



Astronomy Club of Tulsa

Observer

August 2014



Photo: Super Moon rising over Los Cabos, taken at Sidewalk Astronomy July 2014, by Tamara Green.

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AUGUST 2014

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3		4	5	6	7	8
10		11	12	13	14	15
17		18	19	20	21	22
24	25		26	27	28	29
31						30

SEPTEMBER 2014

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2		3	4	5
7	8		9	10	11	12
14	15		16	17	18	19
21	22	23	24		25	26
28	29	30				

UPCOMING EVENTS:

Sidewalk Astronomy	Sat, Aug 9	Bass Pro	8:00 PM
Public Star Party	Fri, Aug 15	ACT Observatory	7:45 PM
Back-Up Night	Sat, Aug 16	ACT Observatory	7:45 PM
Members' Night	Fri, Aug 22	ACT Observatory	7:30 PM
Back-Up Night	Sat, Aug 23	ACT Observatory	7:30 PM
Labor Day	Mon, Sep 1		
Sidewalk Astronomy	Sat, Sep 6	Bass Pro	7:15 PM
General Meeting	Fri, Sep 12	Jenks HS Planetarium	7:00 PM
Club Work Day	Sat, Sep 13	ACT Observatory	TBA
Public Star Party	Sat, Sep 20	ACT Observatory	7:00 PM
Okie-Tex Begins	Sat, Sep 20	Black Mesa	
AUTUMNAL EQUINOX	Mon, Sep 22		9:29 PM CDT
Members' Night	Fri, Sep 26	ACT Observatory	7:00 PM
Back-Up Night	Fri, Sep 27	ACT Observatory	7:00 PM
Okie-Tex Ends	Sun, Sep 28		

Don't forget to register for the 31st Annual Okie-Tex Star Party!

September 20-28, 2014

Camp Billy Joe, Kenton, OK

Offering the most wonderful dark skies you'll ever see!

Hosted by our friends, the Oklahoma City Astronomy Club

With wonderful food by Jody's Catering of Boise City, OK!



www.okie-tex.com

Pre-Registrations must be submitted by no later than September 1, 2014

Meal Registrations must be submitted no later than August 29, 2014

**Both the Star Party registration and the meals registration forms are available on the
website.**

Make your registration today, and we hope to see you there!



Vice President's Message

By Richard Brady

Hi everyone. Mandy is still MIA (actually she is probably at work, at school, or at home studying.) So I get to write something for this newsletter.

Past: We actually had a pretty good month for observing this past July, especially compared to previous months. Sidewalk Astronomy was great! Owen told me that he thought we had the biggest crowd ever for as long as he and Tamara have been doing the event. Way to go, Owen and Tamara, and everyone who came out and helped.

Public Night was the only night that couldn't be considered "great". When we got there it was mostly cloudy, but the clouds cleared north to south. It was still kind of hazy even after the clouds went away. Only a few guests came out, so we ended up with only two or three guests per member, which I thought made for a better experience for our guests.

Member night was another great night! The sky was very clear (the best I'd seen in over a year.) We had many members show up, some that hadn't been there in a while. It was still going strong when I had to leave about 11:00.

Present: The Perseids are in the sky this month. The peak is around Aug. 13. Unfortunately there is a full moon on the 10th. But the Perseids can possibly be seen all month. So leave your telescopes and binoculars inside, take your lawn chair or recliner, and a cool drink, sit back and watch the sky for the Perseids.

Mars and Saturn are still up in the evening sky. And Venus and Jupiter are in the morning sky. Mercury is pretty much lost in the sun's glare.

Future: There are some big changes coming! We are moving the public nights to Saturdays starting in September. This is to allow members to get set up before our guests arrive.

Secondly, and I think more importantly, we are moving our club meetings from TCC-NE to the Jenks Planetarium for September, October, and December. The annual dinner in November will still be held at the Tulsa Air and Space Museum and Planetarium as in previous years. (I'm trying to get us a tour of the MD80. Keep your fingers crossed.) We have also had to change a couple of dates to avoid the football crowds. The meetings will still be on Friday nights, but the September meeting is moving from the 5th to the 12th, and the October meeting is moving from the 10th to the 3rd. **More details along with directions and a map can be found later in this newsletter.**

Don't forget that new officers for the club will be elected in the fall. I'd like to do it again at the annual dinner this November. If you want to help steer the course of this thing called The Astronomy Club of Tulsa, please tell our club secretary and editor of this newsletter, Tamara Green, what office (president, vice president, secretary, or treasurer) you would like to run for. You could also run for our board of directors. You must have been a member of the club for at least a year to run.

Clear Skies!

Richard

P.S. While this really doesn't pertain to the club, I wanted to tell everyone (if they haven't already heard) about Laser Fest coming to the Tulsa Air and Space Museum and Planetarium this August 14-17. These are laser shows in the planetarium set to rock music. More information can be found at TASMs Facebook page, [facebook.com/TulsaAirandSpace](https://www.facebook.com/TulsaAirandSpace).

Club Meetings and Public Nights moving in the Fall

by Richard Brady

When we resume having our monthly club meetings in September, we will be having them at the Jenks Planetarium, instead of TCC-Northeast. (Directions and map at the end of the newsletter.) This summer I met with Dan Zielinski, the Jenks Planetarium Director. He was very enthusiastic about having our club meetings there. Besides having the meeting in their planetarium, there is a deck on the rooftop where we could set up a couple of scopes afterwards.

The planetarium is right next to the Jenks football stadium. Unfortunately, they have home games scheduled for the Fridays we had planned to have our club meetings in September and October. So instead of fighting the football traffic and parking problems, it was decided to move the night of our meetings. The September meeting will be moving from September 5th to the 12th, and the October meeting will be moving from October 10th to the 3rd. Both are still on Friday nights beginning at 7:00 PM. The December meeting is still scheduled for the 5th as before.

The other change coming this fall is to our Public Observing Nights starting in September. The board decided to move them to Saturday nights instead of Friday nights. They will be the same weekends as previously scheduled, just on Saturdays.

Sidewalk Astronomy and Members Observing Nights remain the same.

The calendar for the rest of the year is below.

<u>Event</u>	<u>Date</u>	<u>Where</u>	<u>Time</u>
Sidewalk Astronomy	Sat 8/9	Bass Pro	8:00 PM
Public Night	Fri 8/15	ACT Observatory	7:45 PM
Members Night	Fri 8/22	ACT Observatory	7:30 PM
Sidewalk Astronomy	Sat 9/6	Bass Pro	7:15 PM
Club Meeting	Fri 9/12	Jenks Planetarium	7:00 PM (location & date change)
Public Night	Sat 9/20	ACT Observatory	7:00 PM (date change)
Members Night	Fri 9/26	ACT Observatory	7:00 PM
Club Meeting	Fri 10/3	Jenks Planetarium	7:00 PM (location & date change)
Sidewalk Astronomy	Sat 10/4	Bass Pro	6:30 PM
Public Night	Sat 10/18	ACT Observatory	7:00 PM (date change)
Members Night	Fri 10/24	ACT Observatory	7:00 PM
Annual Club Dinner	Fri 11/7	TASM	6:30 PM
Sidewalk Astronomy	Sat 11/8	Bass Pro	6:00 PM
Public Night	Sat 11/15	ACT Observatory	7:00 PM (date change)
Members Night	Fri 11/21	ACT Observatory	7:00 PM
Club Meeting	Fri 12/5	Jenks Planetarium	7:00 PM (location change only)
Sidewalk Astronomy	Sat 12/6	Bass Pro	6:00 PM
Public Night	Sat 12/13	ACT Observatory	7:00 PM (date change)
Members Night	Fri 12/19	ACT Observatory	7:00 PM



Treasurer's and Membership Report

By Tim Davis

Astronomy Club of Tulsa: 134 members, including 34 new members in 2014.

Welcome to our new members this month: Adam Hunt, Marissa Garcia, Chris Calvert, Steve Sharitt, Rhiannon Overman and Davis Taggart.

Club Accounts as of July 31, 2014:

Checking: \$ 2,817.19

Savings: \$ 3,770.53

Investment accounts: \$ 19,050.64 (*Value Fluctuates with Market*)

PayPal: \$ 0.00



The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at <http://astrotulsa.com/page.aspx?pageid=16> **Click Submit** and you will be given the choice of either **mailing in your dues** with a check or **using PayPal** which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader now. A small fee is also added on to these transactions.

ALSO NOTE: For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by whatever method you choose.

NEWS NOTE: Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Contact their websites for details.

Membership rates for 2014 are as follows:

Adults: \$ 45.00 per year, includes Astronomical League Membership.

Sr. Adult: \$ 35.00 per year for those 65 or older, includes Astro League Membership.

Students: \$ 30.00 with League membership; **Students: \$ 25.00** without League membership.

Additional Family membership: \$ 20.00 with voting rights and League membership; **\$ 15.00** with voting rights but without League Membership.

The regular membership allows all members in the family to participate in club events, but only **ONE Voting Membership** and one **Astronomical League membership**.

Join Online – Add or renew magazine subscriptions. <http://www.astrotulsa.com/page.aspx?pageid=16>

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website.

Astronomy is \$ 34.00 for 1 year, or \$ 60.00 for 2 years. www.astronomy.com

To get the club discount you must go through the club group rate.

Sky & Telescope is \$ 33.00 per year www.skyandtelescope.com

Sky & Telescope also offers a 10% discount on their products.

Note: You may renew your Sky & Telescope subscription directly by calling the number on the renewal form, be sure to ask for the club rate.

NEW SUBSCRIPTIONS must still be sent to the club.



The Secretary's Stuff

By Tamara Green

Hello All!

We have not had any General Meetings or Board Meetings in the past month, so there are no minutes or synopses for me to report on.

But, I do have some news to relate to you all about some location and scheduling changes for some of our events.

First of all, the location for our General Meetings has changed. As of September, we will no longer be meeting at TCC. Instead, we have worked out a deal with the Jenks High School Planetarium, so those meetings will take place there. They will still be on Friday nights, but due to some competition with football games, we have rescheduled some of our meetings and will work out the calendar with them for next year as well. The first meeting after the Summer break will be on Friday, September 12 at 7:00 PM. Directions and maps are on Pages 19 and 20 of this newsletter.

Also, due to it taking so long to get set up for public nights, and the fact that most of us do not get off work until 5:00 PM, our public nights, as of September, will be on Saturday nights instead of Fridays. The public night for this September will be on Saturday, September 20 at 7:00 PM at our Observatory. The dates and days for Sidewalk Astronomy and Members' Nights will be the same as before. Please refer to VP Richard Brady's special report on Page 6 of this newsletter.

Also, don't forget to register for Okie-Tex Star Party! The dates for this year's Okie-Tex are September 20-28. Deadline for Star Party Registration is September 1, and the deadline for meals registration is August 29. Please see flyer on Page 4 of this newsletter for details. We hope to see you there!

Clear Skies!

Tamara

My Improved 2102 Optical Tube

July, 2014

by Bill Steen

I have had the optical tube for a Meade DS 2102 for a couple of years and have done a number of things to it. This work includes:

- (1) Sanding circumferential grooves in the dew shield and objective retainer ring with 60 grit sand paper.
- (2) Repaint everything inside with Rustoleum flat black primer.
- (3) Blacken the edge of the cemented lens with the flat side of a black, cone tipped "Sharpie."
- (4) Carefully check the straightness of the metal tube with a straight edge and bump the tube on my thigh on the right spot as needed to correct any perceived curvature.
- (5) Check the cuts on the ends of the tube with a good square (hold the contact zone up to an overhead light and look for high and low spots, file with a fine toothed file as needed).
- (6) Check the inside lip the objective sits on with my fingernail and carefully sand any bumps with 600 grit sand paper and a very tiny sanding block.
- (7) Collimate the original focuser as well as I could.

The scope has been satisfactory, but I have wanted to use my Meade 5000 series ultra-wide two inch eyepieces in this scope, mostly out of curiosity. This spring, I purchased an Antares 2FOCR Rack and Pinion Focuser from Hands-on-Optics for \$49, I think, including shipping.

The focuser came in and I discovered it was brown, which clashed with the blue of the scope. I did some on-line investigation and found out how to bake enamel. I then took the focuser apart, spray painted it with what was called an epoxy enamel, allowed it to dry, then stuck it in the oven and slowly increased the temperature. I preheated the oven to 160 degrees F (the lowest it would go) and baked the focuser for 20 minutes. Since I did smell volatiles coming off, I repeated at that temperature. I then went to 200 degrees for 20 minutes....twice due to volatile smell until it stopped, then to 250 for 20 minutes with no smell, then to the specified 300 degrees. The article said to bake for about 15 minutes for small objects, so I baked the focuser for 20. I did get a different odor at the end and was afraid I might be scorching the paint so I stopped at that point. The focuser came out with a nice, shiny black, with a very hard surface.

Installing the focuser on the scope required the use of two 1/16th inch shims, made from a strip of brass, under each screw. Even though I had my doubts about how strong the tube metal was and if it could hold up my Meade 5000 series 30 mm by 82 degree eyepiece, I decided to give it a try.

What I ended up with is quite a conglomeration of parts from different companies, the Meade 2102 optical tube, the Antares 2FOCR focuser, an Orion 6X30 correct image right angle finder on the focuser mounting slot, Scope Stuff dovetail and mounting rings, and an Omni CG-4 mount and tripod.

At the same time, I was working on a little Meade 76 mm f/9.3 reflector, which is held by Scope Stuff mounting rings on a small e-1 level Meade mount from an old 60 mm f/15 refractor. The tripod has been replaced with a Celestron e 3 that is another long story. I have done quite a bit of work on the e 3 tripod to stiffen it up, but the little reflector requires seven pounds of weight to balance (short counterweight rod) and still has a lot of low frequency wobble (actually at two different frequencies).

I had my first opportunity on July 3rd, to check out both scopes, amid fire crackers and other premature celebratory fireworks. I had out the 76 mm reflector since I had cut a little more off the tube to allow all of my eyepieces to come to focus. First things first, I checked both scopes for collimation against a star. I had to tweak the reflector a little, but the refractor was dead on.

Running the focuser in and out and comparing what I saw with what Bruce Suiter shows in his star testing book, I THINK the refractor is slightly better than 1/4 wave in under-correction, but very close to that mark. It is definitely worse than the 1/8th wave pictures.

That first night, I realized that my two inch diagonal was in my storage unit instead of at home, so I had to limit my checks to 1.25 inch eyepieces. The reflector did very well all the way down to the 5.5 mm UWA. I was really impressed with what I could see and believed it could do more. On the Moon, the terminator was exactly in the right spot for Maurolycus Crater. I was able to pick out a lot of rubble below the rim where a smaller crater sits that I had not seen before with the 5.5 mm UWA.

Looking at all that devastation and realizing that the little pieces that barely showed up in my scope were probably a couple miles across, I was trying to visualize what violence that had to be when just that smaller asteroid hit the rim of Maurolycus. At that moment, someone sent up an aerial bomb that, in my opinion, is too large for sale to the general public. It was launched from the street in front of my back yard neighbors and went off maybe 100 feet in the air. WHAM! I have never heard an explosion from normal fireworks that loud! With the intensity of my concentration, it was quite an experience.

I went to the little reflector and cranked up the power. The image was definitely dimmer, as would be expected, but was impressive. With a 3.2 mm TMB Planetary, I was able to make out most of the rubble than the refractor what showing, but not quite as much and not as much contrast. I tried the 2.5 mm eyepiece, but the 3.2 is was the limit. That was 219X or 2.88 times the diameter of the primary mirror....not bad, I think.

My next object was Xi Scorpii. Don and I had been discussing this on the Small Refractor Club and I wanted to check it out. Since the reflector has the wobble in the tripod, I stuck with the refractor. I found the Xi, Sigma 1998, and the nearby Sigma 1999, which is supposed to be part of the same system. Both are on the Astronomy League Double Star List and I had viewed them with my 70 mm refractor under heavier light pollution than I now have. With the 8.8 mm UWA I could definitely see Xi AB as a single star that was "doing something" as well as C. Sigma 1999 was also in the view, showing A and B, with what is called C not quite in line and a ways away. I decided to put in the 5.5 mm eyepiece just to see if I could see anything more with Xi AB. Sure enough, the disk turned into an oval with one end being tinted orange and the other end tinted with blue. The blue end was inclined a bit in the C element direction. On a whim, I reached over and put in the 3.2 mm TMB Planetary. The oval turned into a figure eight. It was not all the way to "kissing" disks, but was getting close. If I had any worries about the scope not being collimated correctly, they were gone now.

I went on to look at the double-double in Lyra and M-13. With a little study, I was getting a few stars in M-13 to wink in and out for me.

Last night, July 5th, I had the refractor out again, with the two inch diagonal. I watched the Moon again as the sky was still darkening and just barely had sundown. Maginus was perfect, but Clavius was still a bit dark. I could just see the rims of two of the craters inside Clavius, but the rest of the inside was black. In Maginus, I again marveled at the rubble I could see in the southern part of the basin. I used this crater and the TMB Planetary eyepieces to see how far the scope could go. I made it to the 3.2 and 2.5 mm eyepieces and switched them back and forth several times. I finally decided that I could get more information out of the view through the 2.5 than the 3.2. It could just be my eyes, with the cataracts needing the objects to be larger than made the 2.5 mm eyepiece better. An astute observer with really good eyes might have "sniffed" at the image and thought 4 mm was better....I don't know. If 2.5 mm is the true top end for the scope, then it reached 320X or 3.2 times the 100 mm objective clear aperture. Again, not bad, I think!

My Improved 2102 Optical Tube, by Bill Steen, Ct'd.

Things got darker. I had wanted to look south again, but some clouds were in the way. I turned back to Lyra and put in the 30 mm UWA. I could tell right off that the focuser was at its maximum capacity with that eyepiece, but it was handling it. Man, are there a lot of stars up there! What was nice was seeing the two end stars of Lyra and the Ring Nebula in the same field. I am seeing some coma with that rig in the outer areas. If the field were cut from 3 degrees TFOV to 2.5, it would almost be completely out of the image. At 2 degrees, there is no coma that I could detect at all. This is probably not bad for an f/8 achromat,.... don't know. The coma is not overly objectionable to me for pushing the scope to that extreme, which I am sure it was not made to handle. For now, at least, I am very satisfied. I could possibly make it better with a Moonlite focuser or something else like that, or I could get someone like R F Royce to make me a better objective. But, for a mass produced scope, I think I am getting about all I can get out of it.

What is my point with all of this? I just proved, at least to myself, that an average objective can produce good results if setup and collimated properly. The old saying, an average mirror with an excellent collimation can out perform an excellent mirror with an average collimation, also applies to a refractor objective.

I have a feeling this rig and I will be having a lot of fun together over time.

Bill Steen

Some Amazing First Light Images

by Michael Blaylock

First light images with my new William Optics GT102 APO and Losmandy G11-Gemini II mount. Both were shot with an unmodded Canon T3i.

The moon is a single image shot at 125th sec & ISO 400. (a bit overexposed)

M22 has 10 light frames at 180 sec each; 10 dark frames at 180 sec each; and was processed in Deep Sky Stacker, and tweaked in Photoshop Both images were unguided and no drift alignment (just a rough polar alignment thru the G11 polar scope).

Next I will try a more thorough alignment and guiding.



NITELOG - Norway InTErurban Local Observing Group

by Tom Hoffelder

One year ago saw the beginning of all the Messier Objects being listed in 12 months and all the Herschel 400 objects in two years. Last month on schedule all of the Messiers were covered, as well as around 150 of the H400. So beginning with this month's list, we should be starting on the rest of the H400, but we're not. My intent of observing all or at least most of the objects each month, regardless of how many times seen before, failed miserably on the past 12 lists. Thus I am going to repeat those same lists and DSS photos for the next 12 months. Maybe you would also like to try again, but if you do not want to receive the object spreadsheets a second time, please let me know and I'll take your name of the distribution list. The dates/times for the observing weekends at the top of the observing sheet will of course be updated, as well as message info for things like planets and comets (there are some interesting events coming up with them, see below for the first).

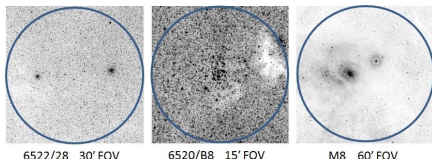
OBSERVING: Nothing scheduled at the Twitchell Observatory in August, but if you see a clear sky and want to do some observing, send me an email!

METEORS: The Perseids, one of only two showers I bother to mention, peak on the night of the 12th/13th. However, there's way too much moon for me to even think about looking for any of them this year.

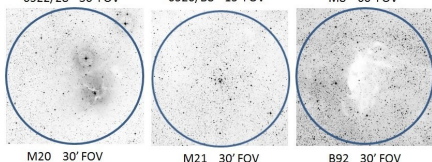
COMETS: Next month our first view of ISON??? Oh wait, sorry, that's left over from last August's email! Nevertheless, if you monitor S&T.com, you may have seen the July 23rd article urging you to get up early and look for the bright 6th magnitude Comet Jacques in the morning twilight sky. End of their story. So why didn't I mention it in my July comet info? If you saw my comment - which may not be there now since the article was written by S&T's boss - you know why: because later this month the comet will be in a dark evening sky and nearly at the same magnitude. Yes, like certain other examples it might fizzle out by then, but unlikely since it has received no hype in the news media. Even though perihelion was on July 2nd, the comet loses little if any brightness during August since the distance steadily decreases from 1.05 AU on the 1st to 0.56 AU on the 29th. RA/Dec/Sweep/predicted mag info for moonless evenings can be found in the attached Excel file. I'm sure you will agree that any mag 6.7 object high in a dark sky is noticeably better than one at 6.2 low in twilight. And you don't have to get up at O-Dark-Thirty! Plus if there are any imagers out there, note the color photo op on the 30th when the comet is practically on top of Herschel's Garnet Star, Mu Cephei.

PLANETS: With the "Big 4" all near the horizon - Mars and Saturn in the evening, Venus and Jupiter in the morning - no detailed telescopic viewing is in the cards. But not only are they near the horizon, the two groupings are near each other, as in conjunction: Venus and Jupe on the 18th, Mars and Saturn on the 27th. The former is an especially close one, with the two planets easily fitting in a half degree field of view (if my calculations are correct!) at the beginning of civil twilight (05:18) in Maine when they will be at an altitude of 10 degrees. If the forecast is clear, that just may be a planetary happening that could get me out of bed before sunrise!

STARS: Three of the reddest stars out there! Theoretically the larger the B-V, the redder the star, but my eye says the one with the smallest value listed is the reddest. Also four doubles - one involving one of the carbon stars - plus an interesting quadruple system. All involve some color contrast.



THE GOOD STUFF: All those goodies in Sgr (and nearby); most of them are M objects this month, driven by the goal of listing them all in one year's time (again).

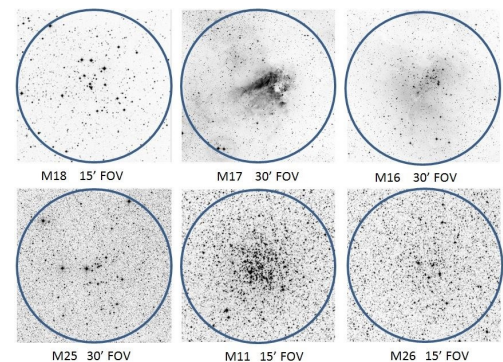


QUESTIONS: As always, questions and comments are welcome!

tom hoffelder

rocksnstars@gmail.com

*Come with me now, Pilgrim of the stars,
For our time is upon us and our eyes
Shall see the far country
And the shining cities of infinity ~ Robert Burnham, Jr.*



**AUGUST 2014
COMETS**

Comet	RA*	Dec*	Star	N/S	E/W	Mag ¹	Urano I	Alt ²	Date	EDT
C/2014 E2 (Jacques)	03 43.6	+55 01	η Per	0.9 S	7.8 E	6.2	39	20	7/23 [#]	22:30
	03 31.8	+56 35	η Per	0.7 N	5.7 E		38	22	8/16	22:30
	03 18.9	+58 04	η Per	2.2 N	3.7 E		38	20	8/17	21:30
	03 03.4	+59 36	η Per	3.7 N	1.6 E		38	23	8/18	21:30
	02 45.5	+61 05	η Per	5.2 N	0.8 W	6.5	38	25	8/19	21:30
	02 24.9	+62 27	ε Cas	1.2 S	3.6 E		17	29	8/20	21:30
	02 01.4	+63 40	ε Cas	-	0.8 E		17	32	8/21	21:30
	01 34.8	+64 38	ε Cas	0.9 N	2.1 W		16	35	8/22	21:30
	01 05.5	+65 17	ε Cas	1.6 N	5.2 W		16	38	8/23	21:30
	00 34.1	+65 34	κ Cas	2.7 N	-		15	42	8/24	21:30
	00 01.7	+65 25	κ Cas	2.5 N	3.3 W	6.6	15	46	8/25	21:30
	23 29.5	+64 49	κ Cas	1.9 N	6.8 W		15	49	8/26	21:30
	22 58.9	+63 47	ι Cep	2.4 S	1.0 E		34	53	8/27	21:30
	22 30.8	+62 21	ι Cep	3.9 S	1.9 W		34	57	8/28	21:30
	22 05.5	+60 35	α Cep	2.0 S	5.8 E		33	61	8/29	21:30
	21 42.9	+58 32	μ Cep	0.3 S	0.1 W	6.7	57	68	8/30	22:00

*At time noted

¹<http://www.aerith.net/comet/future-n.html>

#Date of S&T.com article

²Maine, at time noted

AUGUST
2014
DEEP SKY

8/16		8/23							
SS	CTE	NTE	ATE	MR	SS	CTE	NTE	ATE	MS
19:46	20:17	20:55	21:37	23:11	19:34	20:05	20:42	21:22	18:18

Object (Type)	RA	Dec	Star	N/S	E/W	Mag*/(# of Stars)	Size (")/ Sep (")	Spect/ M# or H#	Dist (ly)	Urano I Page	Comment [B-V] {current mag} (opt x)
T Dra (CS)	17 56.4	+58 13	ξ Dra	1.3 N	0.4 E	7.2 - 13		Nevar		53	{12.5} B-V = 5.6
T Lyr (CS)	18 32.3	+37 00	α Lyr	1.8 S	0.9 W	7.5 - 9.3		C		117	{8.5} B-V = 3.7
V Aql (CS)	19 04.4	-05 41	λ Aql	0.8 S	0.5 W	6.6 - 8.1		CII		251	{7.0} B-V = 3.9
T Dra (MS)	17 56.4	+58 13	ξ Dra	1.3 N	0.4 E	7.2-	16			53	(50)
95 Her (MS)	18 01.5	+21 36	μ Her	6.0 S	3.5 E	5, 5	6.3	A7, G5		159	(120)
OΣ341 (MS)	18 06.0	+21 24	priv	0.2 S	1.0 E	7, 9, 9, 9	28,38,6 3			159 (ni)	(25)
δ Cyg (MS)	19 45.0	+45 48	-	-	-	3.0, 6.5	2.4	A0, dK2	270	84	(340)
OΣ393 (MS)	19 57.5	+44 20	priv	0.9 S	2.2 E	7.5, 8.5	19	K0, A0		84 (ni)	(40)
NGC 6517 (GC)	18 01.8	-08 58	ν Oph	0.9 N	0.7 E	10.1	4.0	H199-2*	30K	294	
NGC 6528* (GC)	18 04.8	-30 03	γ Sgr	0.3 N	0.2 W	9.6	5.0	H200-2*	23K	377	
NGC 6522* (GC)	18 03.6	-30 02	priv	0.1 N	0.3 W	9.9	9.4	H49-1*	30K	377	
NGC 6520* (OC)	18 03.4	-27 53	priv	2.1 N	-	(25)	5.0	H7-7*	5100	377	dN B86 is 0.1 W
NGC 6540 (GC)	18 06.1	-27 46	priv	0.1 N	0.6 E	14.6	1.5	H198-2*	5100	377	

NGC 6523* (DN)	18 03.7	-24 23	γ Sgr	1.0 N	5.5 W	5.0	45x30	M8	2500	339	Lagoon
NGC 6514* (DN)	18 02.7	-22 58	prv	1.3 N	0.6 W	6.3	20	M20	2700	339	Trifid (also H41-4*)
NGC 6531* (OC)	18 04.2	-22 29	prv	0.5 N	0.5 E	(50)	16	M21	4000	339	
M24 Star Cloud	18 17.0	-18 40	μ Sgr	2.3 N	0.8 E	-	120x30	M24	10K	339	OC 6603 0.5 NW of ctr
B92* (dN)	18 15.5	-18 13	μ Sgr	2.8 N	0.4 E	-	15x10	-		339	
NGC 66138* (OC)	18 20.0	-17 06	μ Sgr	4.0 N	1.5 E	(12)	7.0	M18	4200	339	
NGC 6618* (DN)	18 20.8	-16 10	prv	1.0 N	0.3 E	6.0	20x15	M17	5900	294	Swan
NGC 6611* (O/D)	18 18.8	-13 48	prv	2.2 N	0.6 W	6.0	35	M16	5600	294	Eagle
IC 4725* (OC)	18 31.8	-19 07	μ Sgr	2.0 N	5.4 E	(50)	26	M25	2000	340	
NGC 6626 (GC)	18 24.5	-24 52	λ Sgr	0.6 N	0.7 W	6.9	14	M28	15K	340	
NGC 6637 (GC)	18 31.4	-32 21	ϵ Sgr	2.0 N	1.5 E	8.3	7.1	M69	23K	378	
NGC 6681 (GC)	18 43.2	-32 17	prv	-	2.7 E	7.8	8.0	M70	65K	378	
NGC 6715 (GC)	18 55.1	-30 29	prv	1.8 N	2.6 E	7.7	12	M54	50K	378	
NGC 6656 (GC)	18 36.4	-23 54	λ Sgr	1.5 N	1.9 E	5.2	32	M22	10K	340	
NGC 6705* (OC)	18 51.1	-06 16	β Sct	1.5 S	1.0 E	(200)	11	M11	6000	295	
NGC 6694* (OC)	18 45.3	-09 23	prv	3.1 S	1.3 W	(20)	10	M26	5000	295	
NGC 6720 (PN)	18 53.6	+33 02	β Lyr	0.3 S	0.8 E	8.8	2.5	M57	2800	117	Ring

*DSS image
 *[Surf Brtnss for GX's] -
 ni=shown but

mag per square arcmin
 not identified

The Invisible Shield of our Sun

By Dr. Ethan Siegel

Whether you look at the planets within our solar system, the stars within our galaxy or the galaxies spread throughout the universe, it's striking how empty outer space truly is. Even though the largest concentrations of mass are separated by huge distances, interstellar space isn't empty: it's filled with dilute amounts of gas, dust, radiation and ionized plasma. Although we've long been able to detect these components remotely, it's only since 2012 that a manmade spacecraft -- Voyager 1 -- successfully entered and gave our first direct measurements of the interstellar medium (ISM).

What we found was an amazing confirmation of the idea that our Sun creates a humongous "shield" around our solar system, the heliosphere, where the outward flux of the solar wind crashes against the ISM. Over 100 AU in radius, the heliosphere prevents the ionized plasma from the ISM from nearing the planets, asteroids and Kuiper belt objects contained within it. How? In addition to various wavelengths of light, the Sun is also a tremendous source of fast-moving, charged particles (mostly protons) that move between 300 and 800 km/s, or nearly 0.3% the speed of light. To achieve these speeds, these particles originate from the Sun's superheated corona, with temperatures in excess of 1,000,000 Kelvin!

When Voyager 1 finally left the heliosphere, it found a 40-fold increase in the density of ionized plasma particles. In addition, traveling beyond the heliopause showed a tremendous rise in the flux of intermediate-to-high energy cosmic ray protons, proving that our Sun shields our solar system quite effectively. Finally, it showed that the outer edges of the heliosheath consist of two zones, where the solar wind slows and then stagnates, and disappears altogether when you pass beyond the heliopause.

Unprotected passage through interstellar space would be life-threatening, as young stars, nebulae, and other intense energy sources pass perilously close to our solar system on ten-to-hundred-million-year timescales. Yet those objects pose no major danger to terrestrial life, as our Sun's invisible shield protects us from all but the rarer, highest energy cosmic particles. Even if we pass through a region like the Orion Nebula, our heliosphere keeps the vast majority of those dangerous ionized particles from impacting us, shielding even the solar system's outer worlds quite effectively. NASA spacecraft like the Voyagers, IBEX and SOHO continue to teach us more about our great cosmic shield and the ISM's irregularities. We're not helpless as we hurtle through it; the heliosphere gives us all the protection we need!

Want to learn more about Voyager 1's trip into interstellar space? Check this out:
<http://www.jpl.nasa.gov/news/news.php?release=2013-278>.

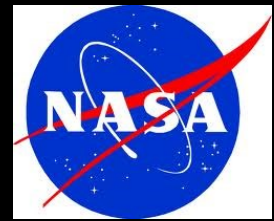
Kids can test their knowledge about the Sun at NASA's Space place:
<http://spaceplace.nasa.gov/solar-tricktionary/>.



Image credit: Hubble Heritage Team (AURA / STScI), C. R. O'Dell (Vanderbilt), and NASA, of the star LL Orionis and its heliosphere interacting with interstellar gas and plasma near the edge of the Orion Nebula (M42). Unlike our star, LL Orionis displays a bow shock, something our Sun will regain when the ISM next collides with us at a sufficiently large relative velocity.

Editors: Download photo here:

http://upload.wikimedia.org/wikipedia/commons/1/1f/52706main_hstorion_lg.jpg



And For The Young Stargazers:

Check out these fun websites from NASA!

<http://climate.nasa.gov/kids>

<http://scijinks.gov>

<http://spaceplace.nasa.gov>



Where We Meet:
JENKS HIGH SCHOOL PLANETARIUM
105 E. B St., Jenks, OK

From the West: (marked in red on maps below)

Take US 75 to the Main St. - Jenks exit
Follow Main St. approximately 2 miles and cross the railroad tracks
Turn left on 1st St.

From central part of Tulsa: (marked in green on the maps below)

Take Riverside Drive to the 96th Street bridge
Turn right and go over the river
Follow A St. approximately 7 blocks
Turn right on 1st St.

From the East: (marked in blue on the maps below)

Take the Creek Turnpike to S. Elm St. in Jenks
Follow Elm St. north to Main St.
Turn right on Main St. and cross the railroad tracks
Turn left on 1st St.

For Each:

Park in the lot at the end of 1st St.
Use the doors at the north side of the building
Go up the stairs to the 3rd floor (there is an elevator for those who need it)
Turn right and go down the hallway to either side of the planetarium

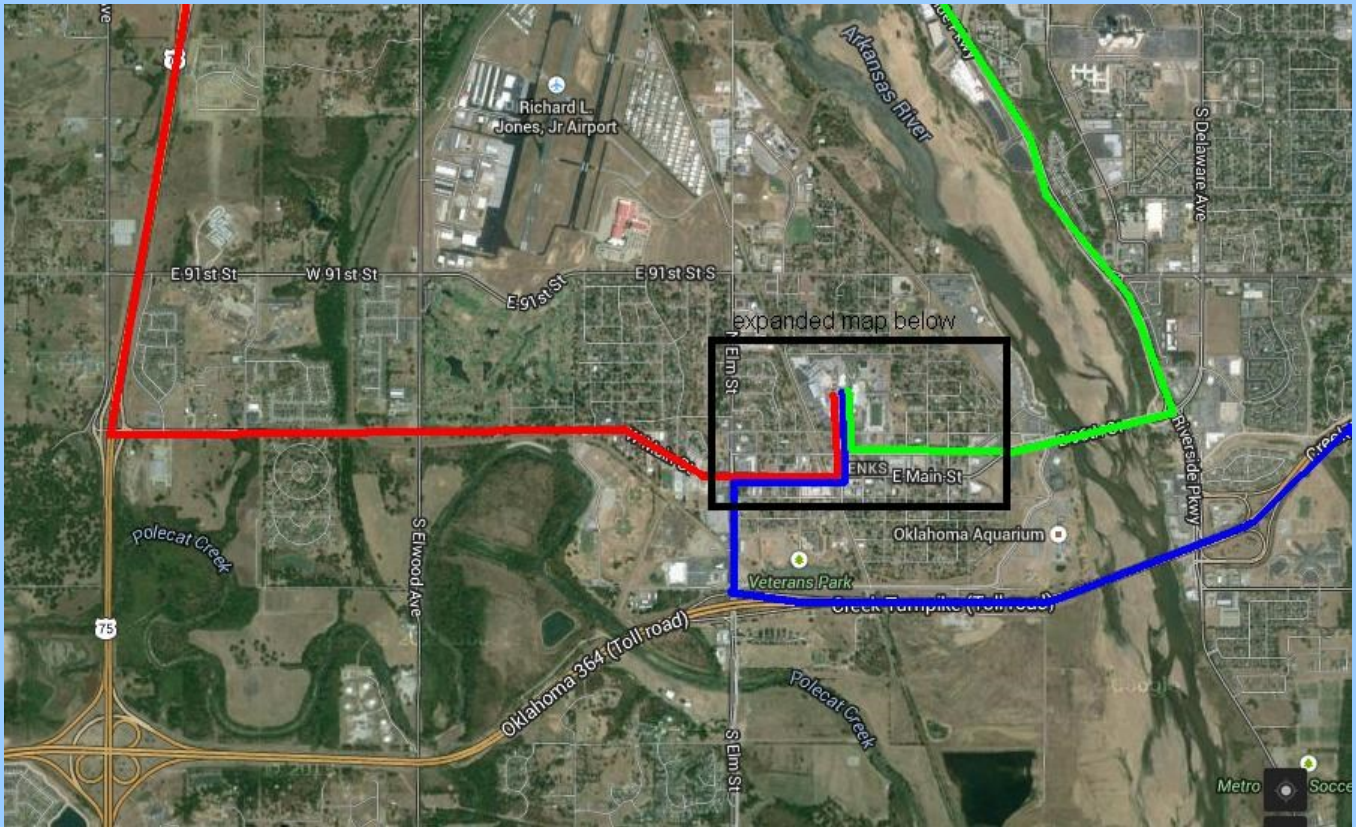
MAPS ON NEXT PAGE

The General Meetings are free and open to the public.

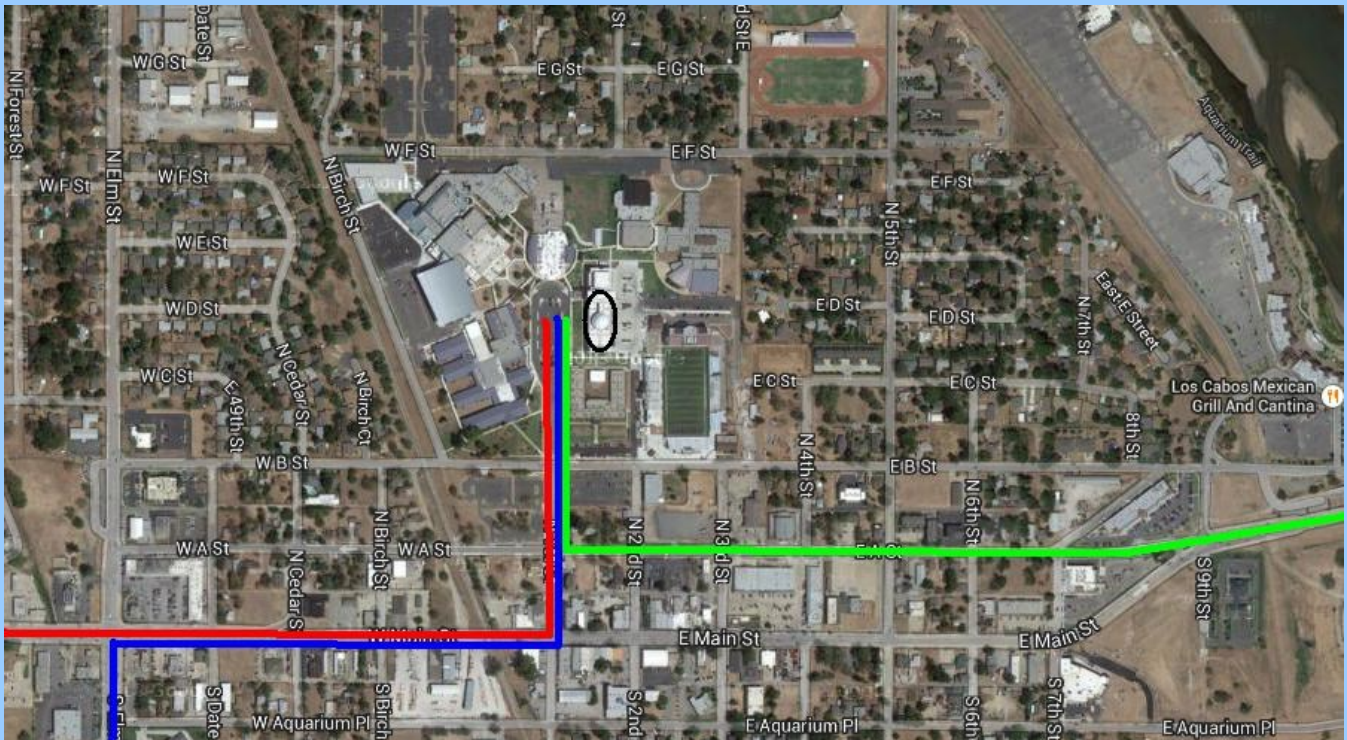
We hope to see you there!

Maps to Jenks High School Planetarium:

To get there via any of the three routes shown on previous page:



To get into planetarium parking lot:



CLUB OFFICERS

President	Mandy Nothnagel	act_pres@astrotulsa.com
Vice President	Richard Brady	act_vp@astrotulsa.com
Secretary	Tamara Green	astronomer.misstamara@yahoo.com
Treasurer	Tim Davis	act_tres@astrotulsa.com

BOARD MEMBERS AT LARGE

Lee Bickle	blotobeast@gmail.com
Michael Blaylock	mblaylock535@gmail.com
Stan Davis	stan.home@cox.net
John Land	astroclubbiz@windstream.net
Christopher Proctor	bishop@busoutoshi.net
James Taggart	act_maint@astrotulsa.com
Skip Whitehurst	skip.whitehurst@gmail.com

APPOINTED STAFF

Newsletter Editor	Tamara Green	astronomer.misstamara@yahoo.com
Webmaster	Jennifer Jones	jjones@seedtechnologies.com
Membership Chairman	John Land	astroclubbiz@windstream.net
Observing Co-Chairman	Richard Brady	act_vp@astrotulsa.com
Observing Co-Chairman	Tamara Green	astronomer.misstamara@yahoo.com
PR/Outreach	Owen Green	darthnewo@yahoo.com
Sidewalk Astronomy	Owen Green	darthnewo@yahoo.com
Group Director	Mandy Nothnagel	actgroupscheduling@gmail.com
Night Sky Network	Mandy Nothnagel	actgroupscheduling@gmail.com
Facilities Manager	James Taggart	act_maint@astrotulsa.com

MEMBERSHIP INFORMATION

MEMBERSHIP RATES FOR 2014 WILL BE AS FOLLOWS:

Adults - \$45 per year. Includes Astronomical League membership.

Senior Adults - \$35 per year. *For those aged 65 and older.* Includes Astronomical League membership.

Students - \$30 per year. Includes Astronomical League Membership.

Students - \$25 per year. *Does not include Astronomical League membership.*

The regular membership allows all members of the family to participate in Club events, but only ONE voting membership and ONE Astronomical League membership per family.

Additional Family Membership - \$15 with Astronomy Club of Tulsa voting rights, \$20 with Club voting rights *and* Astronomical League membership.

THOSE WISHING TO EARN ASTRONOMICAL LEAGUE OBSERVING CERTIFICATES NEED TO HAVE A LEAGUE MEMBERSHIP.

MAGAZINES:

Astronomy is \$34 for one year or \$60 for 2 years.

www.astronomy.com

Sky & Telescope is \$33 per year.

www.skyandtelescope.com

Sky & Telescope offers a 10% discount on their products.

If you are an existing S&T subscriber, you can renew directly with S&T at the same Club rate. Both S&T and Astronomy now have digital issues for computers, iPads and smart phones.

ONLINE REGISTRATION

We now have an automated online registration form on the website for new memberships, membership renewals and magazine subscriptions. Just simply type in your information and hit "send" to submit the information. You can then print a copy of the form and mail it in with your check, or use our convenient PayPal option. .

Link: <http://www.astrotulsa.com/Club/join.asp>



Astronomy Club of Tulsa



Photo: Autumn Stars Rising Over the Eastern Ridge of Camp Billy Joe, Okie-Tex Star Party 2013, by Tamara Green.

THE ASTRONOMY CLUB OF TULSA INVITES YOU TO MAKE PLANS THIS FALL TO JOIN US AT A STAR PARTY!

OPEN TO THE PUBLIC

For more information please visit www.astrotulsa.com.

The Observer is a publication by the Astronomy Club of Tulsa. The Astronomy Club of Tulsa is a 501C 3 non-profit organization open to the public. The Club started in 1937 with the single mission to bring the joy and knowledge of astronomy to the community of Tulsa, OK and the surrounding area. Today our mission remains exactly the same. We travel to local schools, churches and many other venues with scopes and people to teach. Our observatory is located in Mounds and many public programs are offered there. To join the Astronomy Club of Tulsa please visit www.astrotulsa.com where you will find all the information necessary to become a member.

