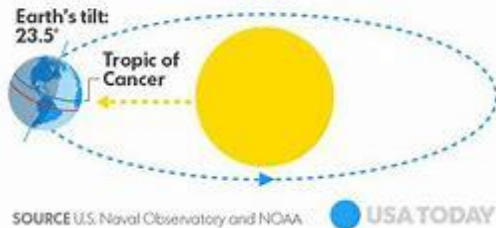


### Travels in Space and Time...

June, brings us short, muggy nights; as well as the "Summer Solstice" (Thursday, June 21 at 6:07 AM EDT).

#### SUMMER SOLSTICE

The Earth's axis of rotation is 23.5 degrees. During the Northern Hemisphere summer, the top half of the Earth is tilted toward the sun.

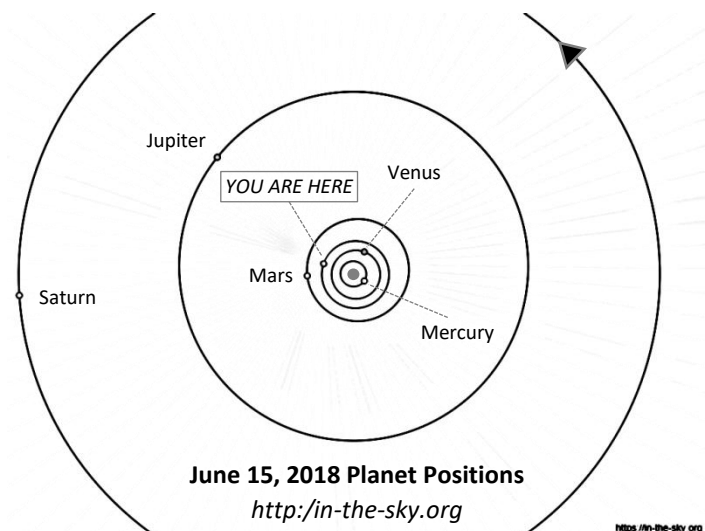


This month, we will take one last journey into deep space (in the direction of Virgo) before we spend the rest of the summer exploring our own galaxy.

Solar system. The month opens with a waning moon, rising after midnight. The new moon is June 13 and the next full moon is June 27. If it doesn't rain, this should be a good month for some deep sky surfing.

**Venus** shines high and bright in the west at sunset. Look through a telescope and you will see that Venus is only about 70% visible. Like the moon, Venus has phases; it is currently waning as it approaches us in its orbit around the sun. These phases of Venus made Galileo conclude that Venus orbits the sun, not the earth. **Mercury** is not visible in June.

**Mars** rises after midnight, getting brighter and "larger" in preparation for its opposition in July.



The gas giants shine high in the southern sky all month long. **Jupiter** appears directly south after sunset in the constellation Libra near  $\alpha$ -Librae (Zubenelganubi). **Saturn** rises in the east just after sunset and will be at opposition on June 27 (when it will also be in conjunction with the moon).

Milky Way. In June, you can witness a dramatic "galaxy rise," as center of our home galaxy the Milky Way rises in the east after sunset. For best results, go somewhere really dark!

Rising in the east, the constellation Hercules offers up two awe-inspiring globular clusters: **M13** is located on the western side of his torso (between  $\eta$ - and  $\zeta$ -Herculis) and **M92** is located at his "head."

Back in the southern sky, globular cluster **M5** is well placed for viewing above Jupiter (Virgo is "standing" on M5). And since Jupiter is showing the way, this might be a good year to try your hand at finding **NGC 5897**. It is a faint globular cluster located at the "right angle" of a triangle formed with  $\alpha$  and  $\sigma$  Librae.

Deep Space: Now let's jump to hyperspace. If you don't have a Millennium Falcon available ("Solo" is a great movie BTW), find someone with an 8-10 inch aperture telescope (preferably bigger). You're gonna need it. Find Spica in Virgo ("Follow the arc to Arcturus, then on to Spica go..."), then follow her "back side" northwesterly until you reach  $\gamma$ - and  $\eta$ -Virginis. Focus your gaze about 2 degrees above these stars (there are maps available online or just ask me). This is the location of "**3c 273.**" It appears to be a small, barely visible (vm 12.9) "star," even in large telescopes. However, it packs quite a punch. Objects like this were known since the 1930s when they were discovered to emit extraordinarily powerful radio waves. Hence, they were named "quasi-stellar radio sources" or "quasars" for short.

Quasars are actually supermassive black holes (millions of solar masses) that emit radiation as they swallow surrounding stars and whole galaxies. 3c 273 is the "brightest" and closest quasar to earth... a mere 2.4 billion light years away! This means, that if you can see it (or imagine it), you are seeing light from 14,000,000,000,000,000,000 miles away and over 2 billion years ago! (Mind blowing!!)

- Jim

### CAAA UP-dates

The June meeting features Tom Wehrman discussing “carbon stars.” Thanks Tom! You’ll have us seeing red all summer.... Get it...? Carbon stars are red...? Okay never mind.

Anyway, there are a lot of outreach opportunities this summer!

On Tuesday, June 19, from 11am – 2pm, RAM and Stan will be conducting a solar viewing outreach for young campers at The Arts Center (*founded in 2006 by our own Deborah Feiste*) on Butler Street in Clemson. RAM would like anyone with solar scopes to come out for a day of teaching and fun!

Also on Tuesday June 19, from 8-10pm, the CAAA will be providing an outreach at Devil’s Fork State Park at Lake Jocassee in support of the SCSM program that provides astronomy outreach for elementary teachers.



On Tuesday June 29 from 11am – 2pm, RAM and Stan will be providing another solar viewing at The Arts Center.

Stay tuned to the website and your email for upcoming star parties, etc.

### Monthly Observation Challenges

*Unaided Eye*


- Mars – Saturn – Jupiter “parade”
- Saturn opposition / Moon Conjunction
- Finding Virgo: “Follow the arc to Arcturus, then on to Spica go.”
- The Spring Triangle: “Regular Spices And Arsenic”

*Binoculars / Small Telescopes*



- Venus at sunset – waning phase
- M13 and M92
- M5
- NGC 5897
- Quasar 3C 273

*Notes and Sketches*


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