

THE OBSERVER



M27: The Dumbbell Nebula - APOD September 14, 2014
 Credit & Copyright: Bill Snyder (Bill Snyder Photography)

UPCOMING EVENTS:

- EVAC Public Star Party - September 13*
- EVAC Meeting - September 20*
- EVAC Star Party - September 21*
- EVAC Star Party - September 28*
- Check out all of the upcoming club events in the Calendars on page 14.*

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From the Desk of the President by Tom Mozdzen

The All Arizona Star Party is set for the nights of October 25th and 26th (Friday and Saturday nights) at Ho-vatter Field. See the newsletter for further details. Save the dates and make your plans, it is less than two months away.

Please think about becoming involved in the running of the club by filling a vacant board or officer position. We are looking for a person, just like yourself, to fill the role of either Secretary, Vice President, or President. There are also three board member positions open. Officer terms are one year, while board member terms are for two years.

Contact [me](#) or any club officer if you would like to step up and into a role. We would like to have at least one person per position set by October (which is only five weeks away) as elections are in November. I'll be watching my inbox expectantly.

The major responsibilities of the open positions are as follows:

Board Members at Large (2 yr term)

Board Members provide input and guidance to the governing board which consists of the four executive officers plus five board members at large. Three to four board

From the Desk of the President

Continued from page 1

meetings are held each year with occasional email discussions of topics of interest.

Secretary (1 year term)

Provide meeting minutes of the monthly general meeting and of any governing board meetings. Monthly club meeting minutes are published in the newsletter.

Vice President (1 year term)

Contact potential speakers to be the featured speaker at club monthly meetings and introduce the featured speaker at the meeting. Fill in for the president in their absence.

President (1 year term)

Preside over board meetings and monthly club meetings. Keep an eye on the functioning of the club in general and elevate any issues to the governing board so that a solution may be jointly developed. Provide a few paragraphs each month to the club newsletter for the "President's Message" column. Update the Policy and Procedure document whenever typical club practices are modified or need documenting to aid future governing boards.

Janet Evelyn has kindly volunteered to coordinate our Christmas party in December (yes, less than four months away). Please contact Janet at janpog48@gmail.com if you would like to lend her a helping hand.

Our modernized website just needs a couple more tweaks, mostly a revamped membership join process and one more once-over review by the team. We are

aiming to go live by the end of September. It's been over four months in the making, and we will send an announcement to evac-announce when it goes live.

Our Facebook page is becoming quite popular. We have over 250 members now. We have many daily posts of astrophotos as well as news about related astronomy topics. If you are on Facebook, I recommend taking a look. It is a closed group, meaning that we simply ask that the person who wishes to join provide an answer (any answer) to three simple questions to make sure they are actual real people. The questions are: 1) How did you hear about the club; 2) are you a member; and 3) is Pluto still a planet to you. We don't care what the answers are, but require a human to type it in.

Ken Milward has a Tucson centric tour planned, which includes visiting the Steward Mirror Lab and the Stari-zona astronomy store on Friday November 8th. The cost is \$18 for tour admission. Contact Ken at events@evacon-line.org if you wish to go on the tour. Space is limited and filling up fast. See Ken's trip description in this newsletter.

Our September speaker will be Tom Polakis. His talk will cover two topics: galaxy classification and century-long time-lapse image pairs. The image pairs are created from images taken in the early 20th century and from his recent backyard images. The talks are titled: "Galaxy Taxonomy" and "A Century in The Blink of an Eye." See you at the September meeting .

Tom Mozdzen

EVAC General Meeting Notes for August 2019

by Tom Polakis

The August meeting was attended by roughly 60 people. Club President Tom Mozdzen opened with introductions of officers and Board members. GRCO Director Claude Haynes described the observatory's Web site, and solicited the help of volunteers for the public sessions every Friday and Saturday. The All-Arizona Star Party will be held at the Salome Emergency Airfield site on October 25 and 26. Details may be found on the club's site. Gary Deatsman who is moving out of the Valley offered a rare Percival Lowell book for auction, the proceeds going to EVAC. It sold for \$100. Tom Polakis

gave a member presentation - a 10-minute slide show of mostly astronomical photographs accompanied by music. Before the break, Event Coordinator Ken Milward announced a tour of the Mirror Lab in Tucson that is available for \$18. Ken is beginning to get school star party requests, and is always in need of help.

The main speaker was Mike Alegria, Assistant Mountain Operations Manager for the MMT on Mt. Hopkins. His presentation described the history of the MMT, which began in 1979 with six 72-inch mirrors, before being up-

EVAC General Meeting Notes for August 2019

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graded in 1998 to having a single 6.5-meter mirror. The MMT program has been a pioneer: it is the first successful alt-az observatory telescope, it was the first “box” enclosure, and the first to be operated by more than one institution. In addition to its many engineering achieve-

ments, the MMT has been productive scientifically. It established the first connection between gamma ray bursts and supernovae in 2003, found the first hypervelocity stars, and showed the “wavy” atmosphere of Pluto during an occultation.

The Backyard Astronomer by Bill Dellinges (September 2019)

Stars Over Costa Rica

Ten years ago last February, I joined Sky and Telescope’s stargazing tour to Costa Rica and reported on my experience in the April 2009 Backyard Astronomer. I thought club members, old and new, might enjoy reading the original article for a vicarious trip down south. I note it’s now under the banner of Astronomy magazine and costs twice what I paid in 2009. Here’s a link: <https://travelquest-tours.com/eclipse-tours/2020-costa-rica-southern-sky-party/>

I last saw the southern hemisphere constellations twenty-three years ago on a Halley’s Comet tour to Australia. However, I have since “disremembered” what I saw down under. I had a desire to take another look at those southern sky goodies and noted with interest the Sky and Telescope’s 6th annual Costa Rica Southern-Sky Fiesta tour scheduled for February 21-28, 2009. Sky and Telescope uses TravelQuest (<http://onlinetravelquest.com>) for its tours.

I booked two spots for my wife Lora and me. The tour’s advantages (compared to a longer trip below the equator) would be price and travel time. Its disadvantage would be that while still able to see the southern sky’s main attractions, they would be relatively low over the southern horizon. How low? The declination of -60 degrees runs through the Eta Carinae Nebula, the Southern Cross, and Alpha Centauri, prime real estate that interested me. The latitude of our observing site 65 miles northwest of San Jose was +10 degrees. Thus, our “prime real estate” would pass no higher than 20 degrees above the southern horizon as it passed the meridian. The globular cluster Omega Centauri (Dec -47) would fair slightly better with a height of 33 degrees. The South Celestial Pole would be 10 degrees below the horizon – there would be no circumpolar constellations. While this concerned me somewhat, I was encouraged by the popularity of this

tour which had drawn enough stargazers to keep it going for 6 years.

For observing equipment, I brought my Televue 85mm F7 refractor and 8x50 binoculars. I could easily sling the TV85 in its soft bag over my shoulder as carry-on. The alt-az tripod was checked in a hard case. I knew going in I wanted large fields for open clusters, nebulae, and Milky Way star fields. The TV85 would prove to be an excellent choice for observing these types of objects.

I was pleased to find that US Airways operated a non-stop flight from Phoenix to San Jose, Costa Rica. That made it a simple task to rendezvous with the other 28 participants in the tour group. Gary Seronik, who writes binocular and telescope-making articles in Sky and Telescope magazine, was our stargazing leader and is very knowledgeable about the night sky. Gary is an affable fellow who guided the group through the wonders of the southern night sky with a series of lectures highlighting the constellations and deep sky objects to be found in the evening and early morning sectors of the February skies. Staying up all night in February allows one to see the very best the southern Milky Way offers.

La Ensenada Lodge rests along the Gulf of Nicoya on the west coast of Costa Rica. During the week of stargazing, the tour group had exclusive access to the facility. Red lights were temporarily installed throughout the rooms and grounds. The rooms were rustic but comfortable and without phones, television or air conditioning (windows on three sides of each room can be opened to create a cooling breeze). Each porch had a hammock. I tried mine on our last day and wished I had discovered it earlier! It was like being in the womb again! During the day it was hot and humid, less so at night. The lodge’s pool gave guests a chance to cool off. Mosquitoes were out at night - repellent is highly recommended. Facing south, the rooms overlooked an expansive lawn with a very low southern horizon – just what the doctor ordered. Most of us set up our scopes on the lawn just outside our rooms, a nice convenience.

The Backyard Astronomer

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Four out of our five nights were clear. Telescopes ranged from small refractors like mine, to mid-size Newtonians, a C6, C8, Gary's 12.75" travel scope, and a 15" Obsession, the biggest telescope there. The skies were fairly dark (dark sky meters registered 21.85 and 21.75 north of the zenith at midnight) with just a hint of sky glow in the southeast from Puntarenas. I had made a list of objects I wanted to observe before leaving on the trip. Gary also had sent us star maps loaded with deep sky objects and their data. At dusk Sirius and Canopus were approaching the meridian allowing me to view many open clusters (OC) in Canis Major, Puppis and Vela. To the west I was able to trace Eridanus all the way down to Achernar. I had hoped to explore the Large Magellanic Cloud with my telescope but it was too low, only about 5 to 10 degrees above the southern horizon. I could barely make it out naked eye.

At midnight the Eta Carinae Nebula (the "Keyhole Nebula", NGC 3372) was on the meridian. This object is the Crown jewel of the Southern Hemisphere in my opinion. This immense emission nebula spans two degrees, is divided by three prominent dark lanes and smothered in Milky Way stars. In the TV85 with an Ethos eyepiece (46x, 2 degree field) I found it hard to take my eye away from it and kept going back to view it again and again during the week - a fascinating object indeed. After a few nights of familiarizing myself with the many OC's in Carina, I realized there were four "showpiece" clusters surrounding the Keyhole Nebula. Two degrees northwest is NGC 3293, the "Diamond and Ruby Cluster", a small and dainty OC similar to the Jewel Box cluster in Crux. Five degrees west is NGC 3114, which Gary called the Spider Cluster. I saw its streams of stars in the shape of a spiral galaxy. It was resolvable in 8x50 binoculars. Due south five degrees is IC 2602, the "Southern Pleiades." Like its namesake, I thought it looked best in binoculars but didn't think it was as pretty as its northern counterpart. Three degrees northeast is NGC 3532, a real monster OC. To the naked eye, it appears as a detached oval piece of Milky Way. In the telescope it was a tidal wave of bright stars. I rate this OC as the second most impressive object I saw in my telescope on this trip (after the Keyhole Nebula).

About 2 a.m. Crux, the Southern Cross, reached the meridian with Centaurus trailing behind it. Crux is the smallest of the 88 constellations and fits comfortably in the 8x50's 7 degree field. The Coal Sack adjacent to Crux was

a conspicuous naked eye black hole. The Jewel Box cluster, NGC 4755, was smaller than I expected and required 60x to gain enough size to appreciate. To the east I eagerly awaited the rising of Omega Centauri, the sky's finest globular cluster. In the TV85 the cluster was much larger and brighter than M13, which I took time to compare with Omega. Resolution of Omega's outlying stars was soft due to its low height above the horizon (33 degrees). At 120x, the cluster filled the 1 degree field and resolution of its stars improved. Performance was compromised by Omega's low altitude and my modest aperture (85mm = 3.3"). So I went over to Gary's 12.75" and bummed a look at Omega Centauri in his scope. Oh yeah, much better! Resolution to the core without averted vision - nice! I really wanted to split Alpha Centauri but due to its low altitude, my TV85, normally a killer on doubles, just couldn't seem to get the job done. Finally, when it reached culmination on the meridian at 4 a.m. and was only 19 degrees above the horizon, I managed to split this magnitude 0.1, 1.2, 13.3" double at 120x. Victory was sweet. It had been a long time since I spied this star's duality (I think low altitude and tropic seeing made a normally easy double difficult to split).

Other notes: Gemini and Auriga were upside-down in the north. Polaris was only 10 degrees above the northern horizon - disconcerting! I felt my world had tipped over. It was not unusual to see Howler monkeys and iguanas roaming the grounds. The place is a birder's paradise. We saw many new, colorful birds. The White-Throated Magpie-Jays were especially fond of dive bombing the dinner table and taking off with a portion of your meal! A boat excursion to a mangrove forest and a tractor-towed wagon trip through the 800 acre property were included in the tour - both were unique and enjoyable. Many participants in the group were repeat customers and the camaraderie was quite evident among them. I see why they keep coming back. I miss the place already, especially that hammock.

Back in San Jose at the Marriott Hotel on our last morning before leaving, I glanced out my east facing room on the 4th floor and in the breaking dawn sky observed Jupiter, Mars, and Mercury in conjunction. I smiled to myself and thought what an appropriate sight to end an enchanting astronomical week.

Hot DOGs

by Henry DeJonge IV (September 2019)

Introduction

This is a brief article on a peculiar class of galaxies called hot DOGs, (hot dust obscured galaxies) which by their name alone sounds interesting, especially when near summer BBQ season. These are among the most luminous galaxies in our entire Universe. They are extremely luminous in the IR, very dusty, and visibly obscured galaxies which are thought to be a very early type galaxy. They may be in a very active star formation phase, (starburst galaxies) or in a quasar forming phase becoming an AGN. It could also be that they are evolving in a transition phase from a starburst galaxy to a quasar. We will examine these powerful, enigmatic galaxies, and their possible explanations.

Hot DOGs

Hot DOGs are a rare class of hyper luminous infrared DOGs, (dust obscured galaxies) with extremely high IR luminosities and relatively faint optical luminosities. As the name suggests these galaxies are extremely visibly obscure and dust laden so that they appear very dim in most optical bands but are extremely bright in the IR bands, and are therefore relatively speaking, very hot. Their IR luminosities are particularly high in the mid IR range, about 3-30um, and generally peaks at about 20um. This IR luminosity can be greater than 10 billion times that of the sun.

Since in general they are extremely faint in the optical bands, they were first identified with the Wide Field Infrared Survey Explorer (WISE) satellite in 2010. They acquired the name hot DOGs in 2012. In a broader classification less IR luminous galaxies that are "only" about a billion times more IR luminous than our sun are called DOGs and they are usually dominated by new star formation, while such galaxies also having a strong AGN phase are usually the brighter DOGs. It is thought that these DOGs will normally evolve into hot DOGs. For a relative comparison, the overall dust temperature in a DOG is about 30-40K, while in hot DOGs it is in the range of 60-120K, thus the name.

As a result, hot DOGs are much less numerous than DOGs in all sky surveys, and are actually considered somewhat rare. Currently only about 1,000 hot DOGs are known. It is

believed that the hot DOG phase of galaxies is a relatively short time period in their evolution. Overall hot DOGs have been detected in a variety of surveys including the Subaru, Vista Viking, and Wise surveys and in a variety of wavelengths.

Hot DOGs are usually very far away, typically being early type galaxies, peaking at about $z = 2-4$, (this range is debatable) which also roughly corresponds to the peak of star formation and growth rate of SMBHs in our Universe. They are also very often found in regions with many surrounding gas and dust rich companions, (although this observation needs more evidence to be conclusive). This gives us a strong feeling of correlation for these events and hot DOGs. However, the early type galaxies that are called hot DOGs are very dust and gas rich which is most likely due to mergers of previous gas and dust rich galaxies even earlier in the history of our Universe. As you can see one of the major difficulties in understanding hot DOGs is the heavy dust which prevents detailed optical observations. Another major difficulty in any model of understanding is the relative rareness of hot DOGs for study. We will now see how hot DOGs may be further broadly classified into 2 subclasses, which often overlap, based upon their spectral output.

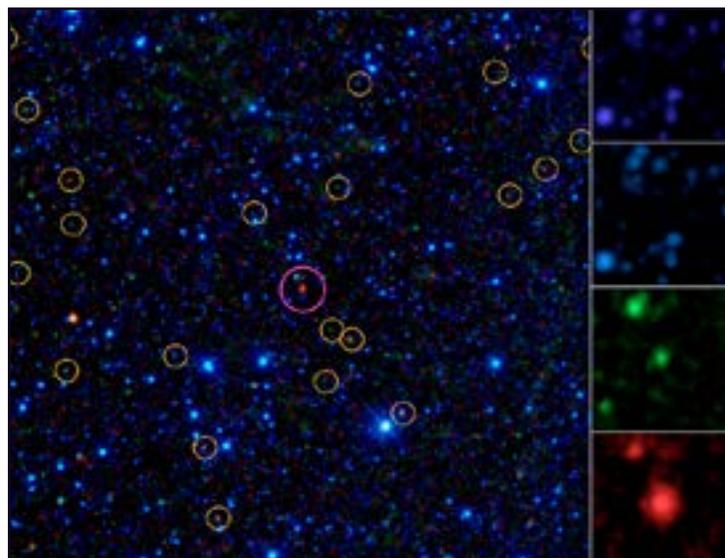


Figure 1. Some hot DOGs detected by WISE

AGN Hot Dogs

It has been suggested that many hot DOGs primarily represent rapidly growing, highly obscured, SMBHs that

Hot DOGs

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may be evolving into an AGN, (or visible quasar). This can come about via recent gas rich galactic mergers, with subsequent BH mergers, and large dust/gas accumulations combined with rapid mass accretion. This rapid mass accretion of the SMBH may also be driven via large periods of active starburst activity. Perhaps it is a combination of both that stimulates the growth of the SMBH. Regardless, AGN driven hot DOGs may show us how some SMBHs can grow and also what may trigger such active growth in an early AGN.

AGN dominated hot DOGs typically show a bluer color in the optical and they are also often very strong emitters in the UV. The spectral energy distribution or SED of an AGN dominated hot DOG usually shows a relatively smooth power law feature in the IR and are known as "PL" DOGs. This blue color is thought to be due to the surrounding gas and dust of the SMBH being more dissipated and allowing more of the higher energy radiation to be let out, (instead of being re-emitted in the IR). However, it may also be that an extremely active star burst region could also produce the excessive UV radiation. Another idea is that there is a dual AGN and one of them is less obscured than the other. Currently as many hot DOGs exhibit both spectral extremes, the exact cause of the excessive UV radiation is still under investigation.

Hot DOGs in this class may be experiencing above Eddington limit mass accretion by their SMBH and as a result may wind up having extremely powerful and widespread, (isotropic) gas outflows from their central cores, thus clearing the path to a quasar. These hot DOGs are injecting large amounts of energy into their ISM and can experience strong AGN feedback events.

A major line of thought is that this type of hot DOG may represent the AGN phase becoming more significant as the galaxy evolves from a star formation phase which is consistent with many theoretical models. This extremely active period of transition is expected to be relatively short so that hot DOGs are valuable in better understanding this aspect of galactic evolution. Therefore, hot DOGs are likely to be another bit of evidence to help us derive a better understanding of the relationships with SMBHs and their galaxies.

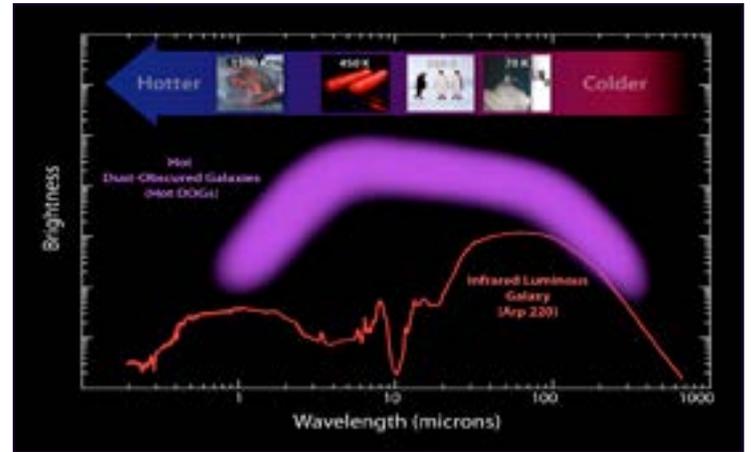


Figure 2. A typical hot DOG spectrum (ARP 220).

Star Formation Hot Dogs

The star formation dominated hot DOGs contain very active regions of intense star formation, typically in the range of hundreds to thousands of solar masses per year. Star formation dominated hot DOGs typically show a redder color in the optical. They are sometimes also known as "bump" DOGs due to a strong bump at about 1.6um in their spectral energy distribution, (SED). This indicates the high intensity of the IR radiation in this part of their SED. This is thought to be due to the extremely rich and obscuring, dust and gas surrounding the SMBH in such active star formation regions, which absorbs the higher energy UV radiation and reemits it as IR radiation. Interestingly these hot DOGs are usually radio quiet but some do show some emission in certain radio bands. However, to further confuse the issue, these star formation hot DOGs may also display strong UV emission as well. This again may be the result of the SMBH clearing some of the surrounding extremely dense dust and gas as the AGN phase of galactic evolution becomes dominant. It may also come from a second SMBH. The excessive UV output in hot DOGs may be the result of multiple activities. It is still a matter of much debate.

One of the most luminous galaxies in the known Universe is called W2246-0526 which is at $z = 4.6$ and has a total, (bolometric) luminosity of over 350 trillion suns! The star formation rate in this galaxy is well over 1,000 solar masses per year. This hot DOG also has a very active and supermassive AGN that is vigorously disturbing the surrounding ISM and is evolving to become an unobscured quasar. One perplexing question in general about such hot DOGs is how such a galaxy could evolve so early in our universe.

Hot DOGs

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Another example of a star formation hot DOG is galaxy W1835+4355 at about $z=2$ which also displays a hyper luminous AGN. It is thought to have a star formation rate of over 3,000 solar masses per year! This hot DOG is best explained as a late stage galactic merger of dust enriched galaxies which is evolving into an optically bright AGN or quasar.

The star formation hot DOGs with their extremely high starburst activity, turbulent surroundings, SMBH growth, and subsequent quasar activity, is most likely triggered by the mergers of dust rich galaxies in the early Universe. This intense starburst activity usually occurs at a later stage of this evolution while at the same time the SMBH accretes high doses of gas and dust. Internally, multiple BHs may also be merging at this time. The exact timing of these stages is however still under discussion and may well effect how SMBHs influence galactic evolution and star formation rates. Overall it is generally believed that the AGN activity precedes the major star formation period in most hot DOGs. DOGs may be the transition period in a galaxy from the dusty starburst heated phase to the AGN dominated phase. Hot DOGs may be the end of the DOG phase which soon blossom into visible quasars.



Figure 3. Artistic rendition of a Hot DOG

Summary

Regardless of their origin, it is now generally believed that all hot DOGs have at a minimum, a type of very luminous and heavily obscured, young AGN, regardless of their other characteristics. Hot DOGs may be explained in several different ways and there are many features processes that we have yet to understand. They may be formed from extremely large hyper luminous SMBHs, by SMBH and /or galactic mergers, or by extreme star formation activity. It is now thought that most hot DOGs

can be modeled by some combination of the above scenarios, which may also easily represent an evolutionary pathway between these scenarios.

Early galactic mergers could explain both the extreme star formation and the active SMBH growth seen in hot DOGs. Many astronomers believe that hot DOG galaxies probably represent a relatively short and early galactic evolutionary state after a galactic merger, (or two) having a lot of dust and gas, showing signs of above normal star formation near the peak of our Universe, and having a very active, young, and growing SMBH. They probably signify the transition from starburst galaxies to the AGN dominated phase and also may be phases where these stages coexist for a short period. The main proposed evolutionary progress would be from a hot DOG to an optical quasar, to a "red and dead" elliptical galaxy. This model is still very controversial.

In the future more sensitive radio observations at multiple frequencies, over many years, combined with other studies will be needed to better understand these galaxies and their possible roles in galactic evolution. We will also need more detailed and sensitive wide field optical observations to get better statistical and spectral data on DOGs. Future studies also need to shed light on the exact phase transitions and their timing in young galaxies. These things are now becoming feasible.

Hot DOG galaxies are very likely to be a key factor in understanding how early massive galaxies originated and evolved in our Universe from about 500 million years after the BB until now. They are most extreme in their luminosity and hot dust temperatures which is mainly thought to be derived from the super massive AGN rather than star formation. Exactly how the AGN in hot DOGs are so powerful is not fully understood. Are they really that super massive so early in our Universe? Are they radiating well above the BH Eddington limit? Do they represent a key phase in galactic and quasar evolution? Will they evolve into giant elliptical galaxies when they die fairly quickly due to the AGN blowing away so much gas and dust? How much of their activity may be caused by merging SMBH? Hot DOGs are still very perplexing objects for astronomers and there are still quite a few confusing, (and unknown) aspects of their behavior. For me it is very interesting and exciting to better understand just a bit the role of hot DOGs, especially regarding star formation, early galaxy evolution, and SMBHs.

Find Out What's Happening – Join EVAC-Announce List

If you would like to receive email announcements about EVAC meetings and activities, please join the EVAC–Announce mailing list. Click on the link below to subscribe. Enter your full email address in the box titled User Options and press OK. You will receive a confirmation email. Your privacy is respected by EVAC and we will never sell your email address, or use it for non-club relevant solicitations. This mailing list is designed for communication from EVAC, and does not enable users to respond to the message. If you wish to contact club officers, please use the list on the Contact-Us tab. To subscribe to the EVAC–Announce mail group click: <http://www.freelists.org/list/evac-announce>. To unsubscribe use the same link, enter your email address and select Unsubscribe from the “Choose An Action” list. Another list that may be of interest is AZ-Observering. To subscribe click <http://www.freelists.org/list/az-observing>.

EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To join: [EVAC Facebook Group](#).

The Gilbert Rotary Centennial Observatory (GRCO) also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To visit, please click on [Gilbert Rotary Centennial Observatory - GRCO](#).

Looking for that perfect weekend activity?

Why not resolve to getting involved?

Contact Claude Haynes to join the staff at GRCO

Email: grco@evaconline.org

All AZ Star Party

October 25 – 26 Hovatter Road Site

Friday – 5pm Potluck Dinner

Saturday – 4 pm Soda Get Together

4:30 pm Raffle Drawing

\$1 each / 6 for \$5

5 pm Taco Dinner \$5.00

9 pm Coffee & Snacks

(each night)

Toilets provided – great camping site

Detailed information under Member
Star Parties at www.evaconline.org



FIRST QUARTER MOON ON SEPTEMBER 5 AT 23:10

FULL MOON ON SEPTEMBER 14 AT 00:33

LAST QUARTER MOON ON SEPTEMBER 21 AT 22:41

NEW MOON ON SEPTEMBER 28 AT 14:26

Tucson Mirror Lab Tour

The date for the Mirror Lab in Tucson has been set for Friday November 8th. This is a limited tour that has started to fill up. If you would like to attend, please bring cash or a check for \$18 made out to EVAC to our September meeting. The tour will begin at 11:00 AM and conclude at 12:30 PM. Usually, it is only an hour tour but they will be extending it for our group. Tours normally start at 10:00 but the Mirror Lab has moved the start time to 11:00 to keep us out of the traffic coming from the valley. You will be providing your own transportation and I would suggest that you ride share if possible. After the tour we will find somewhere for lunch which is not included in the \$18 tour. Both of the Tucson telescope shops Starizona and Steller Vision are expecting us after lunch if you would like to have a look. Starizona will be having a star party that evening in their parking lot and demonstrating some of their equipment. We need this event to fill up and have it a success. I would like to send a check to the Mirror Lab to confirm our reservation after this meeting.

I have been taking star party requests for this coming season. Please consider giving back to your community bring your expertise, experience, and enlighten some of our youth in what is out there in the universe. This can be a very rewarding experience plus an opportunity to spend some time with your fellow astronomers.

Contact me via email (events@evaonline.org) or at the break if you have any questions.

Don't forget to wear your name badge if you wish to be in the free drawing at this meeting. Lets get to know one another.

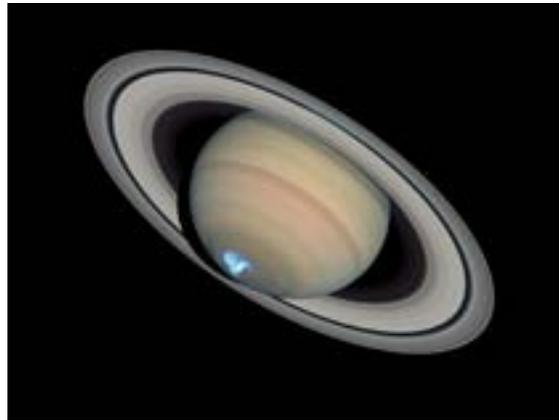
Ken Milward
Outreach and Event Coordinator
East Valley Astronomy Club

Classified Ads

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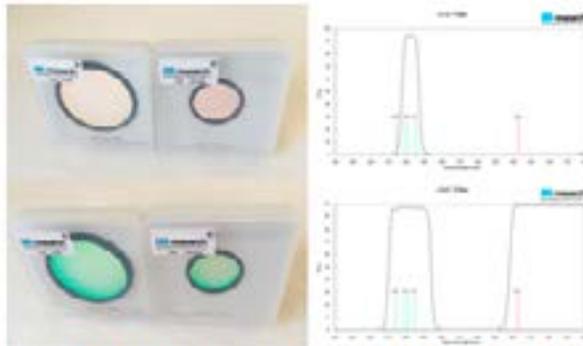
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in
Arizona



Critical products for visual observing, too!



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Classified Ads



The darkest, most Pristine, sky in the continental U.S. !

At the site: Bathroom facilities, running water, 5 pads w110v, wifi, acres of grassy camp sites.

From the site: Very Large Array 42mi E, The Astronomical Lyceum 55mi E, MRO Observatory 80mi E

IC 405

**Insight Observatory
16" ATEO 1 Telescope**

[SkyPi Remote Observatory](#)



For sale Meade LXD75 8-inch Telescope with accessories - \$1250: [LXD75](#)

Bill Musik: bmusik@cox.net

For sale: a classic LX200 8" telescope with field tripod.
\$1,000. 00 cash and carry. No eye pieces with scope.



Frank Pino. f.pino@mchsi 480-882-3485

Upcoming Meetings

September 20

October 18

November 15

December 20

January 17

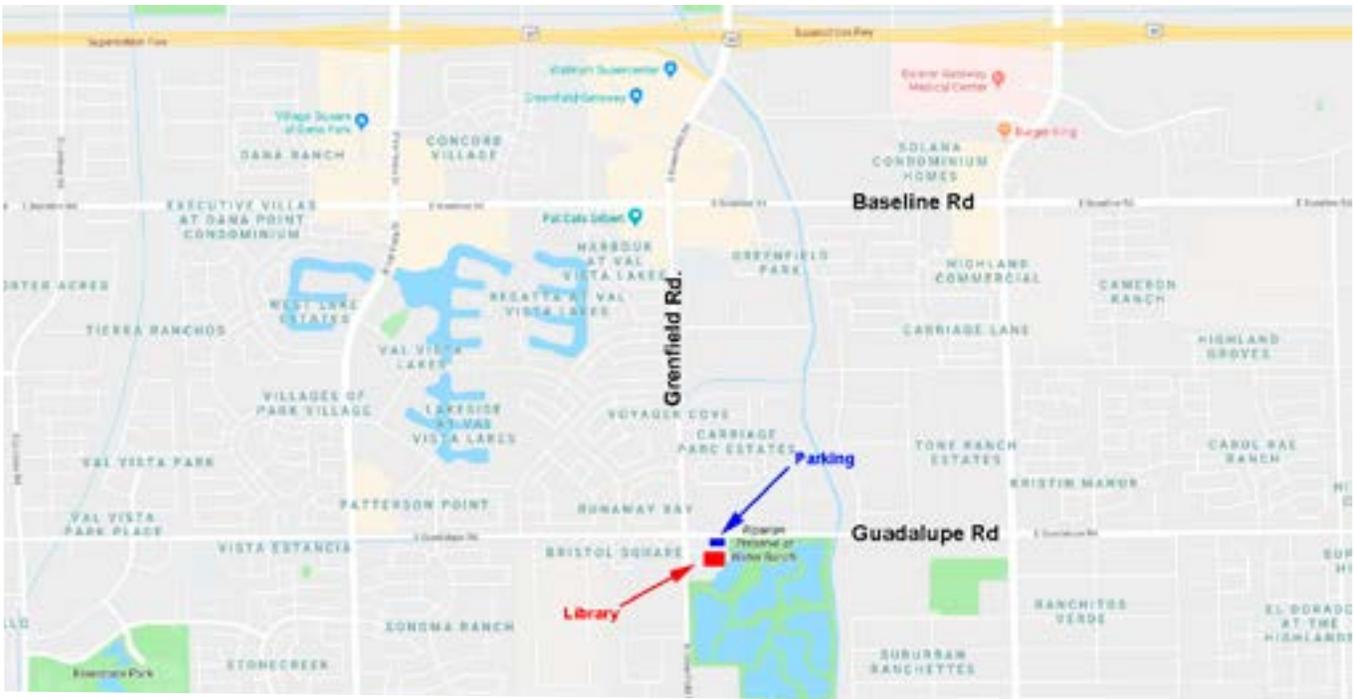
February 21

March 20

The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30 pm.

Visitors are always welcome!



Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234



SEPTEMBER 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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					

September 13 - Public Star Party

September 21 - EVAC Star Party

September 20 - EVAC Monthly Meeting

September 28 - EVAC Star Party

OCTOBER 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		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		

October 11 - Public Star Party

October 21 - EVAC Star Party

October 18 - EVAC Monthly Meeting

September 25 & 26 - All Arizona Star Party

East Valley Astronomy Club -- 2019 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:	
<input type="checkbox"/> New Member	<input type="checkbox"/> Renewal
<input type="checkbox"/> Change of Address	
New Member Dues (dues are prorated, select according to the month you are joining the club):	
<input type="checkbox"/> \$30.00 Individual January through March	<input type="checkbox"/> \$22.50 Individual April through June
<input type="checkbox"/> \$35.00 Family January through March	<input type="checkbox"/> \$26.25 Family April through June
<input type="checkbox"/> \$15.00 Individual July through September	<input type="checkbox"/> \$37.50 Individual October through December
<input type="checkbox"/> \$17.50 Family July through September	<input type="checkbox"/> \$43.75 Family October through December
<i>Includes dues for the following year</i>	

Renewal (current members only):
<input type="checkbox"/> \$30.00 Individual <input type="checkbox"/> \$35.00 Family

Name Badges:
<input type="checkbox"/> \$10.00 Each (including postage) Quantity: _____
Name to imprint: _____

Total amount enclosed:

Please make check or money order payable to EVAC

Payment was remitted separately using PayPal Payment was remitted separately using my financial institution's online bill payment feature

Name: Phone:

Address: Email:

City, State, Zip:

The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month.

<input type="checkbox"/> General Observing <input type="checkbox"/> Cosmology <input type="checkbox"/> Lunar Observing <input type="checkbox"/> Telescope Making <input type="checkbox"/> Planetary Observing <input type="checkbox"/> Astrophotography <input type="checkbox"/> Deep Sky Observing <input type="checkbox"/> Other	
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Would you be interested in attending a beginner's workshop? Yes No

How did you discover East Valley Astronomy Club?

To join via Paypal: http://evaonline.org/join_evac.htm	Joining the club implies you agree to the liability waiver. http://evaonline.org/join-liability_release_form.htm
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The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month. Please send your contributions, tips, suggestions and comments to the Editor at: news@evaonline.org. Contributions may be edited. The views and opinions expressed in this newsletter do not necessarily represent those of the East Valley Astronomy Club, the publisher or editor.

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The East Valley Astronomy Club is a 501(c)(3) nonprofit charitable organization.

www.evaonline.org

East Valley Astronomy Club
PO Box 2202
Mesa, Az. 85214-2202

President: Tom Mozdzen

Vice President: Rob Baldwin

Secretary: Tom Polakis

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Events Coordinator: Ken Milward

Property Director: David Hatch

Refreshments: Jan Barstad

Observing Program Coordinator: Wayne Thomas

AL Representative: Rob Baldwin

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SkyWatch Coordinator: Claude Haynes

Observatory Manager: Claude Haynes