

THE OBSERVER

East Valley Astronomy Club

From the Desk of the President

by Steven Aggas

Finally, some warmer weather, these winters are brutal...!

February usually is the beginning of a dry season here in Arizona and therefore the start of an observing season for the next several months.

We have an EVAC forum that lets folks know when and where they'll be observing at, you should check it out.

The front page of the EVAC website, about half way down, is a section regarding joining the EVAC email list. To join, just click the 'subscribe' circle, type in your email address, and hit submit, it's that easy. I've been on the list for many years. This is also a great way to hear about astronomy gear for sale before the owners post it for sale elsewhere. It's usually cheaper this way because you'll save on shipping!

At this month's General Assembly meeting we will have Don Wrigley giving us a presentation on the Moon. Don is, in my opinion, the club's foremost expert on lunar features. I think if you had lunar flashcards

he'd name every one of them from memory. I've looked at the Moon one time in the 36" scope. It was just 10 degrees above the western horizon and a couple days past New Moon. The view, though, was incredible as Earthshine illuminated many features, and fortunately Don was there to give me a guided tour! So mark February 18th on your calendars.

I would also like to give a shout-out to SAC on their upcoming Messier Marathon. It's going to be on April 2nd this year at the Hovatter Airstrip. See the SAC website for further details and a map!

If you have not already sent in your club membership dues, we'd appreciate it if you could use the website or bring a check with you to the February 18th meeting. The membership year begins January 1st for EVAC so please renew now if you've not already done so!

See you at the meeting for Don's talk on: The Moon!

The Backyard Astronomer

The Winter Hexagon by Bill Dellinges

February is the time to get "Sirius" about the winter night sky. For my money, there is nothing more impressive than the winter constellations. Just look up at the blazing luminaries riding the meridian midmonth.

We can encapsulate them in what is sometimes called the "Winter Hexagon." To draw the Hexagon, begin overhead with Capella in Auriga. Generate a line southeast to Castor and Pollux in Gemini. Continue

south to Procyon in Canis Minor. Turn southwest and head for Sirius in Canis Major, the night sky's brightest star. Slide west to Rigel in Orion, northwest to Aldebaran in Taurus and north back to Capella completing the Hexagon. I find this assortment of constellations to be much more striking than the summer offerings.

Winter's groupings have brighter stars and more distinctive constellation shapes. Without a bright Milky Way

UPCOMING EVENTS:

Deep Sky Observing Night - February 5

Public Star Party - February 11

General Meeting - February 18

Local Star Party - February 26

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

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The Backyard Astronomer

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or summer haze to subdue its stars, the winter panoply enjoys better contrast with a darker night sky.

Auriga offers three Messier objects. All are open star clusters, each charming in their own way – something that can be said about all open clusters. My personal favorite is M37, the southern most of the three just outside Auriga's "Pentagon" asterism. It has a rich, powdery texture I find appealing.

Gemini has two treasures not to be missed. M35 is one of the finest open star clusters in the sky. Put it on your bucket list. Look closely for a smaller, fainter, remote cluster, NGC 2158, just touching M35 on its southwest corner. At low power, it can be mistaken for a comet (so don't bother reporting it!). The Eskimo Nebula, NGC 2392, a planetary nebula just southeast of Wasat (Delta Geminorum) is a popular target. Its 10th magnitude central star can be seen in an 8 inch telescope.

Castor is one of the finest double stars to observe and a good test for your telescope's optics. The AB pair are comprised of 1.9 and 2.9 magnitude stars 4.6" (arc seconds) apart. The pair is widening and will be spaced 4.9" apart in 2015 and 5.2" in 2020. A power of 100x should just split the duo.

The second leg of our Hexagon tour leads us to Procyon in Canis Minor, the Lessor Dog, a simple two star constellation. There's not much here, just Procyon (Greek for "Preceding the dog", as it rises shortly before Sirius, the Dog Star) and Gomeisa (Arabic for "Little bleary-eyed one with a filthy fluid in the corner of the eye.") [Short Guide to Modern Star Names – Kunitzsch].

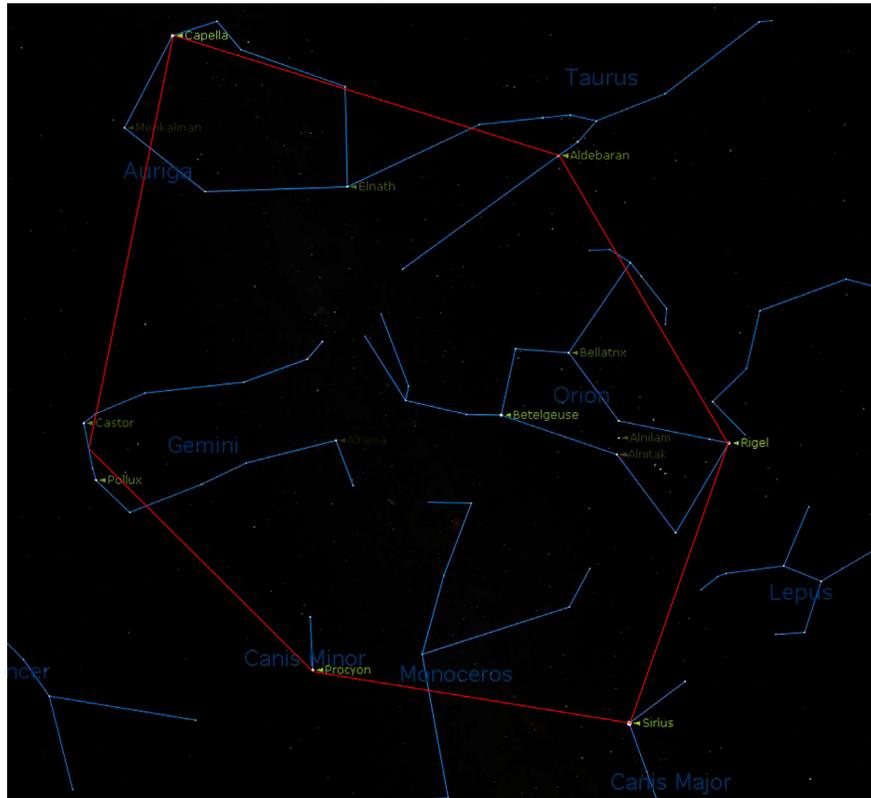
Next stop, Canis Major, the Greater Dog. Take a peek at M41, a large bright star cluster four degrees south of Sirius. My observing log reads "Fits comfortably in 11" SCT at 90x, 0.9° field with Nagler 31mm eyepiece."

The pooch has buried a tasty bone behind Tau Canis Majoris – NGC 2362. Try digging up this small, tight open cluster. Tau is the brightest member of the cluster. Its other stars swarm around Tau like a cloud of bees. Just two degrees north of Tau you'll find the attractive blue and yellow double star h3945, the "Winter Albireo."

Leg four of the Hexagon leads us to what arguably is the king of the 88 constellations – Orion the Hunter. In my

view, no other constellation compares with the grandeur of the mighty Hunter. Its large size, bright stars, distinctive three-star Belt and abundance of deep-sky objects make it a winter wonderland. The Great Orion Nebula (M42) needs no introduction. It's the best example of an emission nebula viewable from the U.S.

Even in a small telescope, its wispy ethereal tendrils are a delight to behold. Try an expansive view of the entire Sword in binoculars. They provide a different perspective often overlooked by observers. The Sword in binoculars will reveal a very busy area indeed. In addition to M42, the other two "stars" of the Sword are actually small star clusters with hints of nebulosity. While armed with binoculars, swing up to scan the area of the three Belt stars to discover a rich field of fainter background stars collectively known as Collinder 70 (CR



70). Other interesting objects to enjoy are NGC 2169, the "37" cluster (looks like the figure 37 but reversed if using a star diagonal) and M78, an emission nebula. Double stars abound in Orion. Two of my favorites are Sigma Orionis and Rigel. Sigma is a quadruple star reminiscent of Jupiter and its moons. Rigel has a 6.8 magnitude companion 9.5" at a position angle of 202° which is challenging due to Rigel's considerable glare (good seeing helps).

From Rigel we travel north on the fifth leg of the Hexagon and arrive at Aldebaran, the brightest star in Taurus the Bull. The constellation is mostly represented by the Hyades, a "V" shaped star cluster forming the Bull's head. The cluster is 120 light years away making it the second closest open star cluster after the Ursa Major Moving Cluster (80 LY). Aldebaran is not a member of the Hyades, but a foreground star 65 light years away. The Hyades is a beautiful binocular object. My 10x70's with a 5.2° field can accommodate all its stars. But I think a binocular with a 7 or 8 degree field is a better choice as it's nice to have a little space (no pun intended) around an object for framing purposes. While examining the Hyades, note the three intriguing set of double stars spaced 120 degrees apart just west of Aldebaran. The fine open cluster NGC 1647, three degrees east of Aldebaran, is worth a look. M1, the Crab Nebula, is near Zeta Tauri. Though famous, I've always found it somewhat disappointing

Continued on page 3

The Backyard Astronomer

Continued from page 2 visually because of its faintness.

Last stop, the Pleiades: "Glitter like a swarm of fireflies tangled in a silver braid" (Tennyson). What can I say about M45 that hasn't already been said? It's hard to argue that it's simply the most unique, conspicuous, and legendary naked eye object in the night sky. With the possible exception of a total solar eclipse, I believe the most stunning sight in

the heavens is the Pleiades seen in 10x70 tripod mounted binoculars. I have spoken.

The sixth Hexagonal leg merely returns us to Capella, our starting point. I hope you enjoyed the ride. Can you ever forgive me for putting a Hex on you?



Thousands of stars are forming in the cloud of gas and dust known as the Orion nebula. More than 3,000 stars of various sizes appear in this image. Some of them have never been seen in visible light. Credit: NASA, ESA, M. Robberto (Space Telescope Science Institute/ESA) and the Hubble Space Telescope Orion Treasury Project Team

A Fizzy Ocean on Enceladus

by Dauna Coulter

For years researchers have been debating whether Enceladus, a tiny moon floating just outside Saturn's rings, is home to a vast underground ocean. Is it wet--or not? Now, new evidence is tipping the scales. Not only does Enceladus likely have an ocean, that ocean is probably fizzy like a soft drink and could be friendly to microbial life.

The story begins in 2005 when NASA's Cassini probe flew past Enceladus for a close encounter.

"Geophysicists expected this little world to be a lump of ice, cold, dead, and uninteresting,"

says Dennis Matson of NASA's Jet Propulsion Laboratory. "Boy, were we surprised!"

Cassini found the little moon busily puffing plumes of water vapor, icy particles, and organic compounds out through fissures (now known as "tiger stripes") in

its frozen carapace. Mimas, a nearby moon about the same size, was as dead as researchers expected, but Enceladus was precociously active.

Many researchers viewed the icy jets as proof of a large subterranean body of water. Near-surface pockets of liquid water with temperatures near 32° F could explain the watery plumes. But there were problems with this theory. For one thing, where was the salt?

In initial flybys, Cassini's instruments detected carbon, hydrogen, oxygen, nitrogen, and various hydrocarbons in the plume gasses. But there were none of the elements of salt that ocean water should contain.

In 2009 Cassini's cosmic dust analyzer located the missing salt – in a surprising place.

"It wasn't in the plume gasses where we'd been looking for it," says Matson. "Instead, sodium and potassium salts and carbonates were locked up in the plumes' icy particles.* And the source of these substances has to be an ocean. Stuff dissolved in an ocean is similar to the contents of these grains."

The latest Cassini observations presented another intriguing discovery: thermal measurements revealed fissures with temperatures as high as -120° Fahrenheit (190 Kelvin).

"This discovery resets our clocks!" says Matson.

"Temperatures this high have to be volcanic in origin. Heat must be flowing from the interior, enough to melt some of the underground ice, creating an underground waterworks."

The finding has led the scientists to ponder how contents of an ocean capped by a crust of ice as much as tens of miles thick could reach the surface.

"Have you ever been sprayed when you popped the top of a soda can?" asks Matson.

The model he and his colleagues propose suggests that

gasses dissolved in water deep below the surface form bubbles. Since the density of the resulting "sparkling water" is less than that of the ice, the liquid ascends quickly up through the ice to the surface.**

"Most of the water spreads out sideways and 'warms' a thin surface ice

lid, which is about 300 feet thick," explains Matson. "But some of it collects in subsurface chambers, builds up pressure, and then blasts out through small holes in the ground, like soda spewing out of that can you opened. As the remaining water cools, it percolates back down to replenish the ocean and start the process all over again."

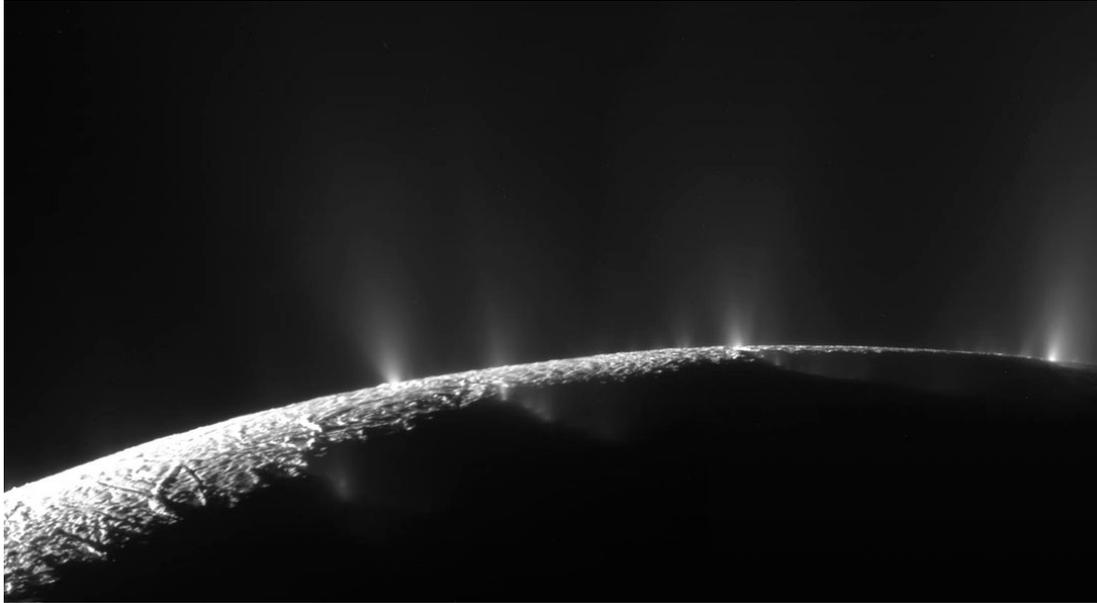
Another mystery remains: "Where's the heat coming from on this tiny body?" wonders Larry Esposito of the University of Colorado. "We think tidal heating could be contributing."

Saturn's powerful tides actually cause the shape of Enceladus to change slightly as it orbits. Flexing motions in the moon's interior generate heat--like the heat you feel in a paperclip when you rapidly bend it back and forth. In this model, internal friction powers volcanic activity, which warms and melts the ice.

"It's clear now that, whatever is producing the heat, Enceladus meets many requirements for life," says Esposito. "We know it has a liquid ocean, organics, and an energy source. And to top it off, we know of organisms on Earth in similar environments."

No one knows for sure what's going on under the ice, but it seems this little moon has quite a story to tell: erupting jets, an underground ocean, the possibility for life.

And they thought this place was dull.



*A Cassini image of vaporous, icy jets emerging from fissures on Enceladus.
Credit: NASA/JPL/SSI; Mosaic: Emily Lakdawalla*

February Guest Speaker: Don Wrigley

I grew up in New Hampshire where I began lunar observing sometime around 1963, after getting my first telescope, a three inch refractor. The light dome from Boston, only 40 miles to the south, prevented me from observing anything but the moon, planets and some double stars, so I mainly concentrated on the moon, which was of some interest during the Apollo era.

After graduating from the University of N.H. in 1971, I put away my refractor until I moved to Arizona in 1986. The arrival of Halley's Comet that year prompted me to get out my telescope again, and I began making systematic observations of the moon.

In 1992 I joined EVAC and got bit by the deep sky bug. Realizing that I needed more aperture, I purchased a Meade 8"

Newtonian, and then discovered the joy of observing the moon all over again. My search for more resolving power led me to several different large telescopes (including an 8" refractor), all of which proved to be too

bulky or heavy for one person to handle. My search for the perfect back yard telescope continues...



2011 ALL-ARIZONA MESSIER MARATHON

SATURDAY, APRIL 2ND, 2011

The site is new for the 2011 Marathon, and is the same site used last fall for the All-Arizona Star Party: The Hovatter Airstrip. The site is located approximately 100 miles west of central Phoenix. It is accessible by all vehicles via exit #53 on I-10. For those having GPS the coordinates are: 33° 34' 50" North, 113° 35' 53" West, elevation: 1,378 feet (420 meters).

You are also invited to come out and enjoy extra night of observing prior to the marathon. This is NO April Fool's joke. This year the day before the marathon (Friday, April 1st) has been set aside for you to observe from your own list at the new Hovatter Airstrip site. Reminder, this is not the marathon - just an extra night of dark sky observing amongst friends.

Complete details here: <http://www.saguaroastro.org/content/messier2011.htm>

○ **NEW MOON ON FEBRUARY 2 AT 19:31**

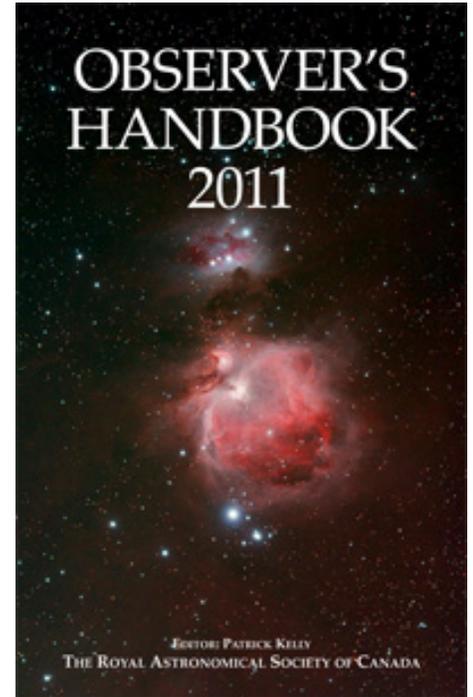
◐ **FIRST QUARTER MOON ON FEBRUARY 11 AT 00:18**

● **FULL MOON ON FEBRUARY 18 AT 01:37**

◑ **LAST QUARTER MOON ON FEBRUARY 24 AT 16:27**

2011 RASC OBSERVER'S HANDBOOKS NOW FOR SALE

The Observer's Handbook is a 360-page guide published annually since 1907 by The Royal Astronomical Society of Canada. Through its long tradition and the expertise of more than 50 contributors, the Observer's Handbook has come to be regarded as the standard North American reference for data on the sky. It should be on the reference shelf of every library; add one to yours for the super price of just **\$20**. Available at the meeting until sold out.



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Upcoming Meetings

February 18

March 18

April 15

May 20

June 17

July 15

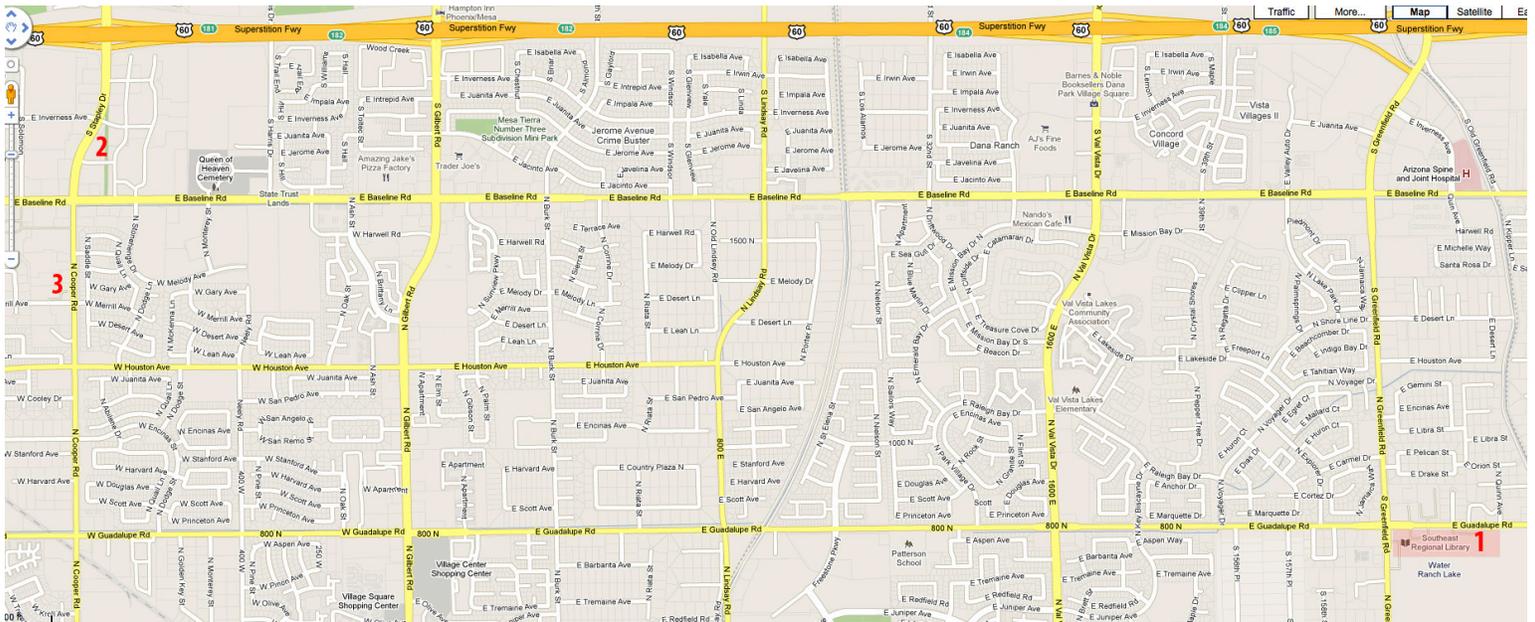
The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

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.

Likewise, all are invited to meet for coffee and more astro talk after the meeting at Denny's on Cooper (Stapley), between Baseline and Guadalupe Roads.

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



3 Denny's
1368 N. Cooper
Gilbert, Az. 85233



FEBRUARY 2011

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					

February 2 - Edu-Prize School Star Party

February 3 - Humphrey Elementary School Star Party

February 4 - Mesquite Elementary School Star Party

February 5 - Deep Sky Observing Night. Head out to your favorite dark sky site and observe!

February 9 - New Life Community Church Star Party

February 10 - Canyon Rim Elementary Star Party

February 11 - Public Star Party & SkyWatch at Riparian Preserve

February 17 - Meyer Elementary School Star Party

February 18 - General Meeting at SE Library

February 25 - City of Chandler Mother / Son Campout

February 26 - Local Star Party at Boyce Thompson Arboretum

MARCH 2011

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		

March 1 - Taft Elementary School Star Party

March 3 - Sousa Elementary School Star Party

March 5 - Deep Sky Observing Night. Head out to your favorite dark sky site and observe!

March 11 - Public Star Party & SkyWatch at Riparian Preserve

March 18 - General Meeting at SE Library

March 26 - Local Star Party at Boyce Thompson

East Valley Astronomy Club -- 2011 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.evaonline.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**

Planets in Strange Places

by *Trudy E. Bell*

Red star, blue star, big star, small star—planets may form around virtually any type or size of star throughout the universe, not just around mid-sized middle-aged yellow stars like the Sun. That's the surprising implication of two discoveries in 2006 from the 0.85-meter-diameter Spitzer Space Telescope, which is exploring the universe from orbit at infrared (heat) wavelengths blocked by the Earth's atmosphere.

At one extreme are two blazing, blue "hypergiant" stars 180,000 light-years away in the Large Magellanic Cloud, one of the two companion galaxies to our Milky Way. The stars, called R 66 and R 126, are respectively 30 and 70 times the mass of the Sun, "about as massive as stars can get," said Joel Kastner, professor of imaging science at the Rochester

Institute of Technology in New York. R 126 is so luminous that if it were placed 10 parsecs (32.6 light-years) away—a distance at which the Sun would be one of the dimmest stars visible in the sky—the hypergiant would be as bright as the full moon, "definitely a daytime object," Kastner remarked.

Such hot stars have fierce solar winds, so Kastner and his team are mystified why any dust in the neighborhood hasn't long since been blown away. But there it is: an unmistakable spectral signature that both hypergiants are surrounded by mammoth disks of what might be planet-forming dust and even sand.

At the other extreme is a tiny brown dwarf star called Cha 110913-773444, relatively nearby (500 light-years) in the Milky Way. One of the smallest brown dwarfs known,

it has less than 1 percent the mass of the Sun. It's not even massive enough to kindle thermonuclear reactions for fusing hydrogen into helium. Yet this miniature "failed star," as brown dwarfs are often called, is also surrounded by a flat disk of dust that may eventually clump into planets. (This

brown dwarf discovery was made by a group led by Kevin Luhman of Pennsylvania State University.)

Although actual planets have not been detected (in part because of the stars' great distances), the spectra of the hypergiants show that their dust is composed of forsterite, olivine, aromatic hydrocarbons, and other geological substances found on Earth.

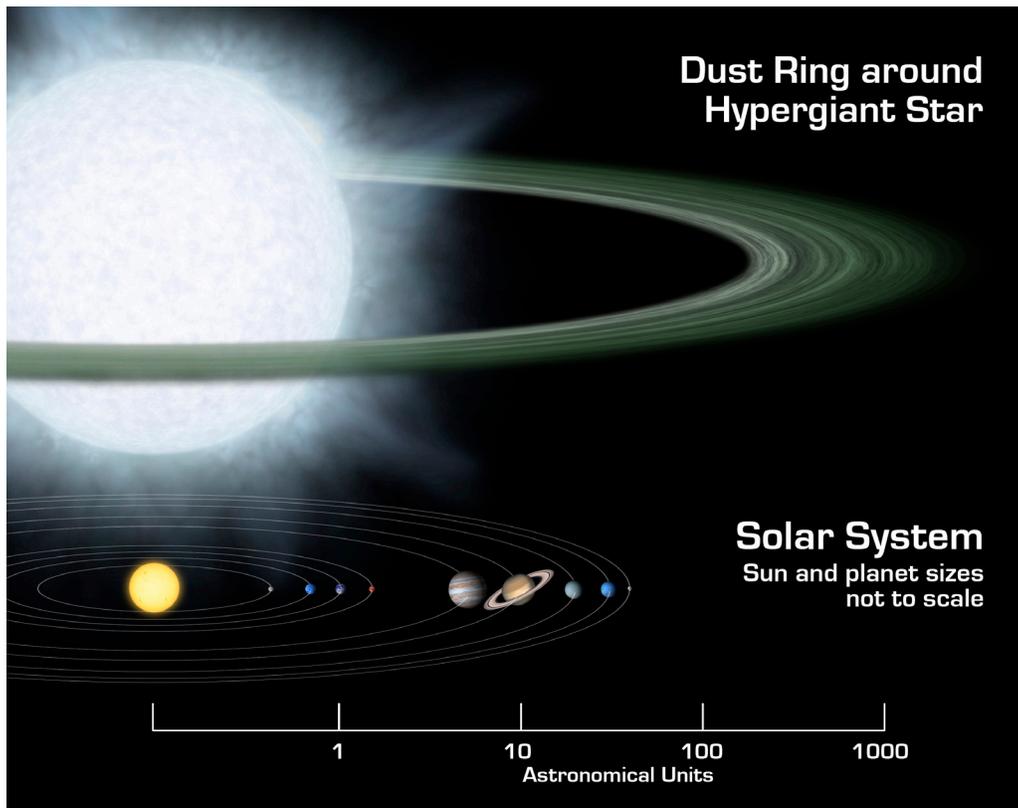
These newfound disks

represent "extremes of the environments in which planets might form," Kastner said. "Not what you'd expect if you think our solar system is the rule."

Hypergiants and dwarfs? The Milky Way could be crowded with worlds circling every kind of star imaginable—very strange, indeed.

Keep up with the latest findings from the Spitzer at www.spitzer.caltech.edu. Kids and their grownup friends can enjoy beautiful images from Spitzer while playing Spitzer Concentration at The Space Place (spaceplace.nasa.gov/en/kids/spitzer/concentration).

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Artist's rendering compares size of a hypothetical hypergiant star and its surrounding dusty disk to that of our solar system.

If It's Clear...

by *Fulton Wright, Jr.*

Prescott Astronomy Club

FEBRUARY 2011

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 arcminutes in diameter. All times are Mountain Standard Time.

On Tuesday, February 1, at 7:15 AM, you can start the month off with an observing challenge. Mercury will be 5 degrees above the southeast horizon. The very thin crescent Moon (2% illuminated) will be 2 1/2 degrees up and to the left from Mercury. Since this is only 15 minutes before sunrise, you will want binoculars to help you find the pair.

On Wednesday, February 2, it is new Moon so you have all night to hunt for faint fuzzies.

On Saturday, February 5, about 6:30 PM, you can have a good look at the thin crescent Moon. With a small (3 inch) telescope look 25 degrees above the west-southwest horizon for its "horns" to be pointing almost straight up. Near the center of the terminator is the crater Langrenus. Further south (to the left) are the craters Petavius and Furnerius. Notice particularly the mountains and rille on the floor of Petavius. Then journey north (to the right) and find Mare Crisium. The terminator crosses through the center of this dark "sea" so you should be able to see very small variations in elevation in the sun-lit half.

On Sunday, February 6, during the first half of the evening, you can watch Algol go from its brightest (magnitude 2.1) to

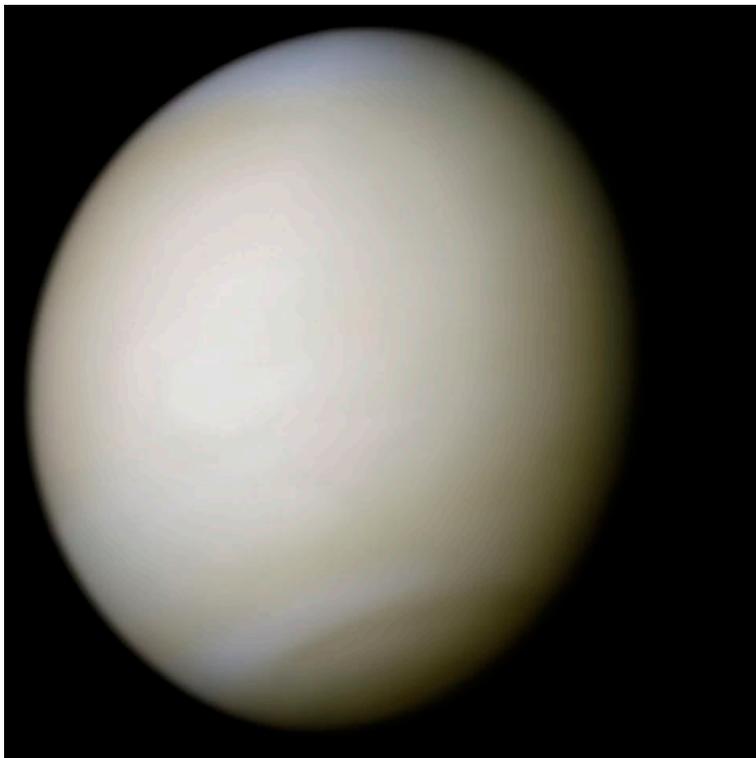
its dimmest (magnitude 3.4) . The decent in brightness starts shortly after sunset (6:04 PM) and ends at 11:28 PM. The following web site has a good chart of comparison magnitudes: <http://www.gaac.us/logs/wp-content/uploads/2010/02/November-Algol.jpg> About 7:00 PM, as you wait for Algol to fade, check out the Moon and Jupiter near each other. Both are 30 degrees above the west southwest horizon, 6 degrees apart.

On Wednesday, February 9, about 6:00 AM, you can see two solar system objects near each other. With a medium (6 inch) telescope look 15 degrees above the southeast horizon for Venus (easy at magnitude -4.2). Then look 1/2 a degree up and a little left (in a correct image telescope) for the asteroid (4)Vesta (much harder at magnitude 7.8). Don't be fooled by 21 Sagittarii (magnitude 4.9) to the left of Vesta or SAO 186786 (magnitude 8.4) just to the lower left of Vesta.

On Thursday, February 10, it is first quarter Moon, which sets at 1:26 AM (Friday).

On Thursday, February 17, at 5:55 PM (19 minutes before sunset) the full Moon rises. spoiling any chance of hunting for faint fuzzies for the whole night.

On Thursday, February 24, the Moon phase is last quarter, and you have until 2:00 AM (Friday) when the Moon rises to look for faint fuzzies.



Venus in real color.

*Image processing by R. Nunes
<http://www.astrosurf.com/nunes>*

Hubble Finds Most Distant Galaxy Candidate Ever Seen in Universe

Astronomers have pushed NASA's Hubble Space Telescope to its limits by finding what is likely to be the most distant object ever seen in the universe. The object's light traveled 13.2 billion years to reach Hubble, roughly 150 million years longer than the previous record holder. The age of the universe is approximately 13.7 billion years.

The tiny, dim object is a compact galaxy of blue stars that existed 480 million years after the big bang. More than 100 such mini-galaxies would be needed to make up our Milky Way. The new research offers surprising evidence that the rate of star birth in the early universe grew dramatically, increasing by about a factor of 10 from 480 million years to 650 million years after the big bang.

"NASA continues to reach for new heights, and this latest Hubble discovery will deepen our understanding of the universe and benefit generations to come," said NASA Administrator Charles Bolden, who was the pilot of the space shuttle mission that carried Hubble to orbit. "We could only dream when we launched Hubble more than 20 years ago that it would have the ability to make these types of groundbreaking discoveries and rewrite textbooks."

Astronomers don't know exactly when the first stars appeared in the universe, but every step farther from Earth takes them deeper into the early formative years when stars and galaxies began to emerge in the aftermath of the big bang.

"These observations provide us with our best insights yet into the earlier primeval objects that have yet to be found," said Rychard Bouwens of the University of Leiden in the Netherlands. Bouwens and Illingworth report the discovery in the Jan. 27 issue of the British science journal *Nature*.

This observation was made with the Wide Field Camera 3 starting just a few months after it was installed in the observatory in May 2009, during the last NASA space shuttle servicing mission to Hubble. After more than a year of detailed observations and analysis, the object was positively identified in the camera's Hubble Ultra Deep Field-Infrared data taken in the late summers of 2009 and 2010.

The object appears as a faint dot of starlight in the Hubble exposures. It is too young and too small to have the famil-

iar spiral shape that is characteristic of galaxies in the local universe. Although its individual stars can't be resolved by Hubble, the evidence suggests this is a compact galaxy of hot stars formed more than 100-to-200 million years earlier from gas trapped in a pocket of dark matter.

"We're peering into an era where big changes are afoot," said Garth Illingworth of the University of California at Santa Cruz. "The rapid rate at which the star birth is changing tells us if we go a little further back in time we're going to see

even more dramatic changes, closer to when the first galaxies were just starting to form."

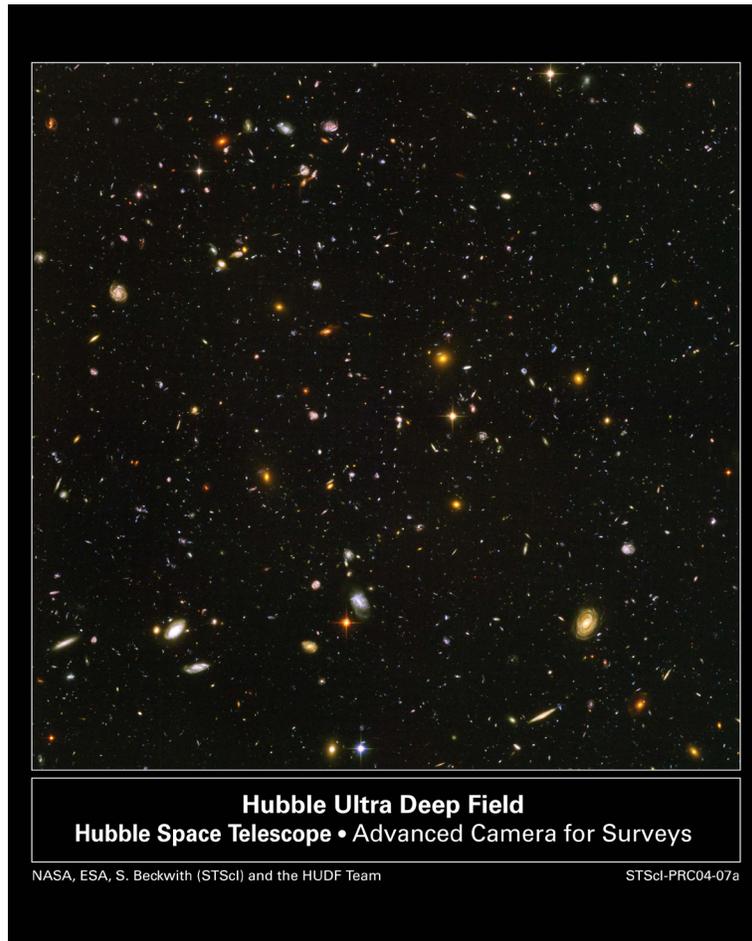
The proto-galaxy is only visible at the farthest infrared wavelengths observable by Hubble. Observations of earlier times, when the first stars and galaxies were forming, will require Hubble's successor, the James Webb Space Telescope (JWST).

The hypothesized hierarchical growth of galaxies -- from stellar clumps to majestic spirals and ellipticals -- didn't become evident until the Hubble deep field exposures. The first 500 million years of the universe's existence, from a z of 1000 to 10, is the missing chapter in the hierarchical growth of galaxies. It's not clear how the universe assembled structure out of a darkening, cooling fireball of the big bang. As with a de-

veloping embryo, astronomers know there must have been an early period of rapid changes that would set the initial conditions to make the universe of galaxies what it is today.

"After 20 years of opening our eyes to the universe around us, Hubble continues to awe and surprise astronomers," said Jon Morse, NASA's Astrophysics Division director at the agency's headquarters in Washington. "It now offers a tantalizing look at the very edge of the known universe -- a frontier NASA strives to explore."

Hubble is a project of international cooperation between NASA and the European Space Agency. NASA's Goddard Space Flight Center in Greenbelt, Md., manages the telescope. The Space Telescope Science Institute (STScI) conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy, Inc., in Washington.

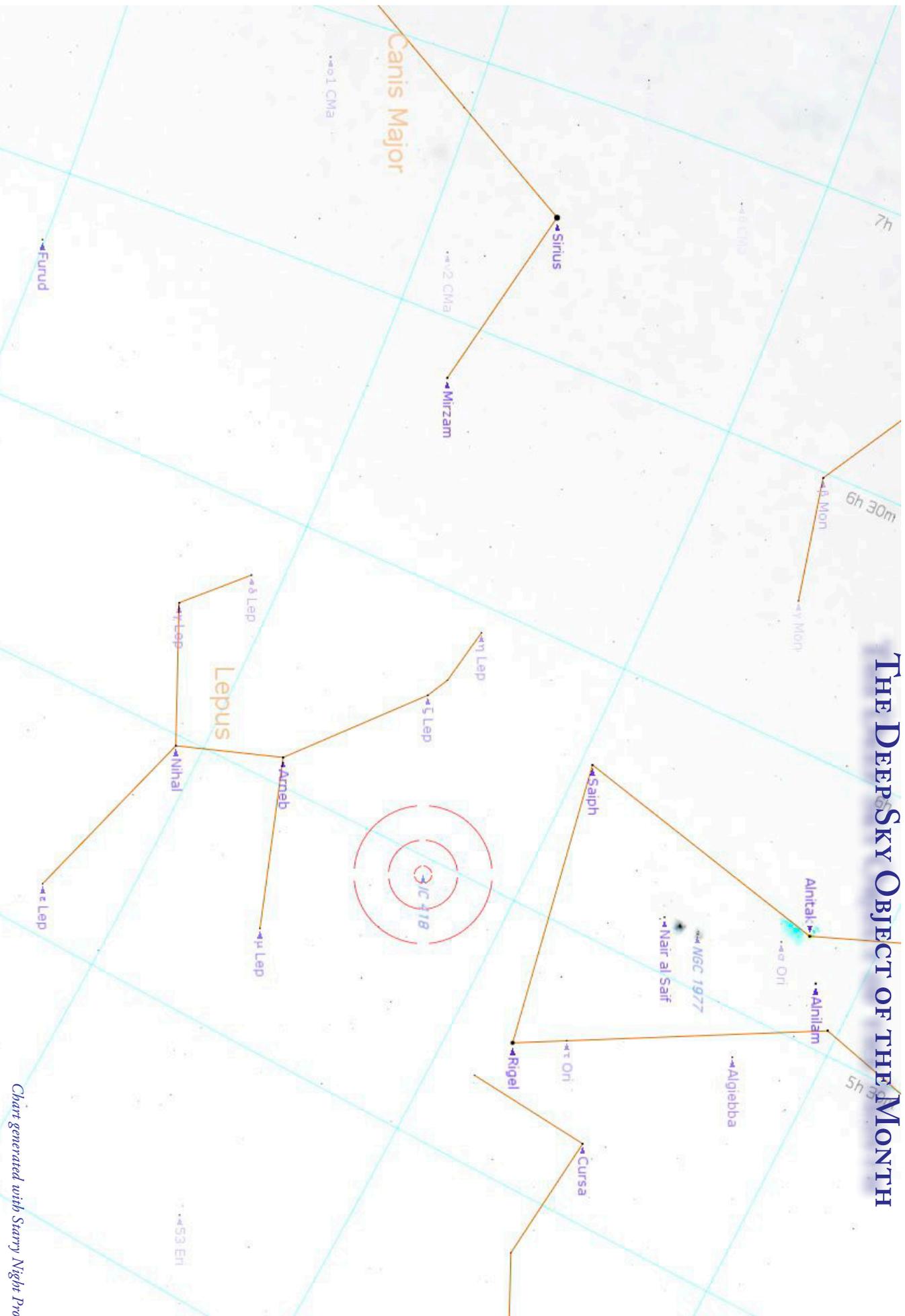


Hubble Ultra Deep Field
Hubble Space Telescope • Advanced Camera for Surveys

NASA, ESA, S. Beckwith (STScI) and the HUDF Team

STScI-PRC04-07a

THE DEEP SKY OBJECT OF THE MONTH



IC 418 (Spirograph Nebula) Planetary Nebula in Lepus

RA: 05h 27m 28.2s Dec: -12° 41' 50" Magnitude: 10.7 Size: 14"

Chart generated with Starry Night Pro



As one of the many benefits to becoming an East Valley Astronomy Club member, we have an 8 inch Dobsonian reflector with eyepieces available for monthly check-out to current EVAC members. Have any questions, or interested?

**Call or see David Hatch, EVAC Properties Manager
C 480.433.4217**



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