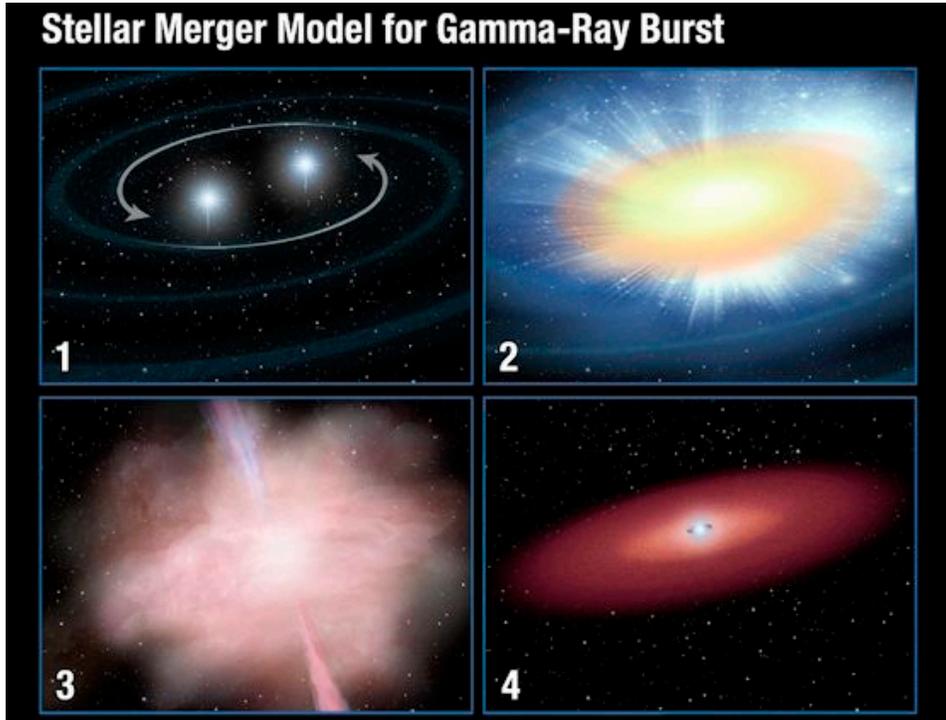


THE OBSERVER

East Valley Astronomy Club



This sequence illustrates the kilonova model for the formation of a short-duration gamma-ray burst. 1. A pair of neutron stars in a binary system spiral together. 2. In the final milliseconds, as the two objects merge, they kick out highly radioactive material. This material heats up and expands, emitting a burst of light called a kilonova. 3. The fading fireball blocks visible light but radiates in infrared light. 4. A remnant disk of debris surrounds the merged object, which may have collapsed to form a black hole.

The Backyard Astronomer High Altitude Observatories by Bill Dellinges

It started out as an innocent enough question. An astronomy friend of mine had phoned me with a challenging question: What are the first and second highest permanent observatories in the continental U.S.? I thought,

OK, this sounds like a trick question. I've visited many observatories over the years and try to keep up with the latest facilities being built. The clock was ticking so I quickly assessed the big U.S. observatories I was familiar with and blurted out, "Mt. Lemmon (9,157') and Kitt Peak (6,800')

observatories!" (Completely forgetting about Mt. Graham Observatory, 10,400').

WRONG, he replied. OK wise guy, what are they?

He asked if I had ever heard of the Meyer-Womble and Magdalena Ridge Observatories. I said no. But "Magdalena" kind of rang a bell in the deep, dark catacombs of my mind.

As it turns out, the former is on Mt. Evans in Colorado at 14,148' and equipped with dual 28" telescopes. Magdalena Ridge Observatory operates in New

Continued on page 2

UPCOMING EVENTS:

- Deep Sky Observing Night - September 7*
- Public Star Party - September 13*
- General Meeting - September 20*
- Local Star Party - September 28*

Check out all of the upcoming club events in the Calendars on page 8

INSIDE THIS ISSUE:

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<i>Membership Form</i>	7
<i>NASA's Space Place</i>	9
<i>If It's Clear...</i>	10
<i>Deep Sky Object of the Month</i>	12

The Backyard Astronomer

Continued from page 1 Mexico with a 94.5"

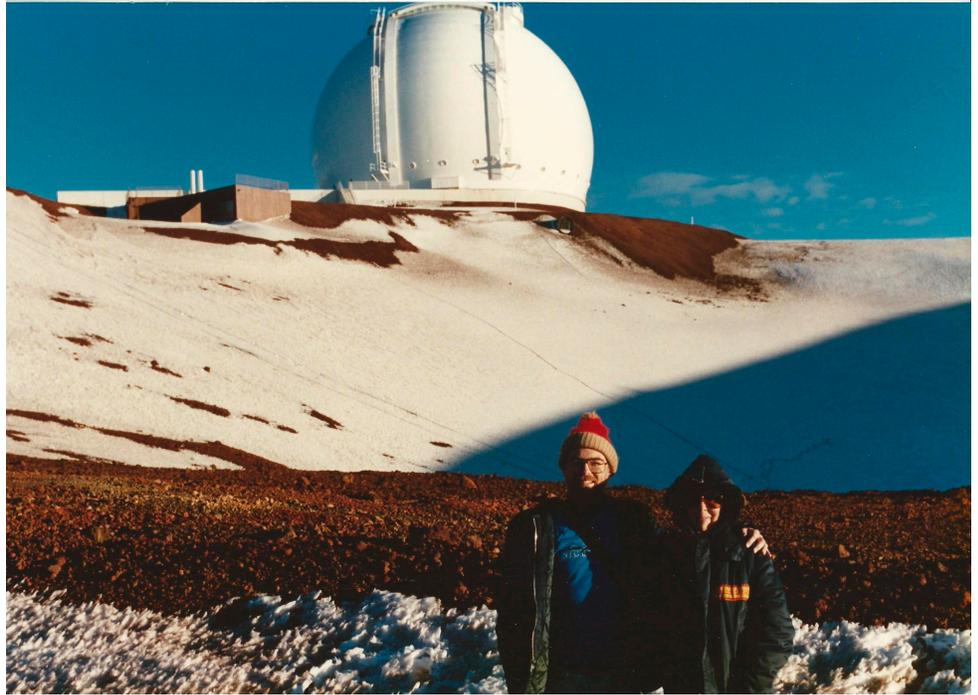
telescope at an elevation of 10,600'. The reason Magdalena rang a bell with me is I had once driven through it coming home from the VLA radio telescope and thought at the time it was a neat little town, perfect for the Witness Protection Program. Recently too, I had read in S&T magazine that a number of amateur astronomers are building observatories near the town. So it was memory bells ringing in my mind and not tinnitus!

Thus began a week of research of the world's highest observatories. I only wish I had first simply Googled "World's Highest Observatories"! That would have saved me a huge chunk of time. On the flipside, I could use the mental exercise being of Medicare age.

As it turns out, the record high altitude optical observatory appears to be the (1) University of Tokyo Atacama Observatory (TAO) in Chile. It's located on Cerro Chajnantor at an elevation of 18,500'.

Note we are now including international observatories.

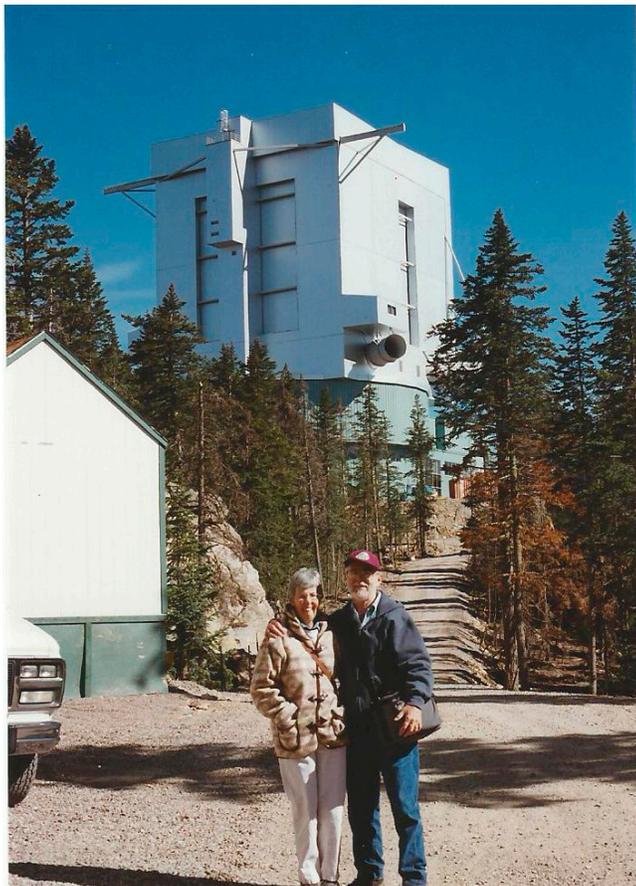
Six radio telescope observatories follow in elevations from 17,160' to 15,030'. The most notable probably being the Atacama Large Millimeter Array (ALMA) at 16,745' only 3 miles from the TAO. When completed, ALMA will have 66



antennae, fifty-four 12 meter and twelve 7 meter dishes. Now we return to optical telescopes with the (2) Indian Astronomical Observatory in India at 14,764' operating a 2m (83") telescope.

Let's continue our list of optical observatories in descending order of altitude, location, and largest telescope on the premises: (3) Meyer-Womble Observatory, Colorado (14,148', 0.71m/28"), (4) Mauna Kea, Hawaii (13,796', 10 meter/394"), (5) Llano del Hato National Astronomical Observatory, Venezuela (11,800', 1m/39.37"), (6) Sphinx Observatory, Switzerland (11,716' 0.76m/30"), (7) Magdalena Ridge Observatory, New Mexico (10,600', 2.4m/94.5"), (8) Mt. Graham Observatory, Arizona (10,400', 2-8.4m/331" Large Binocular telescope), (9) Haleakala Observatory, Maui, Hawaii (10,013', 3.67m/144") and (10) Pic Du Midi Observatory, France (9,439', 2m/79").

I bet most amateur astronomers would recognize only two of the ten observatories listed above. But the next ten are familiar names to most gazers, (again in descending order): Sacramento Peak, Mt. Lemmon, Mt. Hopkins, Paranal, LaSilla, LaPalma, Las Campanas, Cerro Tololo, Kitt Peak and McDonald Observatories. They may not be in the top 10 but at least you can breathe there!



Looking for that perfect weekend activity?

Why not resolve to getting involved?

Contact Dave Coshow to join the staff at GRCO

Email: grco@evaconline.org

18" Classic Obsession Telescope for Sale

Purchased new in 1997 with Galaxy optics. Selling to move to a different scope. Originally the mirror tested with a Strehl ratio of 0.955 (Fringe Centers) / 0.961 (Uniform Grid) and a RMS value of 0.034. It was refigured in 2000 by Swayze Optical to remove some zones. The mirror star-tests very well. All mirrors were recoated in the last 9 months by OMI (IBAD-96 Coating process). The woodwork does show cosmetic finish issues. There are numerous upgrades to the scope.

Asking \$3,200 or best offer.

Contact me at 602.291.3508 or e-mail me if you want details. James.t.waters@cox.net

 **NEW MOON ON SEPTEMBER 5 AT 04:37**

 **FIRST QUARTER MOON ON SEPTEMBER 12 AT 10:09**

 **FULL MOON ON SEPTEMBER 19 AT 04:13**

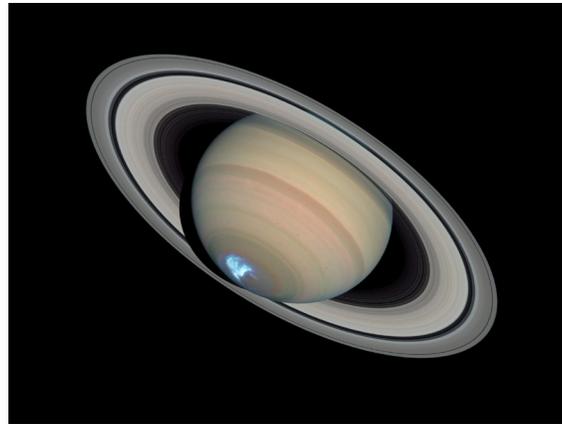
 **LAST QUARTER MOON ON SEPTEMBER 26 AT 20:57**

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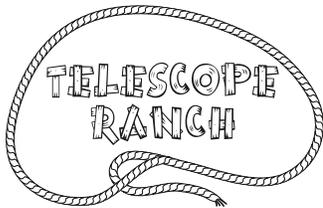


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Upcoming Meetings

September 20

October 18

November 15

Holiday Party - TBD

January 17

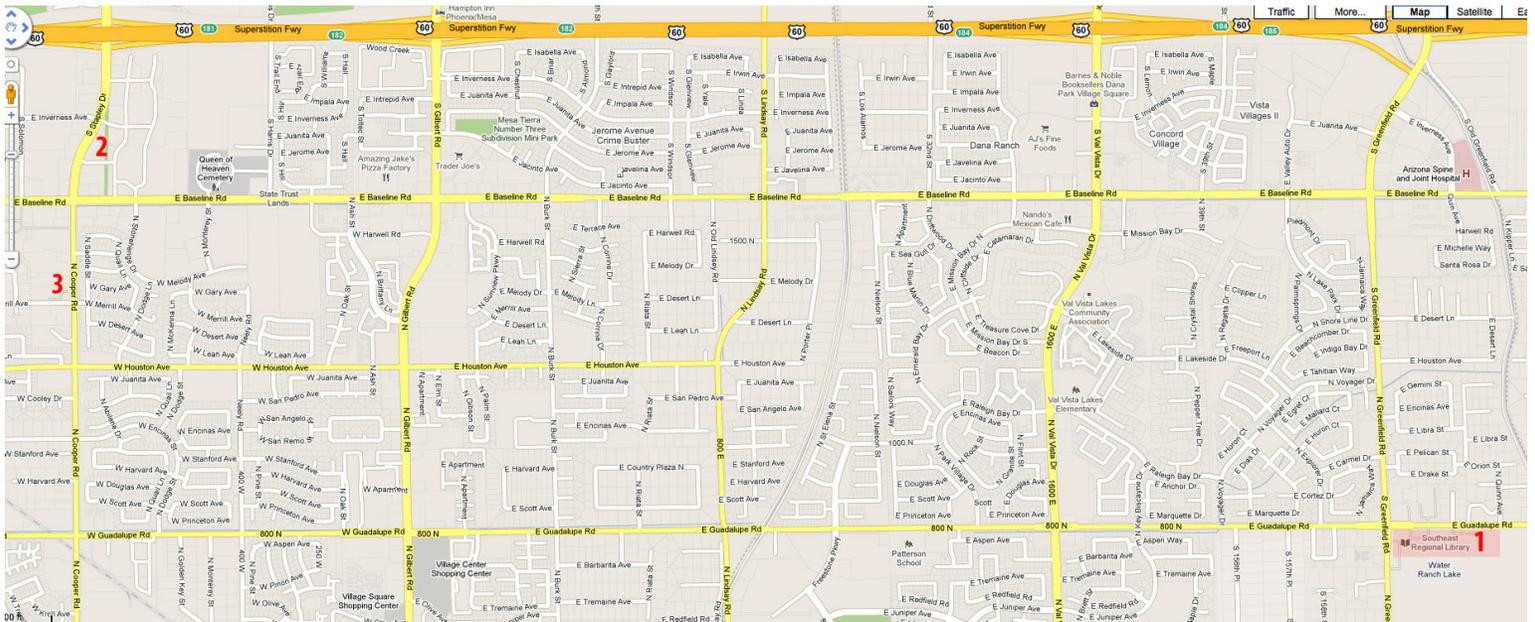
February 21

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.

All are welcome to attend the pre-meeting dinner at 5:30 pm. We meet at Old Country Buffet, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, just south of US60.

Visitors are always welcome!



2

Old Country Buffet
1855 S. Stapley Drive
Mesa, Az. 85204

1

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



SEPTEMBER 2013

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 7 - Deep Sky Observing Night

September 13 - Public Star Party & SkyWatch at
Riparian Preserve

September 20 - General Meeting at SE Library

September 26 - Dobson Academy Star Party

September 28 - Local Star Party

OCTOBER 2013

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 5 - Deep Sky Observing Night

October 11 - Public Star Party & SkyWatch

October 12 - Astronomy Day

October 18 - General Meeting at SE Library

October 26 - Local Star Party

East Valley Astronomy Club -- 2013 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:

- New Member
 Renewal
 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 |
- Includes dues for the following year*

Renewal (current members only):

- \$30.00 Individual**
 \$35.00 Family

Name Badges:

- \$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:

- Publish email address on website

URL:

How would you like to receive your monthly newsletter? (choose one option):

- Electronic delivery (PDF) *Included with membership*
 US Mail **Please add \$10 to the total payment**

Areas of Interest (check all that apply):

- | | |
|--|---|
| <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 |

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? Yes No

How did you discover East Valley Astronomy Club?

PO Box 2202
Mesa, AZ 85214-2202
www.evaconline.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as “EVAC”) I hereby affirm that I and my family agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Please print name here

Date

Please sign name here

**PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org**

Size Does Matter, But So Does Dark Energy

by Dr. Ethan Siegel



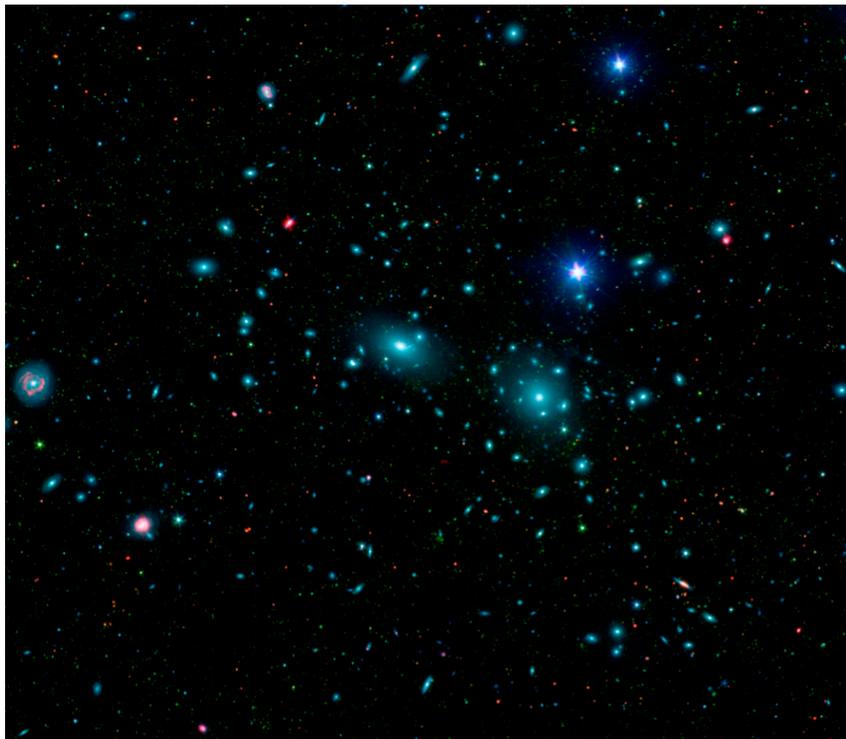
Here in our own galactic backyard, the Milky Way contains some 200-400 billion stars, and that's not even the biggest galaxy in our own local group. Andromeda (M31) is even bigger and more massive than we are, made up of around a trillion stars! When you throw in the Triangulum Galaxy (M33), the Large and Small Magellanic Clouds, and the dozens of dwarf galaxies and hundreds of globular clusters gravitationally bound to us and our nearest neighbors, our local group sure does seem impressive.

Yet that's just chicken feed compared to the largest structures in the universe. Giant clusters and superclusters of galaxies, containing thousands of times the mass of our entire local group, can be found omnidirectionally with telescope surveys. Perhaps the two most famous examples are the nearby Virgo Cluster and the somewhat more distant Coma Supercluster, the latter containing more than 3,000 galaxies.

There are millions of giant clusters like this in our observable universe, and the gravitational forces at play are absolutely tremendous: there are literally quadrillions of times the mass of our Sun in these systems.

The largest superclusters line up along filaments, forming a great cosmic web of structure with huge intergalactic voids in between the galaxy-rich regions. These galaxy filaments span anywhere from hundreds of millions of light-years all the way up to more than a billion light years in length. The CfA2 Great Wall, the Sloan Great Wall, and most recently, the Huge-LQG

(Large Quasar Group) are the largest known ones, with the Huge-LQG -- a group of at least 73 quasars -- apparently stretching nearly 4 billion light years in its longest direction: more than 5% of the observable universe! With more mass than a million Milky Way galaxies in there, this structure is a puzzle for cosmology.



Digital mosaic of infrared light (courtesy of Spitzer) and visible light (SDSS) of the Coma Cluster, the largest member of the Coma Supercluster. Image credit: NASA / JPL-Caltech / Goddard Space Flight Center / Sloan Digital Sky Survey.

You see, with the normal matter, dark matter, and dark energy in our universe, there's an upper limit to the size of gravitationally bound filaments that should form. The Huge-LQG, if real, is more than double the size of that largest predicted structure, and this could cast doubts on the core principle of cosmology: that on the largest scales, the universe is roughly uniform everywhere. But this might not pose a problem at all, thanks to an unlikely culprit: dark energy. Just as the local group is part of the Virgo Supercluster but recedes from it, and the Leo Cluster -- a large member of the Coma Supercluster -- is

accelerating away from Coma, it's conceivable that the Huge-LQG isn't a single, bound structure at all, but will eventually be driven apart by dark energy. Either way, we're just a tiny drop in the vast cosmic ocean, on the outskirts of its rich, yet barely fathomable depths.

Learn about the many ways in which NASA strives to uncover the mysteries of the universe: <http://science.nasa.gov/astrophysics/>. Kids can make their own clusters of galaxies by checking out The Space Place's fun galactic mobile activity: <http://spaceplace.nasa.gov/galactic-mobile/>

If It's Clear...

by *Fulton Wright, Jr.*

Prescott Astronomy Club

Celestial events (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is 1/2 degree or 30 arc minutes in diameter. All times are Mountain Standard Time.

This is a good month to start looking for Comet ISON. See Astronomy Magazine, September 2013, p. 42 & 50 for details. Sky & Telescope, September 2013. p. 50 also has an article.

This is also a good month to catch an asteroid, 324 Bamberga, at its 22 year brightest. Sky & Telescope (p. 51) and Astronomy (p. 43) in their September issues have details.

On Wednesday, September 4, it is new Moon, and you have all night to hunt for faint fuzzies.

On Sunday, September 8, from about 3:30 AM to about 5:00 AM, you can see Mars in the Beehive Cluster, low in the east. It will also be there the next morning.

On Friday, September 13 (uh-oh) the Moon is at first quarter phase and sets at 12:58 AM (Saturday).

On the night of Monday, September 16, after midnight (Tuesday) you can see some events with Jupiter's moons. Here is the schedule:

- 12:48 AM Jupiter rises, Europa's shadow is on the planet.
- 01:44 AM Europa moves in front of the planet.
- 01:53 AM Europa's shadow leaves the planet.
- 02:35 AM Callisto goes behind the planet.
- 02:55 AM Io's shadow falls on the planet.

- 04:06 AM Io moves in front of the planet.
- 04:20 AM Europa moves from in front of the planet.
- 04:50 AM Astronomical twilight starts.
- 05:08 AM Io's shadow leaves the planet.
- 05:20 AM Nautical twilight starts.
- 05:33 AM Callisto moves from behind the planet.
- 05:50 AM Civil twilight starts.
- 06:15 AM Sun rises.
- 06:20 AM Io moves from in front of the planet.

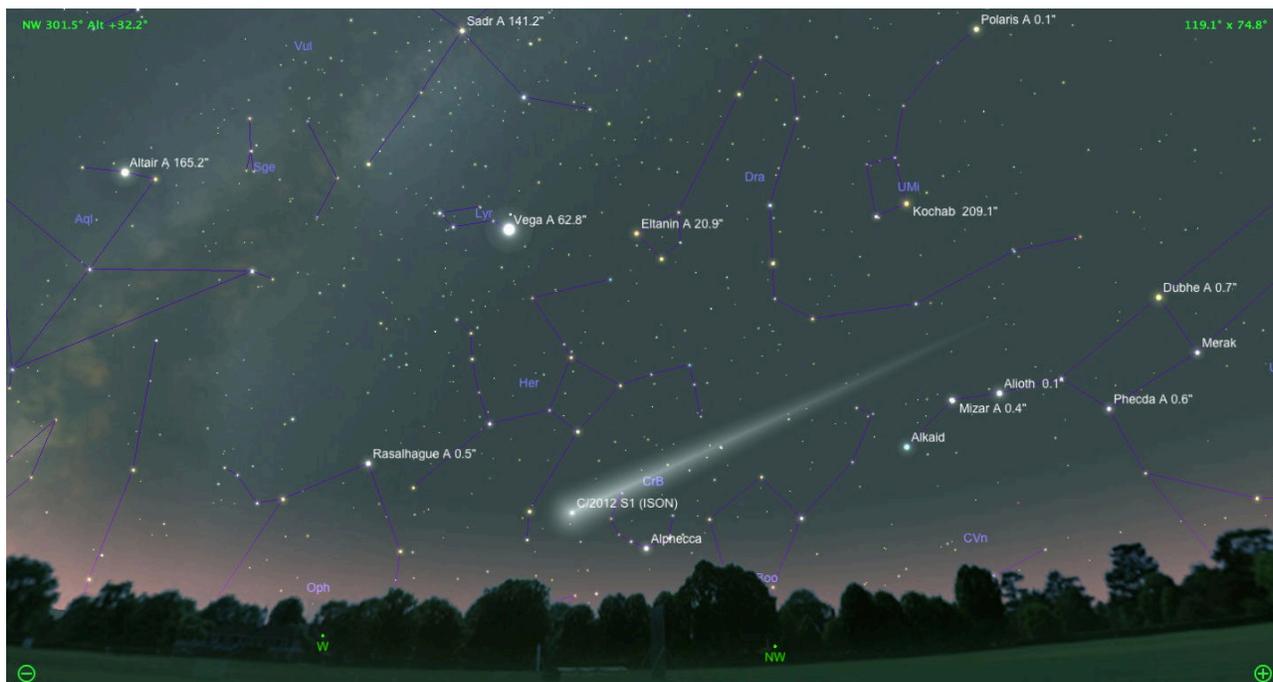
On Wednesday, September 18, at 5:59 PM (33 minutes before sunset) the full Moon rises, spoiling any chance of finding any faint fuzzies for the night. About 7:00 PM you can see Venus and Saturn near each other, low in the southwest.

On Tuesday, September 24, starting at 4:25 AM, you can see 3 events with Jupiter's moons in quick succession. The first is Europa moving in front of the planet. 4 minutes later Europa's shadow leaves the planet. 18 minutes after that Io's shadow falls on the planet.

On Wednesday, September 25, from 2:20 AM to 4:30 AM, Callisto's shadow will be on Jupiter, near the southern limb.

On Thursday, September 26, the third quarter Moon rises at 11:35 PM.

On Monday, September 30, from midnight when Jupiter rises to 5:30 AM when twilight interferes, Ganymede and Europa form a 5 arc-second "double star".





Needed: Newsletter Editor

The search for a new editor continues.
The December 2013 Observer will be the last unless a new editor
steps forward soon...

Feel free to contact me with any questions you may have at:
news@evaonline.org

THE DEEP SKY OBJECT OF THE MONTH

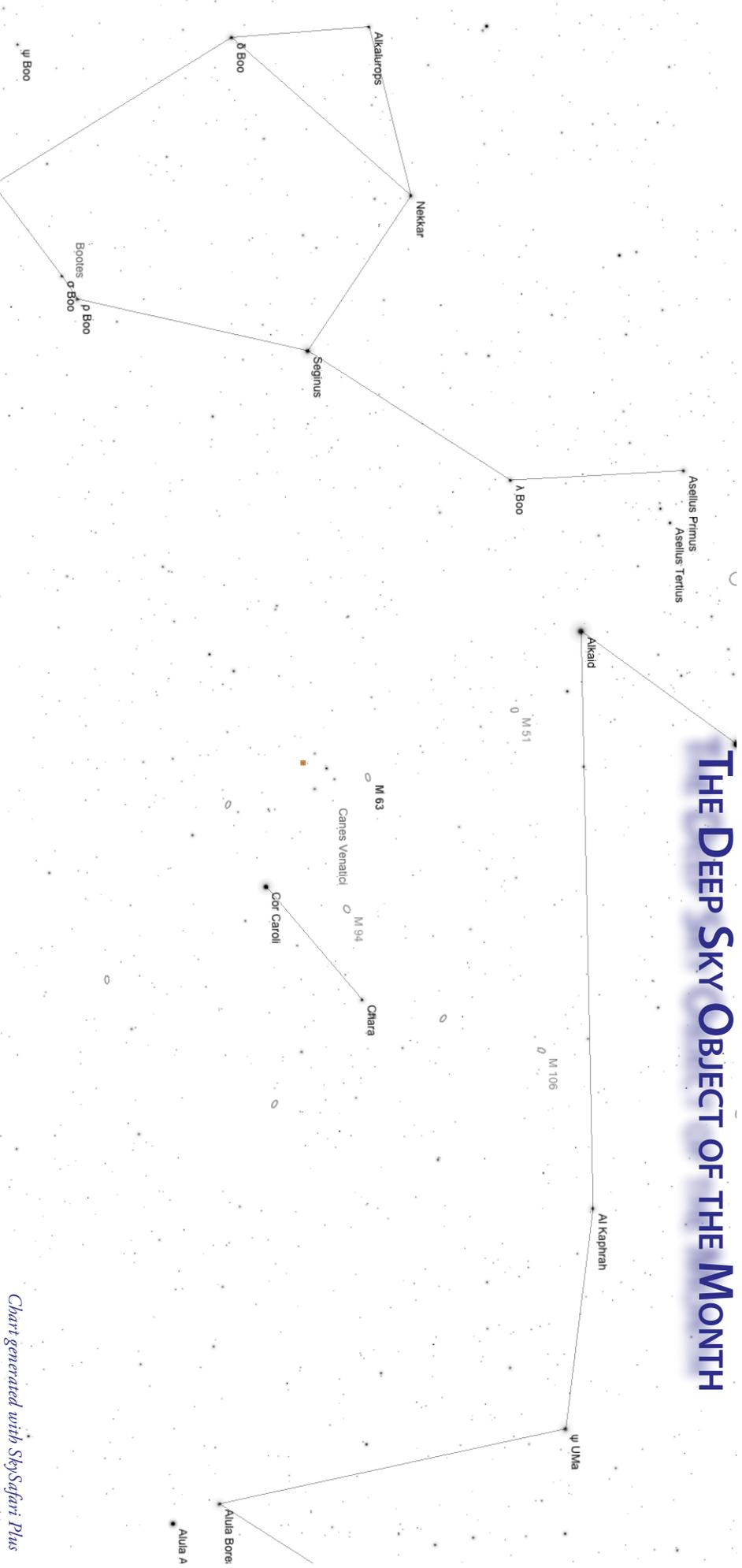


Chart generated with SkySafari Plus

M 63 was the very first discovery of Charles Messier's friend, Pierre Mechain, who caught it on June 14, 1779. On the same day, Charles Messier included it as the 63rd object in his catalog. The Sunflower galaxy is one of the earliest-recognized spiral galaxies, listed by Lord Rosse as one of the fourteen "spiral nebulae" known up to 1850.

Messier 63 has a visual magnitude of 8.6, and apparent dimensions of 10'x 6'. Its spiral pattern resembles a giant celestial sunflower: a large central hub surrounded by tightly wound spiral arms. M 63 has been classified as type Sb or Sc, displaying a patchy spiral pattern; its spiral features are in a multitude of short arcs rather than long well-defined arms.

The spiral arms show up as a grainy background, which brighten slowly from outward and then rapidly inward to the 6"-wide nuclear region, which is still grainy. Star forming regions can be traced all along the spiral arms on color photos.

The type I supernova 1971I was discovered in M 63 on May 25, 1971, and reached magnitude 11.8. The distance to M 63 is about 37 million light years, and it has a diameter of some 90,000 light years. Although it appears 6° south of the Whirlpool Galaxy (M 51), it apparently forms a physical group with that galaxy and several others, known as the M 51 Group.

M63 (Sunflower Galaxy) Spiral Galaxy in Canes Venatici

RA: 13h 16m 26.04s Dec: +41° 57' 37.0" Size: 12.6' x 7.2' Magnitude: 8.60



As one of the many benefits to becoming an East Valley Astronomy Club member, we have the following telescopes available for monthly check-out to current EVAC members:

**8 inch Orion manual Dobsonian
8 inch Orion Intelliscope Dobsonian
60mm Tasco Alt-Azimuth Refractor**

For more information, or to check out one of these scopes, please talk to:

**David Hatch
EVAC Properties Director
480.433.4217**



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. Printed copies are available at the monthly meeting. Mailed copies are available to members for a slight surcharge to offset printing and mailing expenses.

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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