



Skylights



Newsletter of the Astronomical Society of Northern New England



DEC 2016



Member of NASA's



Astronomical League

ASNE MISSION

ASNE is an incorporated, non-profit, scientific and educational organization with three primary goals:

- 1) To have fun sharing our knowledge and interest with others.
- 2) To provide basic education in astronomy and related sciences to all who are interested.
- 3) To promote the science of Astronomy.



ASNE's ANNUAL CHRISTMAS PARTY/MEETING
DEC 2ND – POT LUCK (BRING AN ENTREE OR A DESSERT)



What's Up In December

By Bernie Reim

The month of December always marks the beginning of winter for us in the northern hemisphere. This year that will happen at 5:44 a.m. on Wednesday the 21st. This is the longest night of the year and the lowest point in the sky that the sun will reach for the year.

There will be several highlights this month that will reward you richly in knowledge and experience if you make the effort to brave the cold and try to understand what you are really seeing and what that means to you directly.

All five of the brightest planets will be visible this month along with not one but two meteor showers, another super moon, and, most exciting of all, a brand new nova in the constellation of Sagittarius.

Just discovered by a Japanese amateur astronomer a little over one month ago, this nova can be seen with binoculars at about 9th magnitude in Sagittarius between the handle and the spout of the teapot. It is only about 4 degrees to the left and below brilliant Venus, so that is a good guide. That leaves you only a narrow window of time to see and appreciate this new star, since Sagittarius now sets just a couple of hours after sunset. An even brighter nova was discovered in the same constellation in March of 2015. Now there is also a second, fainter nova just below this one that requires a good telescope to see.

A nova is created when a red giant star wanders too close to a white dwarf. Gas spirals in from the red giant onto the surface of the white dwarf. The gas is compacted by the powerful gravity of the white dwarf, fully 350,000 times stronger than on the surface of the earth, and then heated until hydrogen fusion occurs after a thin shell of this gas has wrapped itself completely around the white dwarf after hundreds or thousands of years. This blows

away the superheated thin shell of hot gas with the force of millions of hydrogen bombs, shooting it into space at 3,000 km per second or 6 million miles per hour, which is 6 times faster than the solar wind is always streaming out from our own very stable sun. This brightens that very dim white dwarf by 100,000 times in a matter of a few hours and it then becomes visible to people on Earth if it is close enough or if they have good telescopes.

Both the white dwarf and the red giant will survive this great event, and it will occur again in a few hundred to a few thousand years. The extreme case of such an explosion is called a Type 1A supernova, when both the white dwarf and the red giant will get blown out of the sky at 1.4 solar masses. Since the mass of this event is known, along with their apparent and absolute magnitudes, they can be used as standard candles or cosmic

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What's Up "Continued from page 1"

yardsticks to measure distances to galaxies billions of light years away.

About 6% of all the stars in the sky are white dwarfs and over 90% of all the stars in the sky will turn into a white dwarf when they run out of fuel, including our own sun. A white dwarf by itself is an incredible event, and it only gets more amazing when it interacts with a red giant.

After a star the size of our sun runs out of fuel and collapses down to the size of the earth, it becomes 125,000 times denser than steel, so that each cupful of this exotic material would weigh more than a cement truck. However, it is not nearly as dense as a neutron star, where each baseball sized chunk would weigh 20 trillion kilograms, or 40 times the combined weight of all 7.3 billion humans on earth. Neutron stars shrink down to the size of a city and only occur after a supernova explosion, which is much more powerful and rarer than the common explosion of an average star, which is called a planetary nebula.

Every white dwarf is basically pure carbon and some oxygen, but much more dense and valuable than the best diamonds on earth. You could think of each white dwarf as a spherical, very solid outbreath, indeed the very last breath of an average star, becoming very stable once again and lasting for another 10 billion years on top of the 10 billion years that this star was living and fusing hydrogen and helium to produce prodigious amounts of energy.

The shells of expelled gas of planetary nebulae can be seen all over our galaxy. We give them interesting names like the Cat's Eye, the Ring, The Helix, the Owl, the Ant, the Eskimo, the Butterfly, etc. At the very center of each one of these ghostly, complex and colorful ever-changing shells lurks this amazing creature, a white dwarf. I have seen many of them for myself through telescopes over the years.

Venus is getting a little closer and brighter and higher in our sky each night, now setting nearly four hours after sunset by the end of the month. Through a telescope you will see that Venus is getting thinner each night, it will be just over half full by the end of the month. Notice that it is catching up with Mars, which is now in Aquarius and continues to set around 9:30 each night. Mercury will show up below and to the right of Venus low in the evening sky for the first two weeks this month.

Watch the slender waxing crescent moon pass just above Mercury, then Venus, and then Mars on the first four successive nights this month.

Jupiter rises earlier and earlier each morning. The king of the planets will be rising by 1 am by the end of the year. Saturn then returns to our morning sky by Christmas, which is a nice celestial present, though not nearly as valuable as a white dwarf.

The best meteor shower of the year, the Geminids, will be washed out by the December super moon on the 13th. However, the less famous Ursid meteor shower will peak on the 22nd, just 3 days before Christmas. Caused by Comet 8P Tuttle, the Ursids usually only produce about 10 to 15 meteors per hour, but they have been known to go up to 50 per hour.

Dec.3. the moon is 7 degrees above and to the left of Venus this evening in Capricornus.

Dec.4. The moon shines 5 degrees to the right of Mars this evening.

Dec.7. First quarter moon is at 4:03 a.m. EST. Gerard Kuiper was born on this day in 1905. The Kuiper belt is named for him and Pluto is the most famous of its denizens, along with Sedna.

Dec.13. the Geminid meteor shower peaks. Full moon is at 7:05 p.m. This is also called the Cold, Long Night, or Moon before Yule. This will also be a super moon within one day of perigee, the third one in a row, but not nearly as close as the tremendous super moon last month which many people watched and enjoyed and photographed. The next one that close will not occur until November of 2034.

Dec. 14. Tycho Brahe was born on this day in 1546. He was the best celestial observer of his time and worked closely with Kepler to figure out that all the planets orbit in ellipses and not perfect circles as was previously thought.

Dec. 17. The first powered flight took place on this day in 1903. In just 66 more years we would fly all the way to the moon.

Dec.20. Last quarter moon is at 8:56 p.m. EST.

Dec. 21. The winter solstice is at 5:44 a.m. Summer starts in the southern hemisphere today.

Dec. 22. The Ursid meteor shower peaks.

Dec.23. The moon, Jupiter, and Spica in Virgo form a line about 9 degrees long this morning.

Dec. 25. Isaac Newton was born on this day in 1642.

Dec.27. Johannes Kepler was born on this day in 1571. He discovered his 3 laws of planetary motion with the help of the excellent and detailed observations of Tycho Brahe.

Dec. 28. Sir Arthur Eddington was born on this day in 1882. He took the famous photographs of the total solar eclipse in May of 1919 that proved Einstein's General Theory of Relativity.

Dec. 29. New moon is at 1:53 a.m. EST.

Moon Phases

Dec 7
First Quarter

Dec 13
Full

Dec 20
Last Quarter

Dec 29
New

Moon Data

Dec 3
Venus 6° south
of Moon

Dec 5
Mars 3° south
of Moon

Dec 6
Neptune 0.7° south
of Moon

Dec 9
Uranus 3° north
of Moon

Dec 12
Moon at perigee

Dec 22
Jupiter 2° south
of Moon

Dec 25
Moon at apogee

Dec 27
Saturn 4° south
of Moon

Submitted by Glenn Chaple for the LVAS



Sky Object of the Month – December 2016

(Courtesy LVAS Observer's Challenge*)

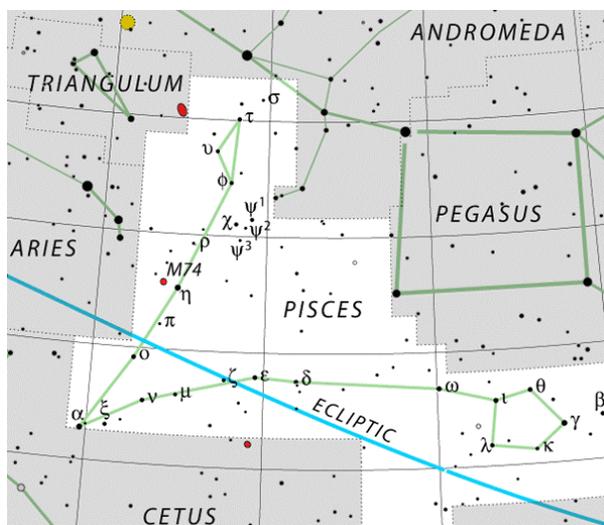
M74 – Spiral Galaxy in Pisces (Mag. 9.4; Size 10')

For backyard astronomers who tackle the annual Messier Marathon, M74 is a serious stumbling block. Even in December, when Pisces rides high in the south when evening darkness has set in, this face-on spiral galaxy is difficult to view. During Messier Marathon time in mid to late March, M74 is all but lost as it sets in the glow of evening twilight.

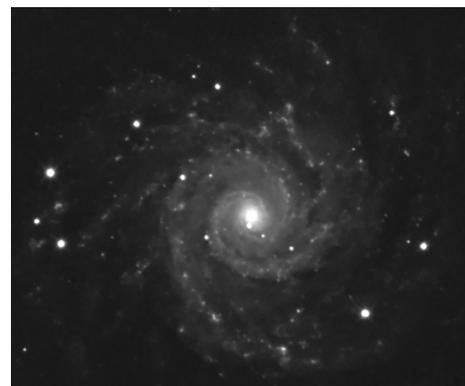
What makes M74 such a challenge is its low surface brightness. A 9th magnitude galaxy shouldn't be difficult to observe, but when its light is spread over an area one-third the moon's apparent diameter it becomes a phantom best saved for especially clear nights.

I've seen M74 in a 3-inch f/10 scope, but only with averted vision after knowing exactly where to look. A 3-inch f/6 rich-field scope captured both M74 and the 3.6 magnitude star eta (η) Piscium 1½ degrees to its west-southwest. In both instances, I worked with a magnification under 40X. To me, M74 was large and roundish – a smaller version of M33 and M101. Even when viewed with my 13.1-inch f/4.5 reflector, M74 was a vague glow.

M74 was discovered by Pierre Méchain in the autumn of 1780. It lies an estimated 33 million light years from earth.

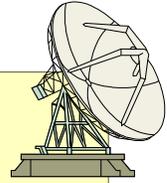


IAU and Sky and Telescope



Mario Motta, MD

*The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either [Roger Ivester \(rogerivester@me.com\)](mailto:rogerivester@me.com) or [Fred Rayworth \(fred@fredrayworth.com\)](mailto:fred@fredrayworth.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.



Got any News? Skylights Welcomes Your Input.

Here are some suggestions:

*Book reviews -- Items for sale -- New equipment --
Ramblings -- Star parties -- Observing -- Photos.*

By-Laws

The next ASNNE Meeting will be on Friday, 2 December 2016, at the New School. A brief Business portion of the General Meeting, starting at 6:00 pm will be held. Members will be asked to vote on the new By-Laws, as well as on the Board-proposed slate of Board Members for 2017; as always, nominations are welcome from the floor. Then the Pot-Luck Party will commence. If enough items are donated, there will also be a Raffle.

Pulled from the meeting minutes as written by Carl Gurtman.

MEMBERSHIP DUES

Membership fees are for the calendar year beginning in January and ending in December. Dues (see page 10 for prices) are payable to the treasurer during the last quarter of each year (October- December) for the upcoming year. Checks should be made payable to the Astronomical Society of Northern New England (A.S.N.N.E). If you would like to mail in your dues, use the form on page 10.

Additional Notice

Dues have to be paid before the December meeting or the members cannot vote or run in the elections for officers for 2017. This is in the By-laws.

Principal Meteor Showers in 2016

January 4
Quadrantids

April 22
Lyrids

May 6
Eta Aquarids

July 30
Delta Aquarids

August 12
Perseids

October 9
Draconid

October 21
Orionids

November 9
Taurids

November 18
Leonids

November 26
Andromedids

December 14
Geminids

December 22
Ursids

Note: Dates are for maximum



The latest issue of the Space Place Newsletter: News and Notes for Formal and Informal Educators can be found at: <http://spaceplace.nasa.gov/en/educators> .

Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

Check out our great sites for kids:



The Space Place website (<http://spaceplace.nasa.gov>)



The *SciJinks Weather Laboratory* at <http://scijinks.gov>



NASA Climate Kids at <http://climate.nasa.gov/kids>

Our Club has Merchandise for Sale at: www.cafepress.com/asnne



***ALL money raised goes to our operating fund.
Any design can be put on any item.
Just let our club member, David Bianchi, know.***

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



Dimming stars, erupting plasma, and beautiful nebulae

By Marcus Woo

Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour.

Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae."

Sahai and his team discovered blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.

The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach.

When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

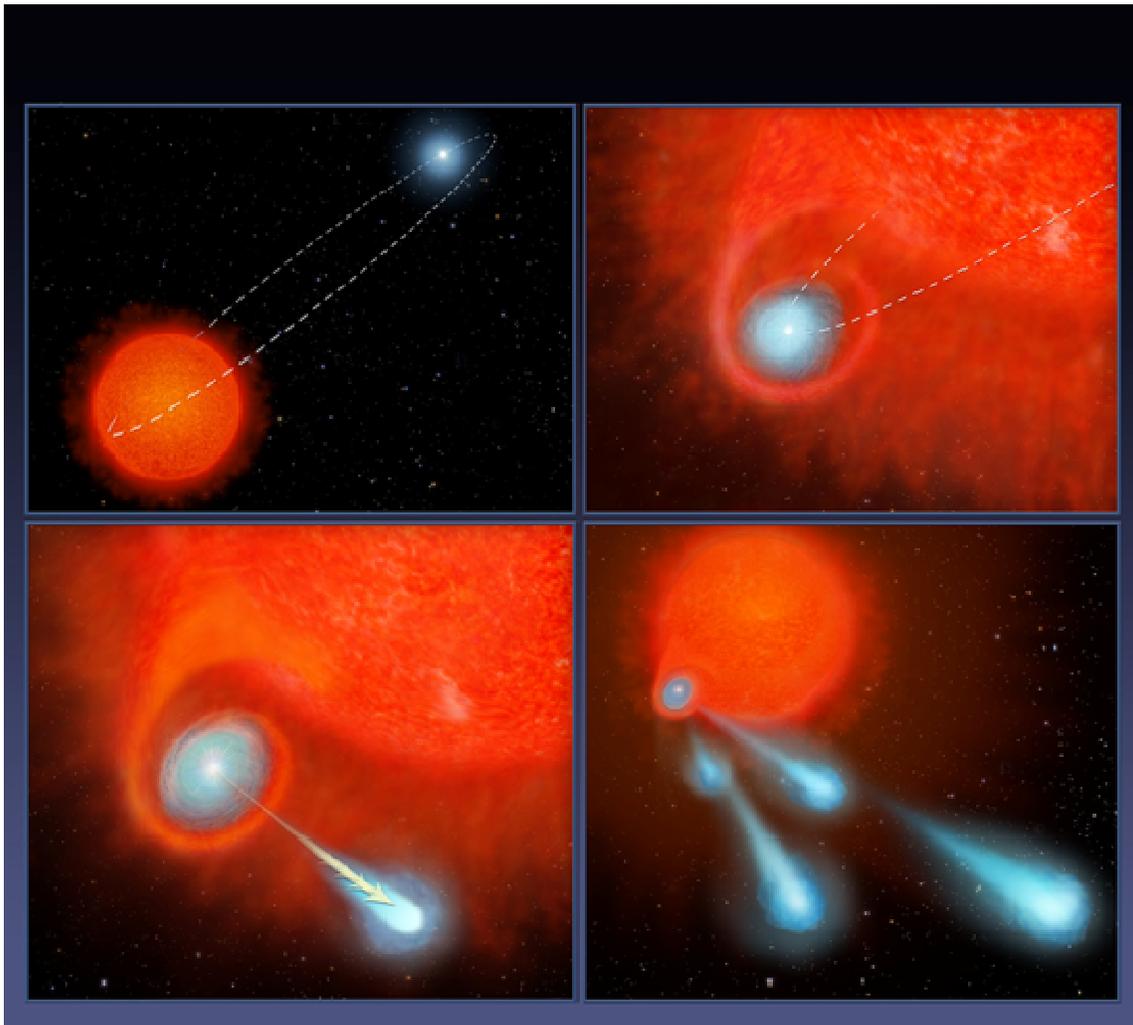
The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction during one orbit, and a slightly different one in the next. As a result, every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been monitoring this variability, making V Hydrae one of the most well-studied stars.

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“Continued from page 6”

Because the star fires plasma in the same few directions repeatedly, the blobs would create multiple lobes in the nebula—and a pretty sight for future astronomers.

If you’d like to teach kids about how our sun compares to other stars, please visit the NASA Space Place: <http://spaceplace.nasa.gov/sun-compare/en/>



This four-panel graphic illustrates how the binary-star system V Hydrae is launching balls of plasma into space. Image credit: NASA/ESA/STScI

Super Moon 11-13-16

Canon Powershot SX50 HS

Photos Submitted by Editor



“Continued on page 9”

The Moon rose into the *Earth's shadow* (purple-gray band) as seen in these two zoomed out images. A delicate rosy glow called the *Belt of Venus* caps the shadow.



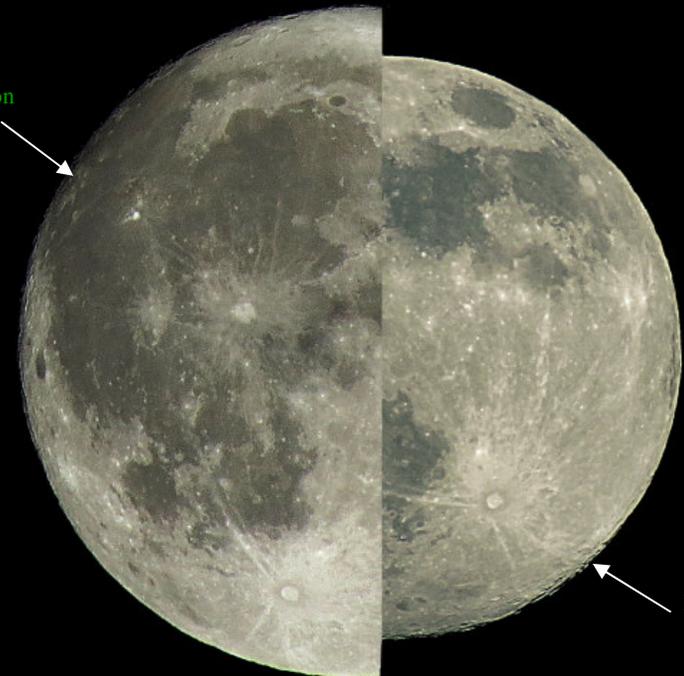
“Continued on page 10”

Photo of Super Moon taken at 10:15 PM



Used two of my photos along with Photoshop to make this composite. The Super Moon was 221,524 miles distant and the May Full Moon 250,477 miles distant.

Super Moon
11-13-16



Full Moon
5-21-16

 Club Meeting & Star Party Dates 		
Date	Subject	Location
Dec 2	<p><u>Christmas Party and Club Meeting.</u></p> <p>Business Meeting 6:00 PM Pot Luck Supper 6:30 PM (6:00 PM set-up time)</p> <p>Bring your favorite dish - salad - desert - or drink</p> <p>Discussion topics: Bernie Reim's "What's Up"</p> <p>Astro Shorts: news, stories, jokes, reports, questions, photos, observations etc.</p>	The New School, Kennebunk, Me.
TBD	Club/Public Star Party (Check List-serve / website for updates or cancellations)	Starfield Observatory, West Kennebunk, Me.

Directions to ASNNE event locations

Directions to The New School in Kennebunk [38 York Street (Rt1) Kennebunk, ME]

For directions to The New School you can use this link to the ASNNE NSN page and then click on "get directions" from the meeting location. Enter your starting location to generate a road map with complete directions. It works great. http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137

Directions to Starfield Observatory [Alewife Road, Kennebunk, ME]

From North:

Get off turnpike at exit 32, (Biddeford) turn right on Rt 111. Go 5 miles and turn left on Rt 35. Go 2 miles on Rt 35 over Kennebunk River to very sharp 90 degree left turn. The entrance to the Starfield Observatory site is at the telephone pole at the beginning of the large field on the left. Look for the ASNNE sign on the pole.

From South:

Get off the turnpike at exit 25 in Kennebunk. After toll both turn right on Rt 35. Go up over the turnpike and immediately turn right on Rt 35. About 4 miles along you will crest a hill and see a large field on your right. Continue until you reach the end of the field. Turn right into the Starfield Observatory site at the last telephone pole along the field. Look for the ASNNE sign on the pole. If you come to a very sharp 90 degree right turn you have just passed the field.

To join **ASNNE**, please fill out the below membership form. *Checks should be made payable to: Astronomical Society of Northern New England (A.S.N.N.E).* For more details, please visit our website:
<http://www.asnne.org>



Astronomical Society of Northern New England
 P.O. Box 1338
 Kennebunk, ME 04043-1338

2017 Membership Registration Form

(Print, fill out and mail to address above)

Name(s for family): _____

Address: _____

City/State: _____ Zip code: _____

Telephone # _____

E-mail: _____

Membership (check one):

Individual \$35 _____ Family \$ 40 _____ Student under 21 years of age \$10 _____ Donation _____

Total Enclosed _____

Tell us about yourself:

1. Experience level: Beginner _____ Some Experience _____ Advanced _____

2. Do you own any equipment? (Y/N) And if so, what types?

3. Do you have any special interests in Astronomy?

4. What do you hope to gain by joining ASNNE?

5. How could ASNNE best help you pursue your interest in Astronomy?

6. ASNNE's principal mission is public education. We hold many star parties for schools and the general public for which we need volunteers for a variety of tasks, from operating telescopes to registering guests to parking cars. Would you be interested in helping?

Yes _____ No _____

7. ASNNE maintains a members-only section of its web site for names, addresses and interests of members as a way for members to contact each other. Your information will not be used for any other purpose. Can we add your information to that portion of our web site?

Yes _____ No _____

