This would be Eco-Friendly lighting. Save the planet!

From below the mirrors reflect the light downward.

From above no light is allowed upward from the bulb.

However the biggest light polluters tend to be commercial lighting. Businesses seem to think the bigger and the brighter the lights the more customers they will attract. While this might be true why waste your business budget shooting light into the sky were it won't do much if any good. Of course some businesses like to have search lights that can be seen for miles. Hopefully we will see fewer of these in the future.



This new wall lantern has LEDs mounted in the top directed downward. Note how the light wash in the wall is mostly down. However the glass is frosted allowing some light to go upward. But not bad.

I don't think my light baffles will catch on. It was mostly a design experiment to see how effective it would be. But I think light bulb designs and new lighting fixtures could go a long way to reducing our light pollution.

Upcoming Events

DATE	EVENT	LOCATION	
Week of July 30-th and August 6th	Telescope viewing for Detroit Public School Camp Kids	Camp Burt Shurley	Coordinator: Brian Ottum and Jim Forrester.
Friday August 3rd. 9 to 11pm	Ann Arbor Public Library Planet Viewing Party	Pittsfield Branch Library	Public Event., Telescopes would be welcome
Saturday August 4th.	Open House	Peach Mt.	Coordinator: TBD
August 4th thru August 12th. 8:15pm	3rd Annual Member Peach Mountain Star Party. Clear Sky Dependent	Peach Mt.	Jim Forrester, will announce via email by midday.
Saturday August 11th.	Open House	Peach Mt.	Coordinator: TBD
Friday August 17th. 7:30pm	Monthly Meeting	Room G115 Angel Hall 435 South St. Street Ann Arbor, MI	Dr. Ed Cackett, WSU physics, Recent LIGO work.
Saturday August 18th. 7 to 10pm	Astronomy related presentation followed by telescope observation of the Moon, Jupiter, and other night sky objects.	Hidden Lake Gardens 6214 Monroe Road (Hwy M-50), Tipton Mi 49287	Lowbrows will bring telescopes for observing.

Adrian Bradley Camp Burt Shurley Report, email of July 26th

We had 5 scopes make it to camp last night. Mine, Jim Forrester, Jack Brisbin, Dave Jorgenson, and John Walbank all showed the kids a combo of the moon, Saturn, Jupiter, the North Star, and Albireo. Dave literally blinded the kids with science! Well not quite but that moon was bright and we didn't have a 2" filter for him! I presented a wavy but serviceable view of Jupiter, which kids mistook for the moon with stars around it. When I pointed out that my scope wasn't aimed at the moon they got confused! John taught the kids about how much hotter than the sun certain colors of stars are. Most thought they were pretty! Jim showed the kids that our polar star was a binary star system, but he also had to spend more time guarding his scope from being run over. And Jack kept telling the kids that it was Saturn. They kept insisting it was an eyeball in space.

WE NEED MORE CLUB MEMBERS!!!
The children are from all different parts of Detroit and many have never been out in a setting like this before. Outreach programs like this are what makes being a Lowbrow so rewarding. It may only be planets or really bright objects, but to children who have only seen pictures on TV or Youtube, this is a first in their lives and most kids are thrilled to see these objects in space for themselves. It blows their minds to see that what they thought was a star is in fact a planet.

If you do come out, remember that you are there to let them look at an object and answer questions to the best of your ability. The faint fuzziest that we love to find aren't always the best objects to show kids. But things that have shape and color are always a hit. Those of us who have done a few of these will help guide you in picking objects that the kids will see.

Also, patience is required. There will always be a few kids per group that have never looked into a telescope and will not see anything the first time they try to look. Gently guide them to get their eyes in the right spot, close one eye (or not-i found that you can observe with both eyes open if you line your Dominant eye up to the eyepiece). They will eventually notice something and for them, that is enough.

Lastly, carry big spray for this time of the year. I went to line up Jupiter and had about 15 mosquitoes all trying to help me. Some were looking through the eyepiece. Others were helping me push the scope to Jupiter. Still other lazy mosquitoes were hitching a ride on the OTA. All had an ulterior motive!

I hope to see some more of you next week at the camp. We'll have less to no moon so the planet views will be brighter.

University Lowbrow Astronomers
7/20/2018
Meeting Minutes

The July meeting was held at the Eastern Michigan University Planetarium. Pizza, Beverage and cookies were available before the meeting. President Charlie Nielsen started the meeting at 7:40pm and introduced our speaker Dan Davis who is a professor of geophysics in the Department of Earth and Space Sciences at Stony Brook University, New York where he researches the formation of mountain belts on Earth. He gave us an excellent talk via Skype titled "Tectonics in space - things that go bump in the crust". He also gave overview of the various additions to the new edition of the book Turn Left at Orion which he co-authored. His observations for the book were made with a 2.4" refractor and with 8" and 10" Dobsonians.

Business Meeting:

President Charlie Nielsen:

Charlie thanked Norb Vance for EMU's hospitality and the use of the Planetarium for our meeting. He also thanked Dave Jorgensen for his work arranging, testing and setting up the Skye connection for Dan Davis's presentation. He informed us that brother Guy Consolmagno will be the speaker at the Great Lake Star Gaze this September. We have been asked to again bring out telescopes to support and event at the Leslie Science and Nature Center on September 29th which should run from about 8pm to 10pm. We have been asked by the Westland Library to make a presentation on meteors October 16th which is close to the Orionids shower. Abe Oraiqat has volunteered to create and make the meteor presentation. Charlie explained that the Orionids meteor shower would not be visible from Westland, however we may be able to provide telescopes for public viewing. We will support an event at Hidden Lakes Gardens on Saturday August 18th with an astronomy related presentation followed by telescope observation of the Moon, Jupiter, and other night sky objects. The Lowbrows will attend on August 14th with Professor Sally Oey a meeting of the Ann Arbor City Council to discuss an outdoor lighting ordinance.

Vice President Jim Forrester:

Reported that the first three weeks of Camp Burt Shurley have been excellent. It is a good observing site. The kids are 8 to 12 years old and are well behaved. We generally start observing at 9:30pm and are done with the kids by 11pm. We can stay longer if we like and some have had good observing sessions afterward. We need additional help next week as two of the regularly attending lowbrows will be out of town.

Jim plans to open Peach Mt. to the membership for cloudless dark of the moon nights from August 4th to 12th. He will send out email notifications.

He suggested that we should do some observing of the Perseid Meteor Shower. They should be good for the open house Aug. 11th but best Sunday Aug 12th. After some discussion it was concluded that we will open Peach Mt. Aug. 12th for a member viewing of the Perseids.

He asked the group how much media attention has been given to the Mars Opposition as he is concerned as to how many people may come to the August Open Houses and whether we should make any specific plans. During the discussion a wait and see attitude prevailed among the members.

Vice President Adrian Bradley:

Reported that our face book page is getting about 10 new likes a month.

Treasurer Doug Scobel:

Reported, 142 memberships. $6132.41 in the treasury, including money collected and paid out at the 7/20 meeting. We have no further obligations outstanding. Paid Astronomical League annual dues for 31 Lowbrows and provided the updated roster. Filed the Federal "ePostcard" form N990 for FY 2017 (April 2017-March 2018). This is a simple online form stating that our annual receipts are under $50,000 and that we are still "in business".

Newsletter Editor Don Fohey:

Reported that he needs newsletter articles.

Meeting Minutes Continued

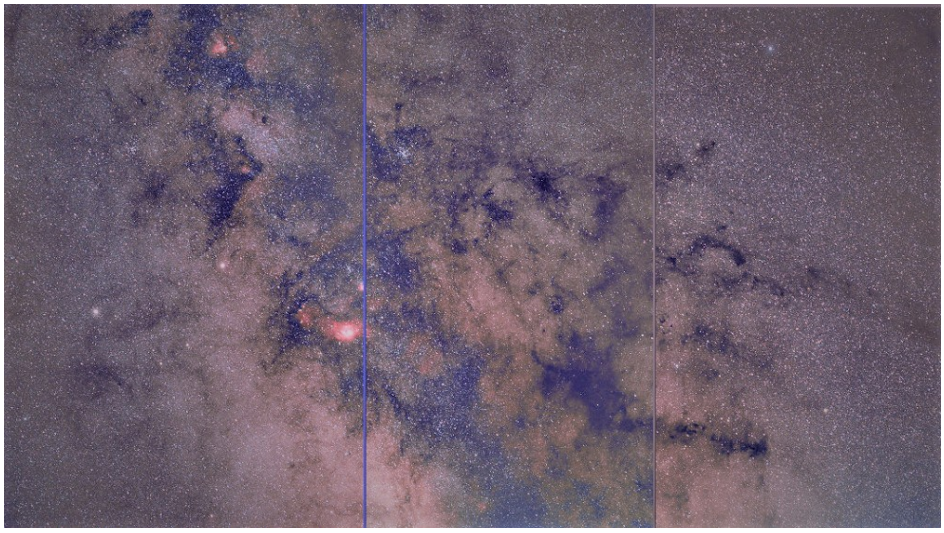
Vice President Larry Halbert:
Reported that he has been distributing brochures and restocking locations that have run out.

Observatory Director Jack Brisbin:
Reported that he purchased two tires and replaced the tires on the club 17 1/2 inch telescope. At the last open house Charlie had reported one tire was flat. Inspection showed a gash in the tire and a hole in the tube. He is prepared for hosting the Michigan Math and Science Scholars at the observatory on Tuesday July 24th with a rain date of Tuesday July 31st.

Norb Vance gave a brief report of his activities. He gave a presentation at the Headlands Dark Sky Park which had good dark skies even though it is close to Mackinaw City. He visited the planetarium at the Besser Museum in Alpena where he assisted with the interview of a candidate for directory of the planetarium. He also visited the Freemont and Three Sister sites. Norb then gave a short presentation of the capabilities of the EMU planetarium. Even though it was cloudy Norb invited attendees to visit Sherzer Observatory to see the facilities.

Submitted by Don Fohey

Member Photos



Left- Awni Hafedh wrote in an email to members on July 11th. "Monday night I went to Hudson to do a quick capture of the Milky Way core using my Canon 6D and 135mm lens, Joy was there to keep me company thank you so much. I ended up capturing three panel mosaic of the core, each panel was 40 subs and each sub is 30sec, ISO6400, F/2.3. The whole imaging sequence should not take more than an hour, except I ended up pausing a lot because there were some partial clouds and I simply capture between the gaps, the final image is not done yet but attached is a quick stack and merge of all three panels, hope you like it."

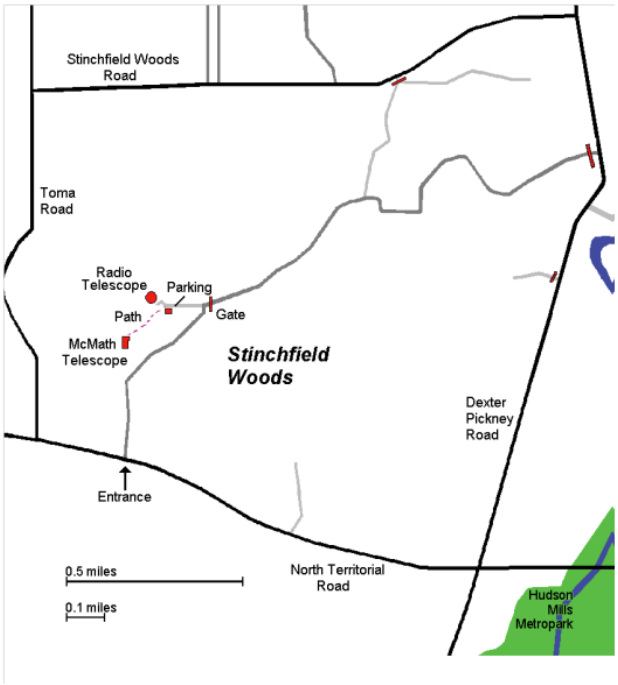
Left - Doug Bock wrote in an email to members on July 18th "NGC 7331 and friends. After collecting 5 nights of data over a year, I decided to combine much of it. Original 172 images from 3 minutes to 5 minutes. Final 121 frames averaging at least 3 minutes each. So, at least 6 hours of data collection. "

(Editor Cropped Photo.)

Places & Times

Monthly meetings of the University Lowbrow Astronomers are held the third Friday of each month at 7:30 PM. The location is usually Angel Hall, ground floor, Room G115. Angell Hall is located on State Street on the University of Michigan Central Campus between North University and South University Streets. The building entrance nearest Room G115 is the east facing door at the south end of Angell Hall.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope and McMath 24" telescope which is maintained and operated by the Lowbrows. The entrance is addressed at 10280 North Territorial Road, Dexter MI which is 1.1 miles west of Dexter-Pinckney Rd. A maize and blue sign marks the gate. Follow the gravel road to the top of the hill to a parking area south of the radio telescope, then walk about 100 yards along the path west of the fence to reach the McMath Observatory.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mt. Observatory, but are usually cancelled if the forecast is for clouds or temperature below 10° F. For the most up to date info on the Open House / Star Party status call: (734) 975-3248 after 4pm. Many members bring their telescope to share with the public and visitors are welcome to do the same. Mosquitoes can be numerous, so be prepared with bug repellent. Evening can be cold so dress accordingly

Lowbrow's Home Page

http://www.umich.edu/~lowbrows/

Membership

The University Lowbrow Astronomers membership dues are $30 per year for individuals or families, $20 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula of Michigan. Membership entitles you access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).
A hard copy of the Newsletter can be obtained with an additional $18 annual fee to cover printing and postage. Dues can be paid at the monthly meetings, by PayPal, or be check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers
P.O. Box 131446
Ann Arbor, MI 48113-1446

Lowbrow members can obtain a discount on these magazine subscriptions:
Sky & Telescope -$32.95/year or $62.95/2 years
Astronomy -$34.00/year, $60.00/2 years of $83.00/3 years
For more information about dues or magazines contact the club treasurer at: lowbrowdoug@gmail.com

Newsletter Contributions

Members and non-members are encouraged to write about any astronomy related topic. Contact the Newsletter Editor: Don Fohey donfohey@gmail.com to discuss format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

Telephone Numbers

President:	Charlie Nielsen	(734) 747-6585
Vice President:	Adrian Bradley	(313) 354 5346
	Jim Forrester	(734) 663-1638
	Larry Halbert	
	Dave Jorgensen	
Treasurer:	Doug Scobel	(734) 277-7908
Observatory Director:	Jack Brisbin	
Newsletter Editor:	Don Fohey	(734) 812-3611
Key-holders:	Jim Forrester	
	Jack Brisbin	
	Charlie Nielsen	
Webmaster	Krishna Rao	

A NOTE ON KEYS: The club currently has three keys each to the Observatory and the North Territorial Road gate to Peach Mountain. University policy limits possession of keys to those who they are issued. If you desire access to the property at an unscheduled time, contact one of the key-holders. Lowbrow policy is to provide as much member access as possible.

Email to all members

Lowbrow-members@umich.edu

University Lowbrow Astronomers

Night Sky Network

Member Club

Astronomical League Member Society
#201601, Great Lakes Region

University Lowbrow Astronomers
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