

THE YOUNG ASTONOMERS NEWSTLETTER

NEW HORIZONS AND JUNO UPDATE

New Horizons is now nearly 300 million miles beyond Pluto. NASA has extended the N.H. mission through 2021. Approximately three-quarters of its 50-plus gigabits of Pluto data have been transmitted. The next Kuiper Belt object proposed for a flyby is 2014 MU69, which should take place on January 1, 2019 (jhuapl.edu news center).

JUNO is currently in the middle of its 53.5 day capture orbit. Low resolution photos have been taken, but the first high resolution images will not be taken until August 27, (<https://www.missionjuno.swri.edu/news/juno>)

LUNAR RECONNAISSANCE ORBITER STILL PROVIDING VALUABLE INFORMATION

Since its launch in June 2009, the Lunar Reconnaissance Orbiter (LRO) has been a valuable asset in helping us learn unique information about our neighbor satellite. When originally launched, the spacecraft was to help explore possible landing sites for future astronaut expeditions and to look for water. After completing its one-year assignment, the mission was extended several times, and the result has been the discovery of water deposits in shadow zones of craters as well as strong indications that water may be present within the moon's subsurface soil.

One of the on-board instruments is a laser altimeter that maps the Moon's surface in fine detail. It has been possible to detect the presence of new craters superimposed on old ones, which allows for establishing a lunar geological timeline. A flash of light detected by Earth-based telescopes was correlated by LRO

to a new impact crater created by a small space rock.

LRO has also witnessed crashes by three other spacecraft. (Sci. News, June 11, 2016).

BLACK HOLES MUST OBEY THE LAWS OF PHYSICS

The formation of black holes should not be considered to be an unusual or unexpected process. Rather, black hole formation is a natural outcome of the gravitational dynamics of free cosmic bodies. The laws that govern the formation of stars, star clusters and galaxies also operates in the formation of black holes. Very simply, self-gravitating systems tend toward the tightest gravitationally bound state that they can achieve. Gravity wins. More dense matter concentrates toward the center of the object and increases in kinetic energy and heat. The core becomes even more dense and hot, and if more matter is available in the surrounding space, gravity pulls it all together more and more tightly. Nuclei become hot enough to cause nuclear fusion. Beyond fusion, gravity causes the compression of subatomic particles. The ultimate outcome is a black hole.

If there is not enough surrounding matter, the body may end up as a planet. More matter can lead to a white dwarf or neutron star. But sufficient matter can lead to the final destination: a black hole.

This is the description of gravitational dynamics described by John Kormendy in the August issue of Astronomy magazine. Kormendy should know what he's talking about. He was one of the early leaders (Univ. Texas, 1980's) in demonstrating the existence of supermassive black holes in the centers of

galaxies. Basically, we still have Newton and Kepler laws working for us.

SO WHAT IS KIC 8462852?

Serious astronomers and many public figures are all atwitter about the revelation in the fall of 2015 of a star that varies in its light emission at irregular intervals and by huge swings in energy output. The erratic output was pointed out by Yale astronomer, Tabettha Boyajian, and the star is now nicknamed “Tabby’s star”. The star, technically labeled KIC 8462852, was registered by the Kepler space probe in 2015, although it has been studied for several years (it is 1480 light years from Earth). Now, it has become a celebrity, being discussed on talk shows (e.g. Stephen Colbert with Neil DeGrasse Tyson). The issue is: what is causing this unnatural radiation behavior? Planets, comets and asteroids orbiting the star have been ruled out. Some believe that it might be a star that has been enveloped by some sort of shield that was constructed by intelligent beings. The idea of an alien megastructure around this star was proposed by Penn State astronomer, Jason Wright. If this is the case, CCNY professor Michio Kaku says that this could be the greatest discovery in 500 years (since Columbus’ discovery of the New World). It would be the first evidence of an extraterrestrial civilization. Sci-Fi clubs have formed to raise money to support research on Tabby’s Star. (EarthSky, May, 2016; AmeriSpace, 2016; Wikipedia).

Research topic: What is a Dyson Sphere? (Can super intelligent civilizations cover a star in order to capture its energy?)

August birthday: Roger Penrose: (b. Aug. 8, 1931). Penrose is a British astronomer-mathematician who made many contributions to our understanding of the geometry of space-time and behavior of black holes.

A MOON FOR MAKEMAKE

Until recently, three of the five dwarf planets were known to have at least one moon. In April of 2015, thanks to the Hubble space telescope, we have identified a satellite around Makemake. So, now only Ceres is a loner. (Sky & Tel., August, 2016).

CELESTIAL INFORMATION FOR AUGUST 2016

Moon phases: First Qtr.: Aug. 10; New Moon: Aug. 2; Full Moon: Aug. 18; Last Qtr.: Aug. 25.
Planet locations: Jupiter (below Leo) is moving well into the glow of the setting Sun. Toward the end of the month, Jupiter will join Venus and Mercury, so that by the 28th of the month, the three planets are within a 5 degree circle of each other and about 23 degrees east of the Sun.

Mars and Saturn are still following Scorpius in the south. The two planets plus Antares can be easily located, especially when you see two red bodies (Mars and Antares).

Perseid meteor shower: This, usually reliable meteor shower will peak on the night of August 11 – 12. As usual, it is better to look for the meteors in the wee hours of the night. This is especially true this year, since the waxing moon won’t set until 1 a.m. Late night is generally best for viewing meteors, since the Earth has turned into the east and “nosed” into the comet debris that creates the meteors.

The Perseids are the debris left behind by the comet 109P/Swift-Tuttle. There is some belief that Jupiter has had a gravitational influence on the cometary remains. This has stirred up the stuff so that some years have high sighting frequency, some low. (Sky & Tel. August, 2016).

Forsyth Astronomical Society website:

<http://www.fas37.org>

SciWorks phone: 336-767-6730 ext. 1000

Have a great summer. Bob Patsiga, editor