

## **REFLECTIONS / REFRACTIONS**

**University Lowbrow** Astronomers

October 2019

**OLUME 43. ISSUE 10** 



## **Observatory Building Repair** Adventures in Scrape and Paint.

#### By Jack Brisbin

Some of the members that have been attending the monthly club meeting know about the work on the Observatory building. Starting in the beginning of the year some members expressed concern about the steel frame structure that supports the Observatory roof when it is rolled off the Observatory building. The I beams where severely rusted showing flaky chips of rust as you can see in the photos.

I asked for members that where interested in helping with this project and get their input on what kind of equipment we should use. We came up with a list of power equipment from belt sanders, disk sanders, hand drills with wire cones and rotary strippers and

the famous hand scrapper. (that's work).

We also used a small air compressor to blow the scrapped rust from the I beams. This type of grinding creates a lot of dust, so dust masks and goggles where used. I want to thank; Dave Jorgensen, Doug Nelle, Larry Halbert, for helping me do this work.

You can see from the picture there was a lot of equipment. The power cords where plugged into different outlets on different circuit breakers including the outdoor outlets on the south side of the building. This lets every one use their power equipment all the time so we didn't blow circuits.



The primer paint is Rustoleum rusty metal brown and the finish paint is Gloss Royal Blue



This is what the steel roof support looked like after a 4 1/2 hour finish scrape and paint day with all of us working on rust and some of us painting while others were doing rust

removal. We used about 2 gallons of rusty metal primer on the roof structure.

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#### Observatory Building Repair Continued

We also had to finish scraping the roof and paint it with the rusty metal primer paint. Because of everyone's work schedule and vacation plans, I came out during the week and did some scrap and paint on the roof building side's, one side at a time. Last week Dave Jorgensen came out and we finished the roof building. The roof and support structure was built in 1959 and galvanized steel was used for the roof structure. We did not use any heavy grinding equipment because that would destroy the galvanized steel. The roof has been there for 60 years. The rust was mostly surface rust that could be scrapped or sanded.





But we are not done yet !

Hopefully in October, we can get our group together to finish the roof in the Gloss Royal Blue paint Then next year we will work on the concrete block building. We have already sprayed certain areas of the building with a mold & mildew agent to remove stains.

We will have to do some touch up and finish work on certain areas of the building and door way. The concrete block building will be finished with a white color paint for exterior use to stop mold & mildew and other weather effects.

Photos of the finished roof paint will be in the November issue.

# Fighting Telescope Envy

by Adrian Bradley, VP/Officer, University Lowbrow Astronomers



Editor's 2" Refractor.

...It's been about 20 minutes since the Sun set. You arrive with your small 80mm refractor on it's tripod, and you have your 2 eyepieces that came with the small refractor (10mm, 25mm). As you carry your already assembled telescope to the field for star party night, you can't help but notice that about 10 other telescope operators are working away on their tablets or phones, tables with full eyepiece sets laid out, and telescopes with 10" mirrors or larger, looming towards the sky. Others are still assembling their telescopes, with some requiring help to lug the big rocker boxes out of the back of their SUV and onto the ground where they will observe tonight. You set down your telescope, turn to look at it, and are at a loss for what to do, since your

telescope came fully assembled and you are ready to go.

As the clear night progresses, you decide to look at a couple of your easy to find favorite objects. "Who am I kidding", you tell yourself, these are the ONLY objects you can find with-

out a star map, because they are the only objects you've been able to see clearly in this scope. So you go to a globular cluster and, after a little bit of searching, you see the faint fuzzy round glow of the cluster in your scope. Just then you hear someone shout out "I've got M13 if anyone wants to look at it." It's the operator with the 14" scope, looking at the same globular cluster you just found. So you walk over, stand in line behind a couple people, and when you look at M13 in their scope, you're amazed at the view. You are also very aware of how much different M13 looks in this scope compared to the view you have.

When you come back to your scope, there's someone asking 'hey are you looking at anything in there?' You quickly say 'no... sorry! But if



Editor's 14 1/4 inch Newtonian DOB

you go over there you will get a very good look at M13!' and they wander away, leaving you to think 'well yes I had M13 in there but if you look at it in my scope, then look at it through that 14" scope, you will be absolutely disappointed in my view. Why am I even OUT here with this little thing? I shouldn't have brought it!!'

## **REFLECTIONS / REFRACTIONS**

## Fighting Telescope Envy Continued

For the rest of the night your scope sits there aimlessly pointing at the spot where M13 used to be, while you go back and forth between views of planets, nebula, galaxies, and even double stars/triple stars in the larger scopes. Eventually you decide you've had enough, so you get ready to leave the star party. You thank the operators for sharing their amazing views through their scopes, even though you have seen amazing views through those scopes from past star parties. You pick up your refractor with one eyepiece in it, and the other eyepiece still in your pocket, and you walk off as quickly as you can so you aren't tempted to stay... until someone with a large 61cm Starmaster says 'Hey I've got a splendid view of M42 in my scope.' Yep, the winter constellations are rising and you knew you'd want to see the Orion Nebula so you turn around, drop your scope on the ground, and go running to see a splendid view of the Trapezium, and swear that you saw all 6 visible stars.

Finally you make it back to your vehicle, almost forgetting to pick up your telescope along the way. You toss the refractor into the back seat without taking it off the tripod, and you forget to turn off that laser sight that puts the dot in the sky where the telescope should be aiming. You don't care, you've decided it's time to get a new telescope. You're tired of the planets looking like a small marble, and you want nebulas and galaxies to stop looking like the exact same fuzzy patch of light.

It was a beautiful night, the milky way was brighter than usual until it rolled west later in the night, and the sky seemed steady and clear. But you couldn't really enjoy that, because you're still thinking about how worthless your telescope is.

You have Telescope Envy.

## WHAT IS TELESCOPE ENVY?

Telescope envy is more than just 'I wish I had their scope.' If you have experienced the following feelings/emotions, you may have telescope envy:

- You take delight in watching someone struggle to get their large scope working.
- You work to clean and collimate your scope when you first get it, but then after viewing the night sky in a larger telescope, you abandon your cleaning regimen.
- You wish you had the coin to spend on a much larger telescope but just can't right now.
- You feel that your knowledge of the night sky would grow by leaps and bounds if only you had a much larger one
- You've left star parties where the sky was absolutely beautiful, but can't remember that because you're too blinded by the fact that your scope sucks.

## Fighting Telescope Envy Continued

I think all of us who have observed at one point or another go through telescope envy (or some form of it) when we start. Astrophotographers have a similar envy when it comes to the images that are produced. We are proud of our images until someone comes along with a much clearer, sharper version of the same object, and when we look back at our feeble attempt we begin to realize we're outclassed. We then take down the image from all the social media sites despite the likes it received.

#### **HOW DO I FIGHT IT?!**

First of all it's human nature to experience telescope jealousy, which is at the root of the scope envy. Therefore the very first thing you can do to combat telescope envy is acknowledge that you are indeed jealous of your fellow astronomer's telescope. Identify the reason you are jealous of that larger telescope. Here are some examples that get right at the root of the problem:

- Since learning about the astronomy hobby, you have been told by telescope sales reps and other astronomers alike; more aperture produces better views of the night sky. While this is true, it takes a little while for the aspiring amateur astronomer to learn how light works and why we can see it through our telescopes in the first place. But you set yourself up for jealousy when you are already thinking 'I need an 8" telescope or more to see any faint objects.'
- Go-to setups enable these large scopes to travel right to an object that you want to see. When the go-to is working properly, these objects just show right up in the eyepiece. Most go-to or push-to will also have tracking so the object stays in the eyepiece a lot longer than if it were a simple push-to with no encoders. It makes for a better viewing experience and better for outreach.
- Face it, large telescopes look impressive. Needing a ladder to get to the eyepiece just confirms that you are looking through a light-gathering bucket that cost a pretty good amount of money to assemble and use. So now there's the thought that the person who has the scope must be doing very well financially to be able to afford it. You wish you had that kind of money to spend on telescope equipment also.

### OK YOU HAVEN'T TOLD ME HOW TO FIGHT IT!...

I'm getting there!!

Alright, start with this fact about all of these bright and beautiful stellar objects: They range from a few light years away to millions and millions of light years away. Even a few light years is such a huge distance, it's an amazing thing to know that we can see any light from that object at all. Photons from distant galaxies are not detectable with our naked eyesight, but even in a small 80mm refractor, that light gets magnified and you end up seeing that light directly.

Having this understanding helps you realize that you are sharing something in common with the big scopes - you are gathering light from these objects and transporting it to your eyes. At the very core of observational astronomy is 'can you clearly see that there is an object there?'

Using binoculars and panning the night sky from someplace where it was dark, I observed and counted 13 DSOs within the span of 5 minutes. I didn't worry that these things looked like hazy blobs, because I simply wanted to be able to detect that the objects were present.

This can be summarized in a step:

STEP 1 - learn to appreciate the great distance light can travel, allowing us to detect these objects at all.

## **REFLECTIONS / REFRACTIONS**

## Fighting Telescope Envy Continued

#### BUT THEY STILL LOOK UNIMPRESSIVE IN MY WEE LIL' SCOPE

Have a hard talk and ask yourself what this 'unimpressive view' is being compared to. One thing we always find with outreach is that when we show something in a telescope, we get our fair share of disappointed viewers who expected to see something similar to what the Hubble Telescope can produce. When we inform them that it is not going to look that impressive, we can see the air go straight out of the balloon. This is a reality check, and most have to get used to the idea that it just isn't going to look as good in our ground-based telescopes as it will with those larger science instruments that are taking images anyways and combining hours upon hours or images to produce a final beautiful photo that gets spread all over the internet and other media. Our eyes can barely pick up any color. Even the most colorful objects in the night sky are not as colorful to our own eyes. But maybe you knew all that, and you are comparing your view to someone with a large telescope. They have more detail than you have, and that makes your scope seem like a little toy that you don't really wanna play with anymore.

#### YEAH, THAT'S EXACTLY HOW I FEEL! I CAN SEE THE DIFFERENCE IN THE BIG SCOPES VS MINE...

To put it bluntly, then think about whether or not you can afford to get a larger scope. Ask yourself why you want this scope. Some honest introspection may need to be done here. Again we're all human and we may have different reasons for being out in the night sky. We can have superficial reasons, and it's time to call those reasons out!

- I want to be the one with the big line of people at star parties, all anxious to look through my scope and what I find.
- I would love hearing those compliments about me and my super large telescope.
- I want attractive people to come look through my telescope and start talking to me because I will seem important enough to talk to.
- I like the attention a larger telescope brings at star parties. (Well this is basically what sums up the things I wrote above)
- I'm an enthusiast and I would really like to see much better views when I observe.
- I like looking through large scopes and want one of my own so I don't have to look through everyone else's large scope.
- I'd get a large scope but I don't have the vehicle trunk space and I can't just go get a new car right now...
- I suck at knowing where night sky DSOs are. If I owned one of those scopes with the fancy go-to on it I would enjoy the night sky that much more because I would be able to see a whole lot more stuff!
- My planets won't look like little bitty marbles anymore.
- I want to go to darker sites and chase smaller faint fuzzies of higher magnitude.

Your reason may not be listed. But it's there. Examine why you feel the way you do about other telescopes. Note that last reason I put - this reason is often the REAL reason that many invest in a larger instrument. They may have seen every single Messier Object over their years of doing observation, and are now ready to use their instruments to chase fainter objects.

#### DARK SITES, EYEPIECES, AND SUDDENLY MY LIL SCOPE IS MORE POWERFUL THAN I THOUGHT

That's right. Where you observe and the quality of your eyepieces all make a huge difference in what you will be able to observe. With better eyepieces comes better contrast in any scope. This helps you pick out a faint fuzzy object in a star field. Filters help you pick out nebula that emit light in wavelengths we can't naturally see with our own eyes. And, simply put, try to get yourself to a dark site. The darker the site, the clearer the night sky and easier it will be to see night objects - maybe even with detail that you didn't think your little scope could pick up. If you are truly vested in wanting to observe, doing these things will take your mind off of the scope envy you may have. Plan a trip to a dark site, bring friends if possible, and bring your little scope with the eyepieces you have.

## Fighting Telescope Envy Continued

Remember that in the 1700s when Charles Messier and other astronomers from that time were observing things in the night sky, they did so with instruments barely better than the binoculars I mentioned finding 13DSOs with earlier. Plus they had a focus - Messier himself was looking for comets, and each of those objects he catalogued fooled him into believing it was a comet, only to remain fixed in it's position in space so that Messier had to take note of it so other comet hunters wouldn't make the same mistake he did in thinking this object was a comet. Had he been able to determine the actual shape of these objects he might have given a lot more attention to them than the comets. So, with the right conditions it is possible to see more than 110 night sky objects with a very modest telescope. Keep that in mind before switching to a larger instrument. Or use it to help you determine when and where you will use your telescope.

One quick but important thought on the moon - there is a lot of observing you can do with a small instrument pointed at the moon. Try picking out the Apollo program landing sites, or look for features on the moon that you may not have known were there. The moon isn't just an inconvenient source of light that ruins your night vision, it is a magnificent object that many in the public will gasp at when seeing it up close with it's craters, mountain ranges, and seas. Simply observing the moon can extend the value of your small telescope.

#### ONE LAST WAY TO FIGHT SCOPE ENVY

... is simply to plan your observing outings with your fellow astronomy club members, and ask them kindly to let you operate their scope. They may be more than glad to teach you how it works, and let you run it. Or, you can ask questions about how their scope operates and how they got it. You can start saving your pennies for it, and resolve that either you will plan for getting a larger telescope, or you will plan to get the most out of the little telescope you have during an observing session one day.

#### **EPILOGUE**

I have personally seen the value of small, computer-less scopes in the short time I have done amateur astronomy. I also dabble in astrophotography. My views are not the best and my pictures aren't always the sharpest or cleanest. But I became satisfied with what each instrument was capable of doing, and determined 'what do I want out of my hobby?' With so many people doing wonderful astrophotography work, I decided I'd not take pictures with the intent to publish (besides social media), but just to get better at doing it.

Some night sky objects are diffuse and hard to see when put in larger telescopes. But smaller telescopes with a focal ratio of f/8 or larger, holding a very well crafted eyepiece, will make these objects easier to find and observe.

In summary, we all love the night sky for different reasons. We owe it to ourselves to take the instrument we've invested in, and use it to go through the process of finding a few DSOs with it. This will give you awareness of not only how the night sky looks during a particular season, but also makes you aware of how these objects move through our night sky, and what objects are available at what times of the year. A larger instrument will show more detail in some objects, but they are more susceptible to any problems with changes in temperature, dewing, focus problems at higher power, and general maintenance/upkeep of the telescope itself.

The night sky is the most important thing out there. Thanks to light pollution it is a resource that we have gradually been losing since the dawn of the industrial age and the lighting that comes with it. Any opportunity to see beyond our planet, with any telescope whatsoever, is one of the biggest reasons we should have for wanting to become an amateur astronomer.

## **REFLECTIONS / REFRACTIONS**

## Event Summaries

By Don Fohey

#### Astronomy at the Beach Friday and Saturday nights, Sept 13th and 14th.

It had been cloudy and rainy all day Friday which I am sure reduced attendance. The clouds parted as predicted about time we set up telescopes. Even with a full moon I was able to show visitors Jupiter, Saturn, Neptune, and brighter objects such as M13, M57 and M27 and Alberio. There were plenty of telescopes for the numbers of people, the positive aspect of the reduced attendance was that I able to take plenty of time to talk with each of the small groups that came to my telescope.

Saturday night Brian Ottum reported "I think I heard the DNR say that there were roughly 400 on Friday and just over 3000 Saturday. Jack Brisbin did a careful count and there was a total of 76 telescopes at the peak Saturday night. Wow. That really helped keep the lines manageable (except for the BIG scopes that always attract BIG lines)." "I talked to about a hundred folks who came through my booth after viewing. The comments were universally positive. They loved seeing Jupiter's cloud bands (and red spot Saturday night), the four moons, Saturn's rings and the moon. Some folks even told me they saw Neptune! I think Adrian showed that. Amazing. Dozens thanked me for helping put on such a unique and impactful event. They were genuinely appreciative. "

Jeff Kopmanis reported "Gretchen talked to one of the rangers and the end and they said that they counted between 300-400 (probably cars) that came. They said that every parking lot was filled Gretchen and I were at the East end of the beach, and we consistently had 25-30 people in line at my scope. "

#### **Rolling Hills Star Party Event**

The event was changed to Sept. 21st and moved to Independence Lake. The coordinator of the event was Adrian Bradley who reported via email to members:

"No rain came to Independence Lake, but the cloud cover sure did. I arrived, met the contacts for the camp out, and began setting up my scope. As I had hoped, skies began clearing and I got a good look at the Southern sky - enough to begin an alignment on. I also saw the North Star pop out so I got started. Before I could pick a star to align on, heavy cloud cover moved in and engulfed all of the stars I had planned to use... and I kicked myself for being too slow at getting going!! Once the clouds came, there was no let up and I wound up demonstrating to a few families how the scope can be remotely controlled to point at an object in space.

Not all was lost! I gave out a stack of brochures to the organizer who put them in view in a park building. Now visitors to the park will see our brochures and come to our star parties if they are interested. Plus the personnel were so happy I took the time to come out, they mentioned contacting us in the future for more possible events. And then I had s'mores and talked photography with someone who happened to have their DSLR present.

The moral of the story - sometimes outreach will go beyond sharing the night sky. Even without showing a single object in space I had the impression that attempting the event meant a lot to that group. While it would have been acceptable for me to cancel the event . I felt that if there was any chance at all of stars being seen, it was worth giving it a try!

#### The Sept. 21st Open House was canceled due to weather by OHC Yogesh Chavarkar

The Sept. 28th Open House was reluctantly cancelled due to weather by OHC John Wallbank

## October 2019

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		Upcoming Events		
DATE	EVENT	LOCATION		
Saturday Oct 5th	Star Party	Leslie Science and Nature Center	EVENT CAMCELLED	
Monday Oct 7th	Lunar ISS Transit at 20:50	Independence Park) at 1898 Denton Rd, Canton, MI 48188	Coordinator Awni Hafedh	
Friday Oct 18th. 7:30 pm	Monthly Meeting	Room G115 Angell Hall 435 South State Street Ann Arbor, MI.	Speaker is Dr. Dan Durda	
Saturday Oct 19th	Star party for Girl Scout Troop,	Linden Michigan	Coordinator John Wallbank	
Saturday Oct 26th. 9 pm	Open House "Girl Scout Astronomy Day"	Peach Mt. Observatory 10280 North Territorial Road	Coordinator TBD Volunteers Needed.	
Saturday Nov 2nd. 9 pm	Open House (Rain Date for Girl Scout Astronomy Day"	Peach Mt. Observatory 10280 North Territorial Road	Coordinator TBD Volunteers Needed.	
Monday Nov 4th.	Library Star Party	South Lyon Library 9800 Pontiac Trail, South Lyon, MI 48178,	Coordinator Brian Ottum and Jeff Kop- manis	



Abe Oraiqat wrote in an email to members on Setp 24th.

"Here is my attempt at the Sadr region. I am using an Oshiro 135mm lens @ f/3.5 (open at f/2.8 leads to lens flare). These are 26 subframes of 2 minutes (unguided) exposures. The mount is a Skyguider Pro and the camera is an ASI071MC-Pro (gain = 90, temp = -5degC) with an Optolong L-Enhance filter. I am in a very light polluted

area, I am only feet away from a flood lamp. I am still learning here! I worked on the light pollution using Astroflat Pro and Astronomy Tools for photoshop."

## **REFLECTIONS / REFRACTIONS**

#### **University Lowbrow Astronomers**

Meeting Minutes September 20, 2019

The meeting was held at the U of M Museum of Natural History's new Planetarium & Dome Theater.

President Charlie Nielsen called the meeting to order and introduced the evening's speaker, the planetarium manager, Matt Linke. Matt first talked about the design and construction of the planetarium, showing pictures he had taken at various stages of the construction. He then demonstrated the capabilities of the planetarium both for astronomical education and other fields. Night sky capabilities were demonstrated. Vantage points from different locations in space demonstrated views that could never be seen from earth. Some wide screen immersive videos were spectacular. He spoke lastly of some Great Lakes underwater theater programs that were in the process of being developed.

#### **Business Meeting**

<u>President Charlie Nielsen</u> asked that the business meeting be kept brief so that Matt could close the planetarium.

He reported that Saturday's Sept. 21st Peach Mt Open House co-ordinator is Yogesh Chavarkar. He asked for a volunteer co-ordinator for the Sept 28th Open House. He will coordinate and upcoming Leslie Science and Nature Center Star Party Event (scheduled for Oct. 5th). The planned Tecumseh Star Party has been cancelled. Next month's meeting will be in the newly refurbished Angell Hall room G115.

<u>Observatory Director Jack Brisbin</u> reported that the observatory roll off roof structure is finished and has been painted with a royal blue color. Work continues on the roof structure, the north and south sides have been primed and more work is required.

<u>Treasurer Doug Scobel</u> reported\_a membership of 159 and \$7053 in the treasury. The AATB check has not been cashed. He has not received membership renewals nor has not been able to contact Tom Ryan, Phil Schafer and John Wasyl. He asked members who may know them to help with contacting them. He will be working on the ordering process for RASC Observer Calendars and Handbooks.

Newsletter Editor Don Fohey pleaded "I always need newsletter articles."

Webmaster Krishna Rao reported the web site is up and running.

<u>Vice President Adrian Bradley</u> reported that the Rolling Hills County Park camper event was to be held Saturday Sept. 21st at Independence Lake. He would go first to that event with his telescope and then to the Peach Mt. Open House.

Submitted respectfully by,

Don Fohey

#### 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

Annual dues are \$30 for individuals and families, \$20 per year for students and seniors (age 55+) and \$5 if you live outside of the Lower Peninsula. Membership entitles you online access to our monthly Newsletters and use of the 24" McMath telescope (after some training). A mailed copy of the newsletter can be obtained with an additional \$18 annual fee to cover printing and postage. Dues can be paid by PayPal (contact the treasurer to find out how) or by 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 \$65.90/2 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: <u>lowbrowdoug@gmail.com</u>

#### **Newsletter Contributions**

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

#### **Telephone Numbers**

President:	Charlie Nielsen	(734) 747-6585			
Vice President:	Adrian Bradley	(313) 354 5346			
	Jim Forrester	(734) 663-1638			
	Joy Poling				
Dave Jorgensen		1			
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

## **REFLECTIONS / REFRACTIONS**







Member Club



Astronomical League Member Society #201601, Great Lakes Region

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