



ASTRONOMY CLUB OF TULSA

OBSERVER

JULY 2017

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THE ASTRONOMY CLUB TULSA
IS A PROUD MEMBER OF



PHOTOS: Club volunteers are hardly visible amongst the colorful parade of glow-stick wearing American Heritage Girls at their Summer Camp Astronomy event, June 2017. Both photos by Tamara Green.

THE ASTRONOMICAL LEAGUE

JULY 2017

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8 
9	10	11	12	13	14	15
16 	17	18	19	20	21	22
23 	24	25	26	27	28	29
30 	31					

MOON PHASES AND HOLIDAYS:





INDEPENDENCE DAY	TUE JUL 4
FULL MOON	SAT JUL 8
LAST QUARTER	SUN JUL 16
NEW MOON	SUN JUL 23
FIRST QUARTER	SUN JUL 30

UPCOMING EVENTS:

SIDEWALK ASTRONOMY	SAT JUL 1	8:00 PM	BASS PRO
PUBLIC STAR PARTY	SAT JUL 15	8:15 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI JUL 21	8:45 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT JUL 29	8:00 PM	BASS PRO
PUBLIC STAR PARTY	SAT AUG 12	7:45 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI AUG 18	8:15 PM	ACT OBSERVATORY
TOTAL SOLAR ECLIPSE	MON AUG 21	1:30 PM	
SIDEWALK ASTRONOMY	SAT AUG 26	7:30 PM	BASS PRO

**MEMBERS AND FAMILY ONLY PLEASE.

AUGUST 2017

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7 	8	9	10	11	12
13	14 	15	16	17	18	19
20	21 	22	23	24	25	26
27	28	29 	30	31		

MOON PHASES AND HOLIDAYS:

FULL MOON	MON AUG 7
LAST QUARTER	MON AUG 14
NEW MOON	MON AUG 21
FIRST QUARTER	TUES AUG 29

ASTRONOMY EQUIPMENT FOR SALE!

CELESTRON 6 SE TELESCOPE

I have a brand-new (still in box) Celestron 6 SE telescope that I would like to sell. I'm in Claremore. Asking \$750.00.

Contact John Knapp at John.Knapp@bakerhughes.com.

KC LOBRECHT'S 12 INCH DOBSONIAN—THIS IS NO JOKE!!



As many of you know this is a wonderful user friendly telescope. Need to be 5'5" not need a step up.

John Hall, (Pegasus Mirrors) reconfigured mirror. Have the light wave curve specs from his work.

Enhanced secondary, capable of 15th magnitude. AstroSystems Teflon, one of the few Dobsonians that pivots beautifully at zenith.

Kenneth Novak hardware. Starlight Instruments, 2" Focuser, #59, with reducer. Had it serviced (rack and pinion) in '09. Flocked it then too. 100+ lbs in three parts, counting mirror. Will fit in a compact car. 2 minute set up.

Acceived many of my Master Observer Certicates with it, except H2, binocular, meteor and solar program.

Asking \$1200. Have \$2k in it.

Contact KC Lobrecht at lobrechtkc@gmail.com.

Telescopes and Astronomy accessories Sale.

Long time members Bob and Marcia Boston are reducing their astronomy inventory.

If you are interested in purchasing one or more items.

Contact Marcia Boston thebostons@cox.net 918-636-4414



< **Celestron CPC 1100** 11" Aperture fl 2800 mm >>>
 Fully equipped GoTo technology
 Includes \$300 StarSense Auto align –
 2" Dielectric diagonal \$100 – 40mm plossol eyepiece
Asking \$2,100 Web list for \$3,000 +



Light Bridge fl 1524 mm
 2" focused with
 wide angle 26mm 70 deg eyepiece
 Web list for \$999



Meade 12" f5
 Crayford style
 Meade QX
Asking \$ 500



Orion StarBlast 6 in f5 fl 760 mm >>>> >
 With Sirius Plossol 25mm & 10mm eyepieces
Asking \$ 200 Web list for \$340
 This tabletop telescope is a great "Grab & Go"
 Scope for family and public events.



< **Celestron C 100 ED-Refractor 4"** f9 fl 900mm
Asking \$400.00 estimated value \$1,000.00
 A premium planetary or imaging telescope.



Meade ETX 105 mm 4" fl 1470 mm >>>
Asking \$225 Web list \$550.00
 Solar Filter for ETX \$25
 This classic Alto/Azimuth
 scope includes GoTo and
 tracking technology
 Plus excellent portability.



Also a variety of eyepieces, filters and other accessories – See Listing on next page



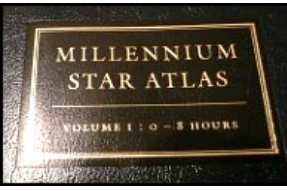
Ethos
13 mm



Eyepieces, filters
& cases



Electronic
Eyepiece



Star Atlas Set
3 vol set



Messier
AstroCards

Additional astronomical accessories

Contact Marcia Boston thebostons@cox.net 918-636-4414

Brand	Type	Focal Length		Asking Price	Web List Prices	Details
	Eyepieces					
Televue	Ethos	13 mm	100 deg	\$400.00	\$600.00	1.25 / 2" hybrid barrel
Televue	Nagler type 6	9 mm	82 deg	\$200.00	\$310.00	1.25"
TMB	Planetary WA	6	58 deg	\$30.00	\$50.00	1.25"
Meade	Super Plossol eyepieces	Set	52 deg	\$100.00	\$170.00	32-15-12.4-9.7-6.4 mm with shorty 2x barlow with color filters and case
Meade	Electronic Video Eyepiece			\$30.00		Monochromatic Live view – RCA output - uses 9 volt battery
	FILTERS					
Televue 5X powermate barlow				\$90.00	\$205.00	
Orion Ultra Block LP filter				\$40.00	\$80.00	1.25"
Orion 2" variable Polarizing filter				\$30.00	\$60.00	Great for lunar observing
Orion 2" Oxygen-III nebula				\$70.00	\$140.00	Deep sky Nebular viewing
Lumicon UHC light pollution				\$50.00	\$100.00	1.25"
Lumicon 1.25 " Oxygen III nebula				\$50.00	\$100.00	1.25"
3 Vol Set	Millennium Star Atlas			\$150.00	\$450.00	Over 1,500 star charts and 1.8 million stars to 11th magnitude by Roger Sinnott
AstroCards	Messier set charts with red light viewer			\$20.00		Each card has info and finder charts

Also:

A member of the Tulsa Astronomy Club is having a "Virtual Telescope Garage Sale"

If you have a genuine interest Contact DAN L. at medjl@utulsa.edu for images, specs and to discuss details.

Here is a list of several quality telescopes:

DISCOVERY PDHQ 16"

LX200GPS 14"

LX200GPS 7"

LX10 8"

HARDIN DSH 12.5"

CELESTRON NEXSTAR 11

CELESTRON CF 9.25"

TRAVELSTAR ACHROMAT 8" F/6

Intes Alter M603 MCT

ORION 150 MCT

TMB 152/1200

TEC 140

BO 1278

ORION ST120

VIXEN FL102S

WO ZS80

TELEVUE RANGER

I also have several goto and alt-az mounts, eyepieces and misc. accessories.

Dan says " I probably have about one of just about everything!"



Great American Solar Eclipse Updates

Monday Aug 21, 2017 is the date of the long awaited the Great American Solar Eclipse. Everyone continental United States will be able to see at least a partial solar eclipse. Tulsa will experience an 88.6 % partial eclipse.

For State by State details of viewing locations and planned events go to

http://www.eclipse2017.org/2017/path_through_the_US.htm

Also has many helps and suggestions for preparing and viewing the eclipse.

For a Google style map to zoom into any specific location go to

http://xjubier.free.fr/en/site_pages/solar_eclipses/TSE_2017_GoogleMapFull.html

Note: You'll have to read the map instructions details and click agreed button to see the map.

Link to a photography blog regarding the Eclipse: [CLICK LINK HERE](#)

Featured Resource: [2017 Solar Eclipse Resource List](#)

Are you ready for the August 21, 2017 total solar eclipse? Is your community ready? Check out this collection of resources to prepare the 99% of the country who will see a partial eclipse.

Find the list at: https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=588



BUILD A SAFE SOLAR FILTER for your telescope, binoculars or camera. You can make your own Safe Solar Filter using a sheet of Mylar Baader coated material from AstroPhysics. This specially designed material gives safe images with excellent resolution. The Astronomy Club of Tulsa has ordered some of the material in bulk.

25 cm Sqaure (~ 9 in) for \$ 12 available at our club meeting or contact our treasurer Tim Davis. Complete details in our March newsletter

http://astrotulsa.com/CMS_Files/201703.pdf



The Tulsa Astronomy club has individual solar glasses that you can purchase at meeting or events for \$ 2 each <https://www.rainbowsymphony.com/> has a good prices on Eclipse glasses and viewing cards. You can purchase bulk orders in lots of 25 or more for about \$ 1.00 each. For the younger kids Eclipse Cards are recommend. Mount them taped securely on a larger sheet of stiff cardboard with a cutout section for the viewing area. This allows their face to be covered from the sun when observing. I bought sets of glasses and cards for friends and each of my grandkids' school classes.

ASTRONOMY CONVENTIONS FOR 2017

Looking for an opportunity to meet other astronomy enthusiasts and learn what area clubs are doing. Consider attending an astronomy convention. You'll meet interesting people, hear some great presentations and guest speakers and even browse the products of invited vendors.

Mid States Region
of
The Astronomical League



The Mid-States Region of the Astronomical League (MSRAL) convention will be held at Missouri State University in Springfield, MO.

Friday June 9 through Sunday June 11.

This event will be cohosted by the Springfield Astronomical Society and the Ozarks Amateur Astronomers Club.. Attractions will include a tour of the University's Baker Observatory near Marshfield, Missouri (birthplace of Edwin Hubble) (<https://physics.missouristate.edu/BakerObservatory.htm>)

Friday evening features a "Star-B-Q" Saturday will have a variety of guest speakers.

Sat Night has a banquet and the keynote speaker will be Dr. Peter Plavchan, Assistant Professor in the Department of Physics, Astronomy, and Material Science at Missouri State University.

Details and registration available at

<https://missouristate.collegiatelink.net/organization/ozarks-amateur-astronomers-club/calendar/details/1277692>

Accommodations available on campus and also in area hotels.

Located just a 3 hour drive from Tulsa, Springfield, Mo. also has many tourist attractions.

The birthplace of President Harry Truman, the city has several historical sites including a National Park at the Wilson's Creek Civil War battlefield which features restored buildings and guided tours of the extensive area. The Fantastic Cavern Cave tours are always a favorite as you can ride through this an ancient limestone cave. Home of the original Bass Pro shop you can tour the adjoining "Wonders of Wildlife" National museum and aquarium.

Other area attractions at <https://www.springfieldmo.org/museums-and-historical-attractions>

PRESIDENT'S MESSAGE

BY RICHARD BRADY



Upcoming club events

We will be holding elections for officers and board members at the October General Meeting on Friday, October 27th. If you want to run for an office or board member, please let our secretary, John Newton, know. His email address is astrotulsa.secy@gmail.com. To be an officer or board member you must be a member in good standing for at least a year.

On Saturday, November 18th we will be having our annual club dinner. More details coming soon.

The Perseid meteor shower peaks on Sunday, August 13. If anyone is interested in going out to the observatory to watch them, let me know.

The planets this month

In the sky this month, Mercury is low in the northwest right after sundown, Jupiter is starting to get lower in the southwest as the month goes on, Saturn is now coming up before sundown and well placed later in the evening, and Venus is the bright morning star. Mars is still too close to the sun and basically unobservable this month.

Mercury is just visible low in the northwest, only 8° above the horizon. Binoculars will help if you try to find this elusive planet.

Jupiter is still well placed for viewing in the evening. It is in Virgo all month, the brightest object in the evening sky. It is around magnitude -2.0 all month with an apparent diameter around 35". It remains up until around 1 AM at the start of the month but sets around 11 PM by the end. On July 28th it will be about 3° from a 6 day old crescent Moon.

Saturn was at opposition last month on June 14, so it is basically up all night all month. It stays around magnitude +0.1 all month. The rings are tilted about as far as they can be, so now is a good time to look. Even a small telescope will show them well.

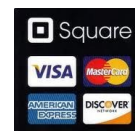
Venus is the bright morning star around magnitude -4.1 and in between 63% to 74% illuminated. It comes up about 2 1/2 - 3 hours before sunrise.

Mars is in conjunction with the sun on July 27th and so is can't be seen all month.

Clear skies!
Richard Brady

TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 155 members, including 24 new members in 2017.

Welcome to our new members this month: Annalea McMillan

Club Accounts as of June 30, 2017:

Checking: 5,191.53; Savings: \$6,777.15; Investment accounts: \$21,476.90 (*Value Fluctuates with Market*)

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. 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 2017 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 for 1 year, or \$60 for 2 years. www.astronomy.com



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

Sky & Telescope is \$33 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.

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!



The Shape of the Solar System

By Marcus Woo

When Stamatios (Tom) Krimigis was selected for the Voyager mission in 1971, he became the team's youngest principal investigator of an instrument, responsible for the Low Energy Charged Particles (LECP) instrument. It would measure the ions coursing around and between the planets, as well as those beyond. Little did he know, though, that more than 40 years later, both Voyager 1 and 2 still would be speeding through space, continuing to literally reshape our view of the solar system.

The solar system is enclosed in a vast bubble, carved out by the solar wind blowing against the gas of the interstellar medium. For more than half a century, scientists thought that as the sun moved through the galaxy, the interstellar medium would push back on the heliosphere, elongating the bubble and giving it a pointy, comet-like tail similar to the magnetospheres—bubbles formed by magnetic fields—surrounding Earth and most of the other planets

"We in the heliophysics community have lived with this picture for 55 years," said Krimigis, of The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. "And we did that because we didn't have any data. It was all theory."

But now, he and his colleagues have the data. New measurements from Voyager and the Cassini spacecraft suggest that the bubble isn't pointy after all. It's spherical.

Their analysis relies on measuring high-speed particles from the heliosphere boundary. There, the heated ions from the solar wind can strike neutral atoms coming from the interstellar medium and snatch away an electron. Those ions become neutral atoms, and ricochet back toward the sun and the planets, uninhibited by the interplanetary magnetic field.

Voyager is now at the edge of the heliosphere, where its LECP instrument can detect those solar-wind ions. The researchers found that the number of measured ions rise and fall with increased and decreased solar activity, matching the 11-year solar cycle, showing that the particles are indeed originating from the sun.

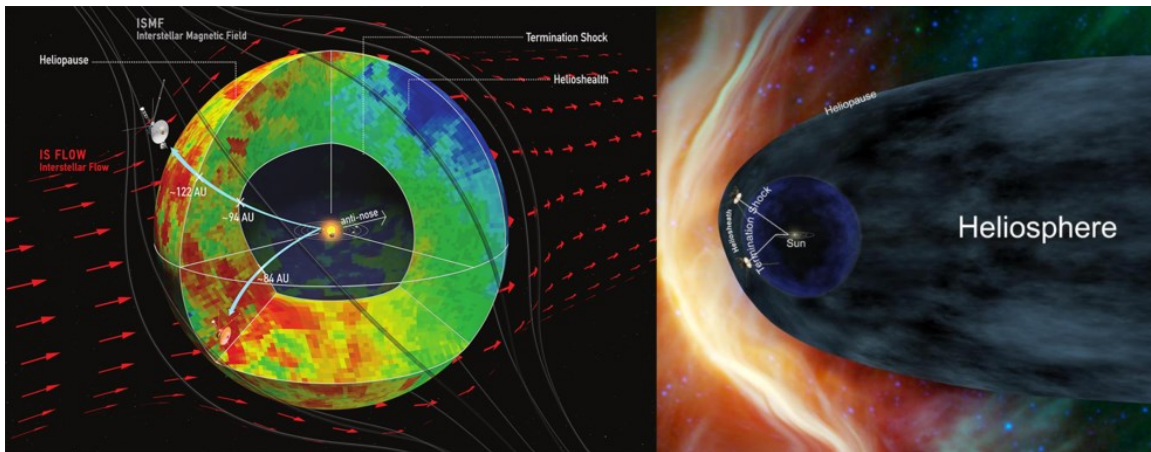
Meanwhile, Cassini, which launched 20 years after Voyager in 1997, has been measuring those neutral atoms bouncing back, using another instrument led by Krimigis, the Magnetosphere Imaging Instrument (MIMI). Between 2003 and 2014, the number of measured atoms soared and dropped in the same way as the ions, revealing that the latter begat the former. The neutral atoms must therefore come from the edge of the heliosphere.

If the heliosphere were comet-shaped, atoms from the tail would take longer to arrive at MIMI than those from the head. But the measurements from MIMI, which can detect incoming atoms from all directions, were the same everywhere. This suggests the distance to the heliosphere is the same every which way. The heliosphere, then, must be round, upending most scientists' prior assumptions.

It's a discovery more than four decades in the making. As Cassini ends its mission this year, the Voyager spacecraft will continue blazing through interstellar space, their remarkable longevity having been essential for revealing the heliosphere's shape.

"Without them," Krimigis says, "we wouldn't be able to do any of this."

To teach kids about the Voyager mission, visit the NASA Space Place: <https://spaceplace.nasa.gov/voyager-to-planets>



Caption: New data from NASA's Cassini and Voyager show that the heliosphere — the bubble of the sun's magnetic influence that surrounds the solar system — may be much more compact and rounded than previously thought. The image on the left shows a compact model of the heliosphere, supported by this latest data, while the image on the right shows an alternate model with an extended tail. The main difference is the new model's lack of a trailing, comet-like tail on one side of the heliosphere. This tail is shown in the old model in light blue.

Image credits: Dialynas, et al. (left); NASA (right)

WHERE WE MEET

JENKS HS PLANETARIUM



**Our Club General meetings are held at the
Jenks Public Schools Planetarium
105 East B St, Jenks, OK**

When you enter the building lobby, take the elevator to the 3rd floor.

Meetings begin at 7:00 PM

**Printable Detailed map available at [http://astrotulsa.com/cms_files/
Directions_JenksPlanetarium.pdf](http://astrotulsa.com/cms_files/Directions_JenksPlanetarium.pdf)**

We hope to see you there!

MEMBERSHIP INFORMATION

ASTRONOMY CLUB OF TULSA OFFICERS:

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VICE PRESIDENT TAMARA GREEN

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SECRETARY JOHN NEWTON

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TREASURER TIM DAVIS

astrotulsa.tres@gmail.com

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JOHN LAND

JAMES TAGGART

SKIP WHITEHURST

JAMES LILEY

JERRY CASSITY

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FACILITIES MANAGER JAMES TAGGART

astrotulsa.obs@gmail.com

MEMBERSHIP RATES FOR 2017 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.

MAGAZINE SUBSCRIPTIONS:

ASTRONOMY IS \$34 FOR ONE YEAR OR \$60 FOR 2 YEARS.

WEBSITE: www.astronomy.com

SKY & TELESCOPE IS \$33 PER YEAR.

WEBSITE: www.skyandtelescope.com

SKY & TELESCOPE OFFERS A 10% DISCOUNT ON THEIR PRODUCTS.

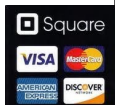
IF YOU ARE AN EXISTING S&T SUBSCRIBER, YOU CAN RENEW DIRECTLY WITH S&T AT THE SAME CLUB RATE. BOTH S&T AND ASTRONOMY NOW HAVE DIGITAL ISSUES FOR COMPUTERS, IPADS AND SMART PHONES.

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>

OR, IF AT A STAR PARTY OR MEETING, SIMPLY FIND A CLUB OFFICER TO ASK ABOUT JOINING OR RENEWING WITH YOUR DEBIT OR CREDIT CARD THROUGH OUR CONVENIENT SQUARE OPTION!



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

OPEN TO THE PUBLIC

FOR MORE INFORMATION
PLEASE VISIT
WWW.ASTROTULSA.COM.

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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.



Also find us on Facebook!

<https://www.facebook.com/AstronomyClubofTulsa>



WE ALSO ARE A PROUD PARTICIPANT IN NASA'S NIGHT SKY
NETWORK.

THE EDITOR WISHES TO THANK THE FOLLOWING FOR
THEIR CONTRIBUTIONS TO "THE OBSERVER" FOR
THIS ISSUE:

MARCUS WOO

JOHN LAND

RICHARD BRADY

TIM DAVIS

TAMARA GREEN



PHOTOS: Above, Evening stars over the observatory; Below: More Summer evening stars, both photos taken during the Summer of 2016 by Tamara Green.

