New Braunfels Astronomy Club

Larry's Celestial Calendar & Newsletter by Eric Erickson

290th Edition September 16, to October 21, 2021

Venus Dominates Summer Evenings

Jupiter and Saturn are Beautiful

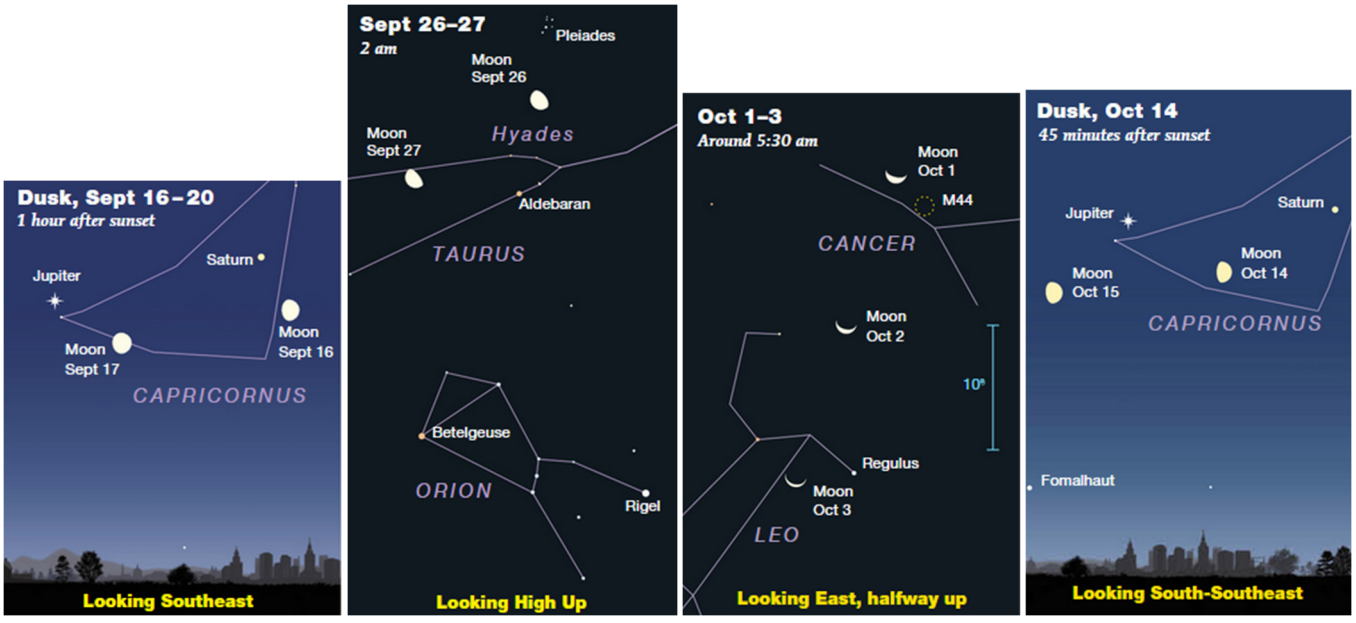
Blue Neptune at Opposition+-

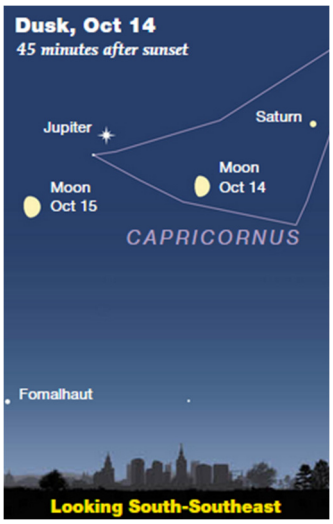
Comets 67P & Faye Photo Opportunities

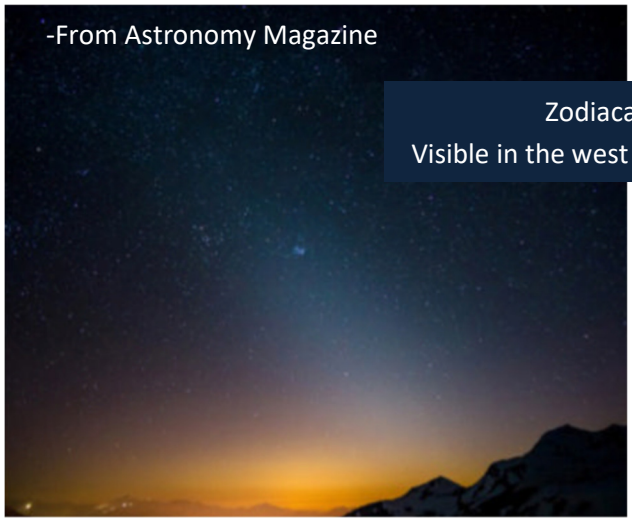
Orionids Peak against the Moon

Highlight Calendar for Clear Skies

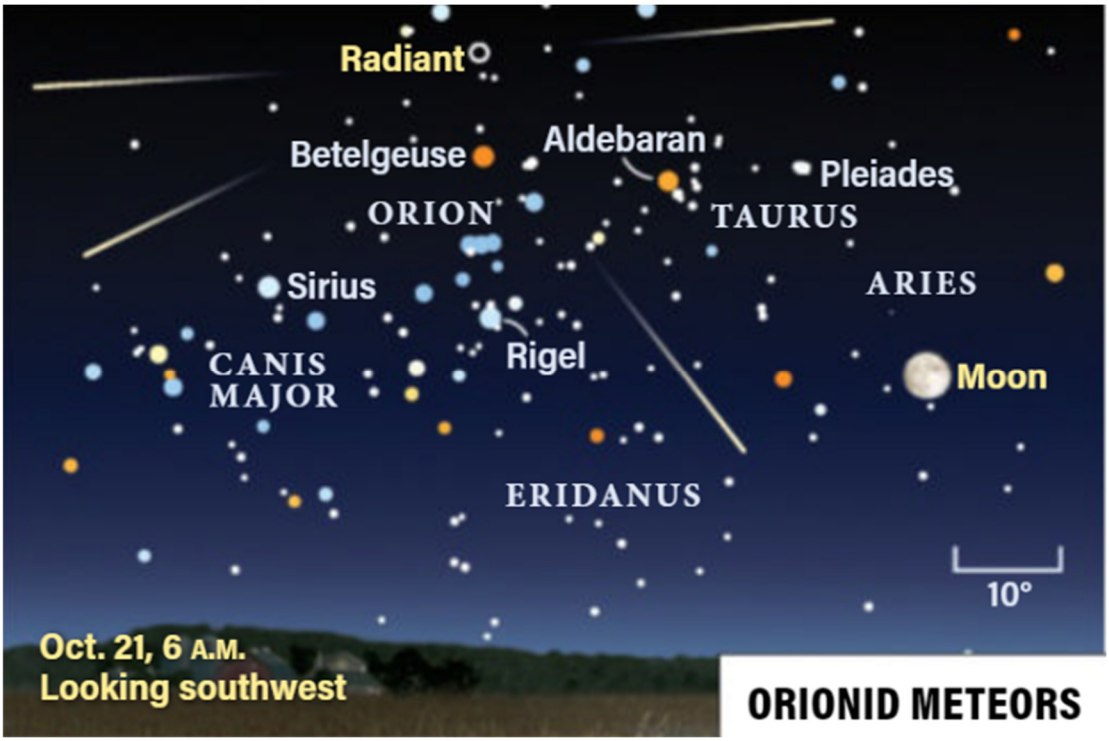
-From Sky and Telescope Magazine







-From Astronomy Magazine

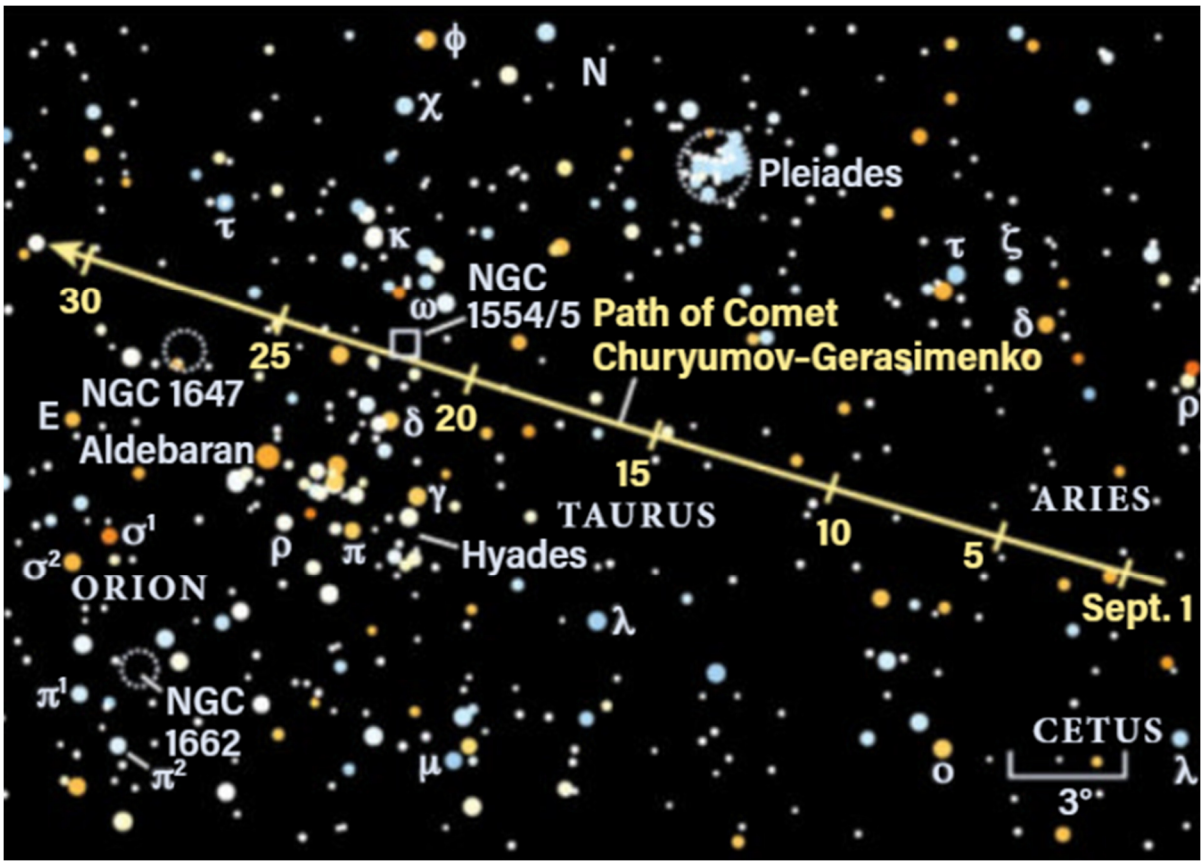


Solar System Observing

- Mercury is low in the western evening sky and dim. It doesn't get better until late October, when it appears in the early morning hours before sunrise.
- Venus dominates the western evening sky after sunset at magnitude -4.2. Watch its phases change in September and October
- Earth still spins, and we are still here to marvel at it all.
- The Moon pairs up with stars and planets as usual and looks great.
- Mars is in the Sun's glare until December.

- Jupiter is past opposition, in retrograde motion, and looking great as it courses through our southern sky.
- Saturn is past opposition, rising about an hour earlier than Jupiter and in retrograde motion. Retrograde stops on October 10th and it resumes its normal easterly motion. Beautiful!
- Uranus rises after sunset and is visible most of the night in southern Aries. At magnitude 5.7 it should be catchable in binoculars. Look for a fairly bright grayish green "star".
- Neptune is past opposition but at its distance opposition lasts a long time. It's magnitude 7.7, visible in binoculars, so catch this bright little blue ball. It's up most of the night and a nice target in eastern Aquarius
- Comet(s)
    - Comet 4P/Faye, another short period (7.5 year) visitor, glows at a paltry 10th magnitude. A 4" scope will just reveal it and larger ones should produce its little tail.
    - Identified in 1969, Comet 67P/Churyumov-Gerasimenko was examined seven years ago by the Rosetta spacecraft and Philae probe. Now it passes close enough to see with 8" and larger telescopes. Look for its telltale duck-shaped form.

-From Astronomy Magazine



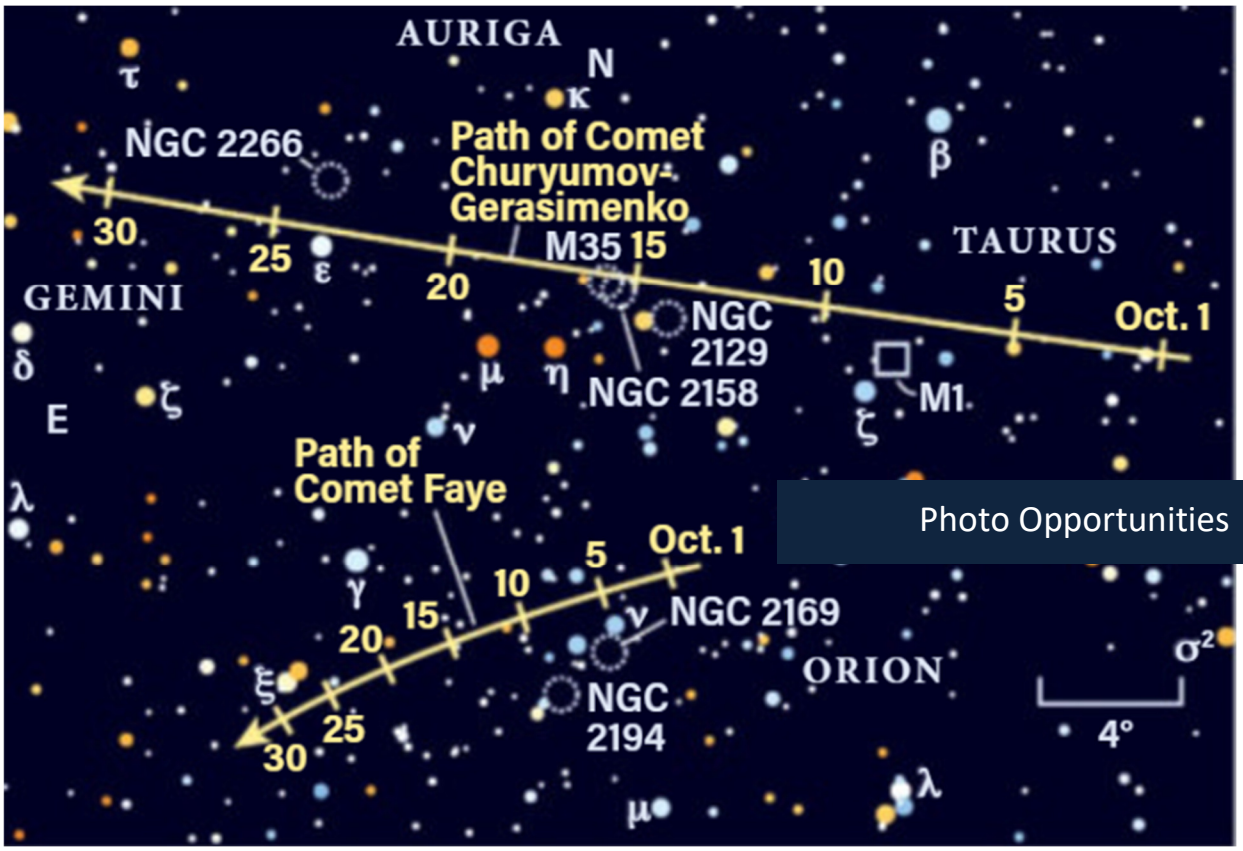


Photo Opportunities

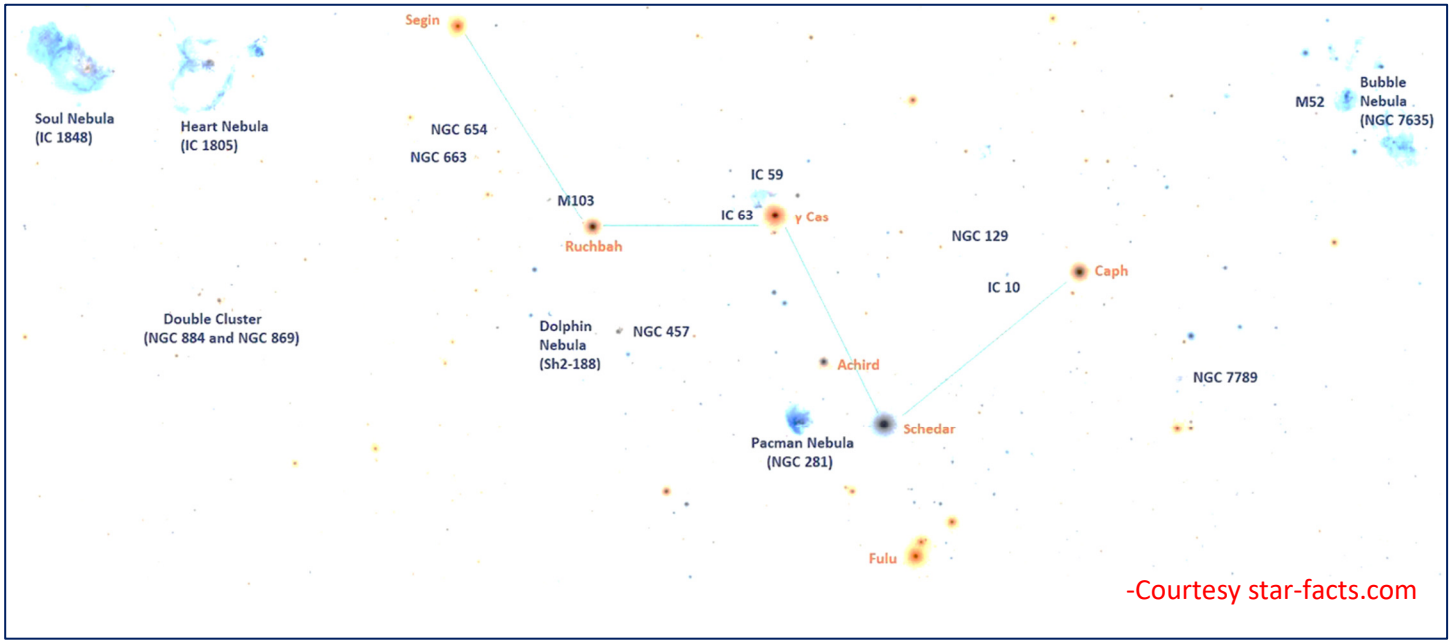
Best ISS viewing for New Braunfels (works for Canyon Lake too).

-From Heavens Above

Date	Start Time	Start Loc	Max Alt °	End Loc	Note
09/16	19:55	SW	68	NE	
09/17	20:47	WSW	17	NNE	Passes through Big Dipper cup
09/18	19:58	WSW	28	NNE	
10/07	20:05	NW	71	SE	Disappears as it enters Earth's shadow
10/09	20:13	WNW	23	SSE	Passes above Venus
10/10	19:27	WNW	43	SSE	
10/18	06:55	S	24	ENE	
10/20	07:03	SW	67	NE	Passes through Auriga, close to M36, 37, 38
10/21	06:20	SSW	64	NE	NOTE: START IS 24° ABOVE THE HORIZON AS ISS EMERGES FROM EARTH'S SHADOW

My Observing Pick: Cassiopeia - Again

You got the story in January so I'll not repeat. The graphic I used did not include many objects so here is a new graphic I found with fine objects. The Double Cluster is a bonus although belonging to Perseus. NGC 7789 is my personal favorite. Also known as Caroline's Rose, it was discovered by Caroline Herschel in 1873. With the Celestron 11" it has a rose petal appearance.



Imagining Imaging: Platform for club imagers…images and imagers needed!

Is Gravity a Force?

I better say yes or risk the wrath of standard model physicists.

According to the standard model gravity is one of the four fundamental forces – *Strong*, *Electromagnetic*, *Weak*, and *Gravity*. It's in there with the other forces but something's amiss. The other forces have a particle associated with them, but gravity seems an anomaly. It either doesn't have a particle or we haven't found it yet. The strong force has its *gluons*, electromagnetism has *photons*, the weak force has W^+, W^-, and Z_0. Gravity…bupkis. So, why is it a force?

Because it appears to affect things via, well, gravitational attraction. Anything with mass has gravity and is attracted to anything else with mass. When you went on a date and your hand and your date's hand got closer and closer was it gravity? No, that's chemistry.

Gravity was a subject of great discussion among philosophers all the way from the time of Aristotle. Galileo Galilei recognized the relationship of distance travelled and time of a falling object. It took the combined genius of Robert Hooke, Isaac Newton, and Edmond Halley to work out the relationship between gravity and distance. They discovered gravity is an inverse-square force. At twice the distance gravity is one forth as strong. Not bad for the late 17th century.

Except for the finding that Mercury has a weird orbital discrepancy not predicted by Newton's theory, it worked exceptionally well, and is still used for most applications today.

Then came Einstein. He figured out Mercury's orbital issue, a 43 arcsecond per century advance in its perihelion.

In the early 20th century Albert Einstein turned the astronomy and physics world upside down. His general relativity theory described gravity as the phenomenon of space-time curvature around a mass. So much for gravity as a force. Well, that just muddied the waters for physics and astronomy, but that's a good thing. Competition forces the competitors to work harder, think smarter, and work on their respective theories. OK, Newton is gone, but gravity as a force is supported by a whole slew of scientists. Problem is, if gravity is a force, where's its particle? And what about space-time curvature, how does mass cause space-time curvature? Einstein called quantum entanglement "spooky action at a distance". I think space-time curvature is a little spooky too.

So, which is right, gravity as a force or gravity as a curvature of space-time? The force advocates predict a particle will be found, and they call it the *graviton*. There is hope that upgrades to the Large Hadron Collider (LHC) will "force" that little bugger out of hiding.

Even more intriguing, a fifth force might be at play, with its own, yet to be revealed particle. Go LHC, fun!

-Eric Erickson