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CNY Outdoors

Stargazing in Upstate NY in September: Look for more subtle objects on autumn nights

Updated: Mar. 22, 2019, 12:56 a.m. | Published: Sep. 06, 2016, 4:57 p.m.



By [Special to nyup.com](https://www.nyup.com)

IMAGE_1__2016sept_smDomeCom.JPG

A composite of three images from Ionia, NY during the Perseid Meteor Shower.

(Image courtesy of Nick Lamendola, member of the Astronomy Section of the Rochester Academy of Science.)

By Damian Allis | Contributing writer

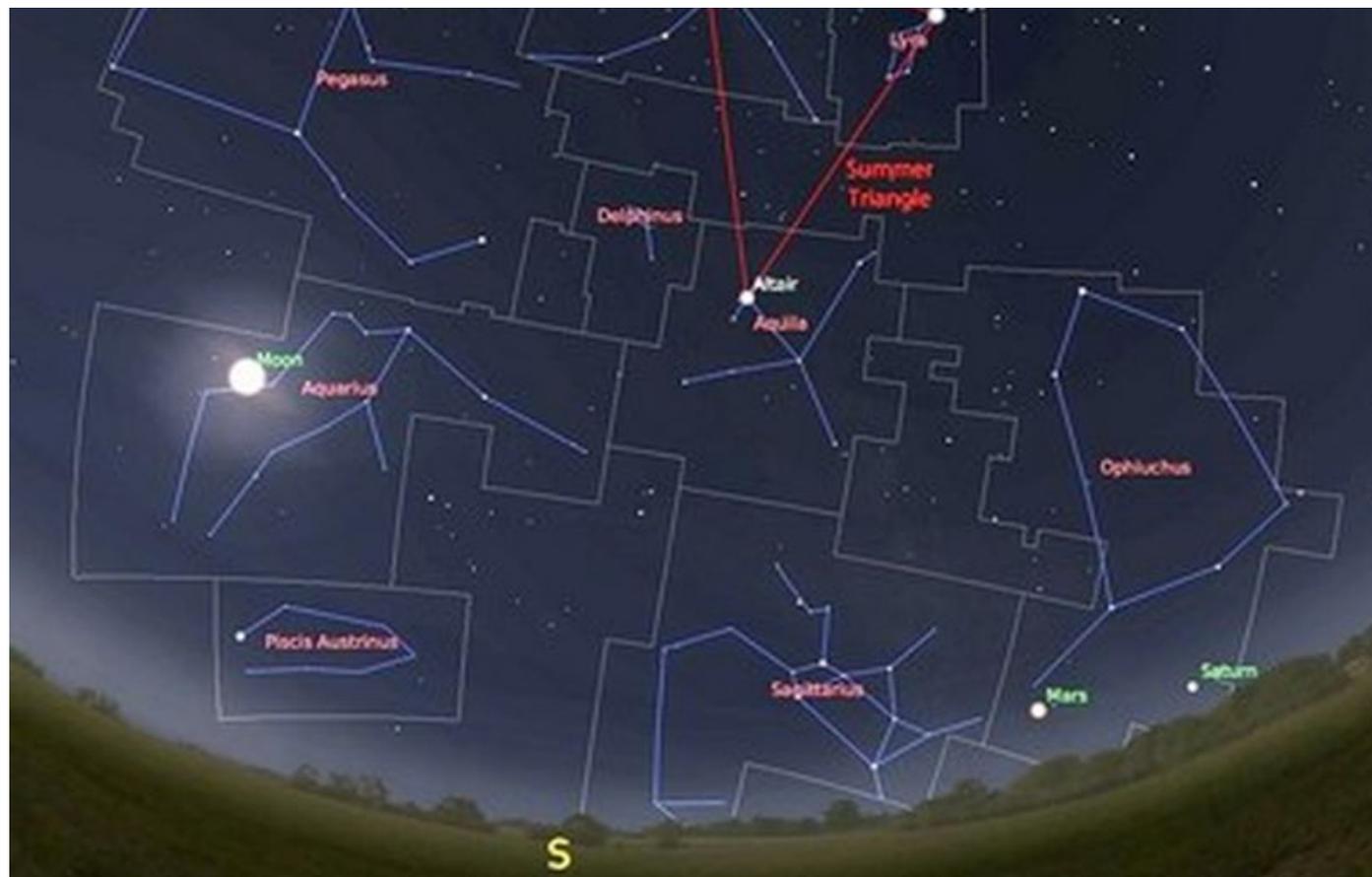
Syracuse, N.Y. — August was an impressive month for local observational astronomers. We were treated to a Jupiter/Venus conjunction, pleasant early-evening alignments of the Moon and several planets, a number of bright International Space Station flyovers, and the always predictable and generally (but not always) impressive Perseid Meteor Shower - all this against the backdrop of our Milky Way Galaxy, which stands tall and at its brightest to our South near midnight during the summer months.

While the night sky is always impressive, September will not see the flurry of planetary activity August brought, there are no impressive meteor showers to stay awake for, and even our pre-midnight ISS flyovers are on hiatus until the very end of the month. With the start of the school year upon us, nature has given young observers a chance to reset their clocks for early mornings, and given many astronomy clubs a chance to refresh their knowledge of the autumn skies before some start up their school year outreach activities.

On the bright side (no pun intended), it's getting darker earlier, meaning the hours of productive observing are on the increase! This makes September a great time for some to head out to a dark patch with a star chart, binoculars, and a red light flashlight. We're going to start introducing some of the more subtle observables with this month's guide in an attempt to coax you out to a dark, wide open space.

Your First Steps Outside





The view looking south at 10 p.m. on Sept. 15 (except for the changing Moon position, this mid-month view is accurate for all of September).

Items and events listed below assume you're outside and observing between 9 p.m. and midnight throughout September anywhere in New York state. The longer you're outside and away from indoor or bright lights, the better your dark adaption will be. If you have to use your smartphone, find a red light app or piece of red acetate, else set your brightness as low as possible.

Jupiter is effectively off our observing list with its pre-sunset setting below the western horizon, and won't be visible again in the pre-midnight skies until early February, when it pops up in our eastern sky. With luck, Jupiter will still stay prominent in our news feeds, as NASA's Juno probe continues to map and measure the Solar System's largest planet.

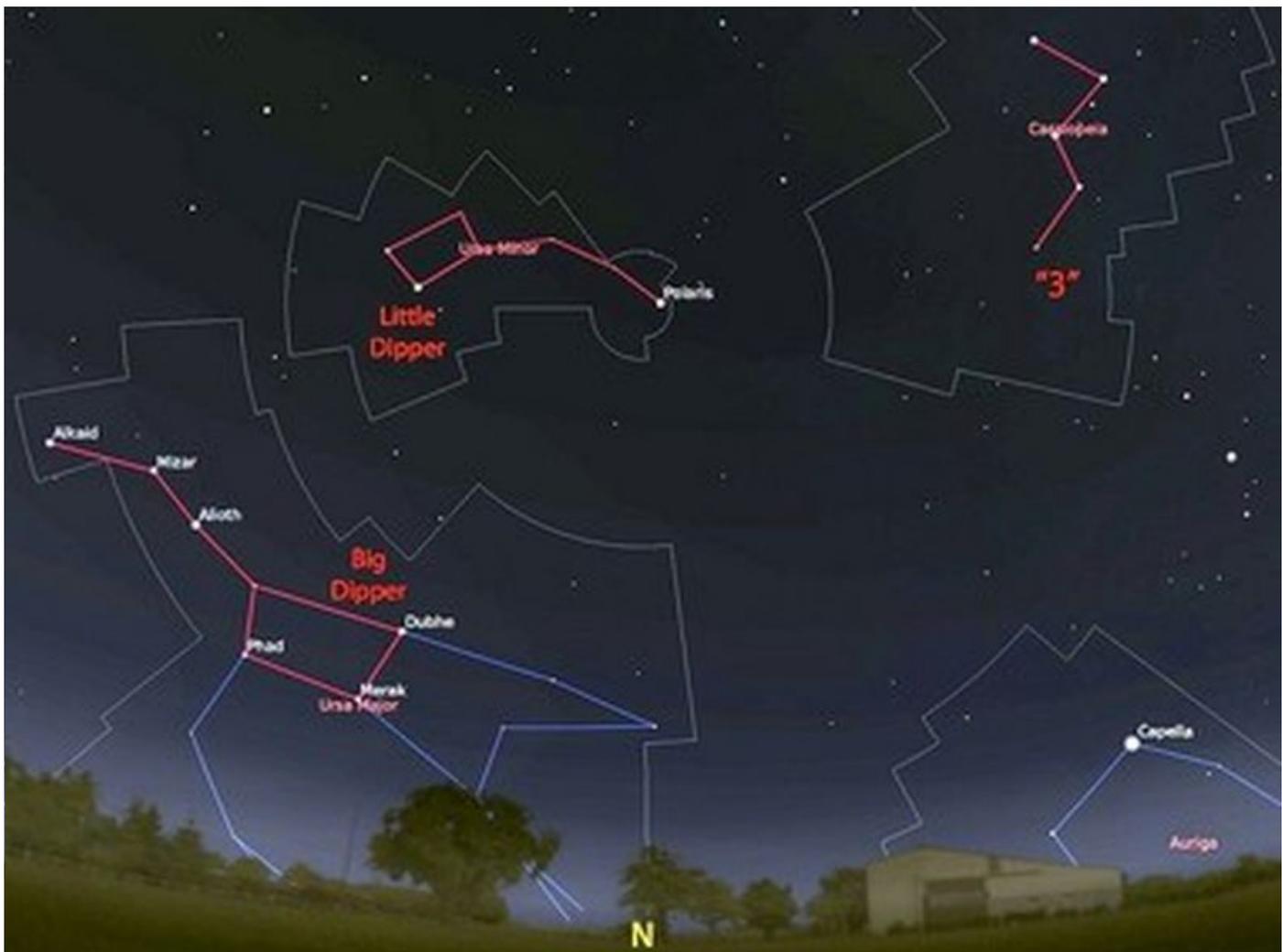
Jupiter's late-August companion Venus is very low on the horizon at sunset for the first part of this month, also becoming a difficult catch without a low tree line. If you see a very bright pinpoint of light low on the southwest-west horizon close to sunset this month, you can assume with high confidence that it's Venus.

Saturn remains prominent, but sets below the horizon by 10 p.m. just after mid-month, making Mars our prime planetary observing target for all of September. Mars will fly through the densest part of the Milky Way this month and still be visible for all

of October.

The Summer Triangle, our highlight in the [August observing article](#), is still prominent in the nighttime sky. As autumn arrives, we get to spend less time straining our necks to look straight up, and can now use a pair of binoculars and scan high and westward to look for interesting objects within and around the triangle. Before we begin to explore the northern sky in more detail in future articles, we're going to spend a little more time in the Summer Triangle itself, as it is a great opportunity to get some introductory and easy-to-find deep sky object observing in with only a decent pair of binoculars.

The Big Dipper



The view looking north at 10 p.m. on September 15, highlighting the two dippers, brightest named stars, and Cassiopeia.

The Big Dipper is low on the northern horizon during September observing hours. Its handle extends out to the West and its bowl rests near-flat and nearly due-north, balanced as if its bowl were filled to the brim with the last small scoop of the original celestial seasonings from the Little Dipper, which itself sits directly above the Big

Dipper during our observing window. If you look high and to the northeast, you may see a prominent and jagged "3" in the sky. This constellation, Cassiopeia, will be a big part of an upcoming article, as we hone our deep sky observing skills to find our largest galactic neighbor.

ISS And Other Bright Flyovers

Satellite flyovers are commonplace, with several bright passes per hour, yet a thrill to new observers of all ages. Few flyovers compare in brightness or interest to the International Space Station. The flyovers of the football-sized craft with its massive solar panel arrays can be predicted to within several seconds and take several minutes to complete. September flyovers for our standard observing window (sunset to midnight) are off the table until month's end. That said, if you're an *early* morning person, there are many flyovers throughout September, with the 10 brightest predictions listed below. Simply go out a few minutes before the start time, orient yourself, and look for what will at first seem like a distant plane.

Predictions courtesy of heavens-above.com

Satellite fly-bys

Date	Brightness	Approx. Start	Start Direction	Approx. End	End Direction
9/6	very	5:26 AM	S/SW	5:31 AM	E/NE
9/8	extremely	5:18 AM	W/SW	5:22 AM	NE
9/9	very	4:27 AM	E	4:30 AM	E/NE
9/10	very	5:10 AM	W/NW	5:14 AM	NE
9/18	very	6:11 AM	NW	6:17 AM	E
9/20	extremely	6:02 AM	W/NW	6:08 AM	E/SE
9/21	very	5:11 AM	N/NW	5:15 AM	E/SE
9/22	very	5:54 AM	W/NW	5:59 AM	S/SE
9/23	extremely	5:04 AM	SE	5:07 AM	SE
9/24	moderately	5:47 AM	SW	5:49 AM	S
9/27	moderately	7:48 PM	S/SE	7:48 PM	SE
9/28	very	8:29 PM	SW	8:31 PM	S
9/29	very	7:37 PM	S/SW	7:41 PM	E
9/29	moderately	9:13 PM	W	9:14 PM	W
9/30	extremely	8:20 PM	W/SW	8:24 PM	NE

The Moon

New:	First Quarter:	Full:	Third Quarter:
Sept. 1	Sept. 9	Sept. 16	Sept. 23

The moon's increasing brightness as full moon approaches washes out fainter stars,

random meteors, and other celestial objects - this is bad for most observing, but excellent for new observers, as only the brightest stars (those that mark the major constellations) and planets remain visible for your easy identification. If you've never tried it, the moon is a wonderful binocular object.

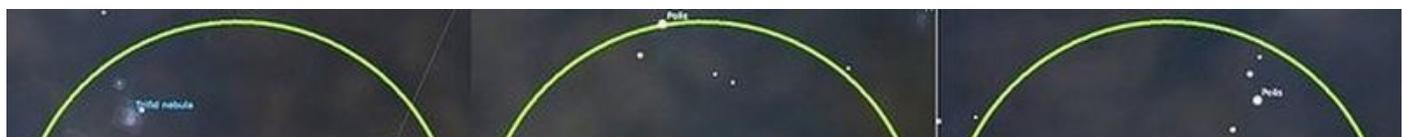
Many astronomy clubs worldwide are now planning their events for the International Observe The Moon Night, which happens on Saturday night, October 8th. If the skies remain clear, the Technology Alliance of Central New York (tacny.org) and CNY Observers (cnyo.org) will be hosting a special lecture and observing session at The MOST in Armory Square, downtown Syracuse.

Viewing the planets

We've one prominent inferior planet (one between us and the Sun) and one superior planet (one beyond Earth's orbit) in the sky this month, and both are bright and to our south in early September. Those with some observing experience or good automated GOTO telescopes may even want to try for the dwarf planet Ceres or the gas giants Neptune and Uranus.

Saturn: Saturn remains at the western border of the constellation Ophiuchus and will slowly make its way east until settling into Sagittarius in 2018. Mars will be drifting away from Saturn this month, with Saturn setting earlier and earlier as the month progresses. Saturn will be below the horizon around 10 p.m. at the end of September, but observers will still have plenty of time to catch it in the early evening sky until the end of October. In good binoculars, Saturn and its rings appear as a small oval. With big binoculars or a small telescope, you should be able to distinguish between the planet and its rings, and maybe even see the dark Cassini Division within the rings.

Mars: Mars remains unmissable this month, glowing bright red-orange in the south-southwest sky. Mars will spend its last night in the constellation Scorpius on September 1st, then will join Saturn within the borders that define the constellation Ophiuchus until the night of September 22nd. The border between Ophiuchus and Sagittarius is a busy one - just two nights later on the 24th, Mars will be equidistant between the galactic center, which lies just on the Sagittarius side, and the Lagoon Nebula, a massive interstellar gas cloud roughly 5,000 light years away. During the final week of September, Mars will move even closer to the Lagoon Nebula while crossing into the galactic thicket - a region of interstellar dust between us and the core that blackens out some of the region around the galactic core.





Use Mars to spot the Lagoon Nebula and Trifid Nebula in late-September. The green circles mark the field of view for 10x50 binoculars.

If you've spent many a cloudy night staring at images from the Hubble Space Telescope but have never seen a deep sky object with your own two eyes, Mars will avail you a golden - well, orange-reddish - opportunity this month to find two. Starting on the night of September 19th, anyone with a pair of 10x50 binoculars will be able to put Mars, the Lagoon Nebula, and the Trifid Nebula into the same field of view. If you've a pair of 7x35's, you can start a day earlier - with a pair of 12x50's, subtract a day from both sides of the range. From September 19th to October 6th, Mars will move close to those two nebula, hitting closest approach just below the Lagoon Nebula on the 28th-29th. If you're a member of any astronomy or astrophotography groups on Facebook, expect some fantastic images of this grouping in early October. The series of images above show you where to place Mars with respect to the other two in your binoculars. For a number of reasons, ranging from the relative brightness of Mars to the sensitivity of our own vision to faint objects under low-light conditions, I will warn in advance that the Lagoon and Trifid Nebulae will not be particularly impressive sights. You will, hopefully, be able to identify two dim, fuzzy splotches (I can almost hear the astronomical hate email being typed) in the correct locations. With luck, seeing these two for the first time will entice you to seek out a local astronomy club during one of their public viewing sessions - the Lagoon Nebula in particular is an absolute jewel to behold in a quality telescope.

Learn A Constellation: Lyra The Harp





Finding Lyra the Harp is easy once you've found the Summer Triangle. In 10x50 binoculars, splitting the double-double into two bright stars should be easy, while finding the faint Ring Nebula may be a challenge for new observers.

When items of astronomical interest are only as large as the very tip of a pen when held at arm's length, even small constellations can hold a wealth of observables. Lyra the Harp is a summertime favorite among amateur astronomers because it contains a number of impressive sights in a small, easy to find package.

The search starts easily - once you've found the Summer Triangle, tipped high and slightly to the west, the brightest star will be the west-most point. This star, Vega, is our marker for Lyra, and is bright enough to be visible very soon after sunset. The rest of the constellation is equally easy to find - Vega is the brightest star in a small and bright triangle, while the triangle star to Vega's south marks the corner of a perfectly placed parallelogram oriented to the south. For the constellation, that's it - but certainly not all.

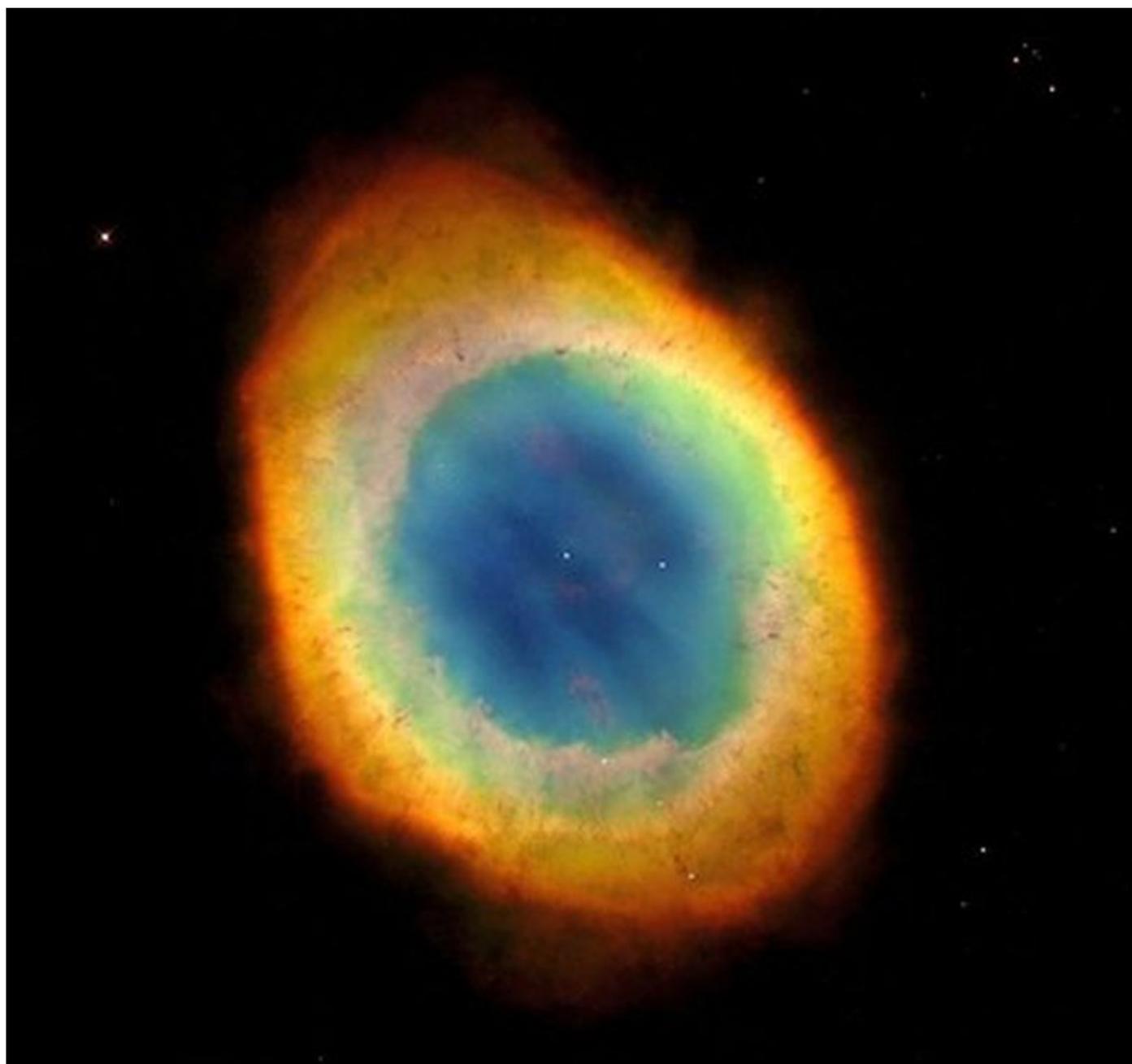
With any decent pair of low-power binoculars or even a small telescope, the second-brightest star of the Vega-triangle will separate into two stars - one of the more famous double stars in the nighttime sky. Under excellent skies, some may even be able to see this single star as a closely-spaced pair without any magnification. With a high power telescope, observers can see that each of these two stars is itself a double star. Observers even refer to this astronomical eye candy as the "Double-Double."

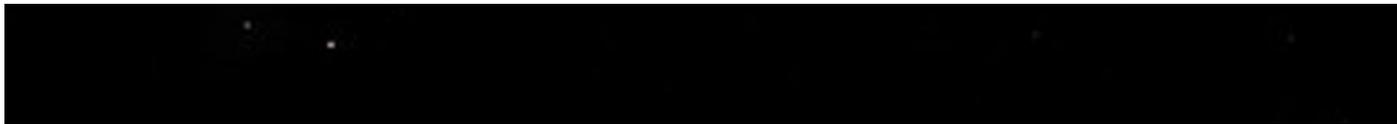
The Double-Double is a busy piece of celestial real estate. The two pairs of stars are gravitationally bound to one another, meaning their positions appear to change (albeit slowly) over time as the two pairs orbit one another. The whole complex of stars is about 160 light years from Earth, just over 6 times the distance between ourselves and bright Vega.

As a test of your vision and your binoculars, I now direct you to the southmost part of the parallelogram. Through binoculars, you may be able to discern a dim, slightly fuzzy star almost exactly between the two corner stars. In a telescope and under dark skies, you may even be able to discern a shape - it should appear as an out-of-focus doughnut.

This otherwise unassuming object is referred to as the Ring Nebula, an object you might also see labeled as Messier 57 (or M57 - we'll cover the meaning of "Messier" in

a future article). The reason for the "ring" shape is one of timing - as the star at the center of the Ring Nebula passed between a Red Giant stage and final White Dwarf stage, a ball of ionized gas was ejected out in all directions. Now imagine the ionized gas as being the rubber of a balloon. As you inflate the balloon - our proxy for the force that ejected the gas around the star - it starts as a mostly spherical ball of rubber you can't see through. As you continue to inflate it, eventually you can begin to see through the middle of the balloon but not the edges - the balloon is being stretched out symmetrically, but there's more rubber to try to look through around the edge. Soon after the ionized gas began to race away from the central star, the "Ring Nebula" would have looked like the "Ball Nebula." Right now, we see a faint ring - and excellent telescopes and clear skies can even reveal the central white dwarf star in the middle. Eventually, the gas will thin away and the nebula will all but disappear to observers on Earth.





The Ring Nebula as observed using the Hubble Space Telescope.

What makes the Ring Nebula a special sight to some observers is that the star that formed the Ring Nebula was similar to our own Sun, giving we observers an opportunity to see what our own Sun and surroundings may look like in 5 billion years, when the Sun is expected to undergo the same dramatic transition into a Red Giant before collapsing into a white dwarf and expelling a shell of gas out in all directions.

Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador.

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