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YOUNG ASTRONOMERS NEWSLETTER

MAPPING THE MILKY WAY

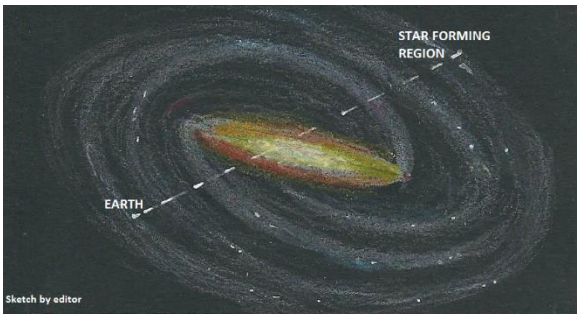
Using the Very Long Baseline Array (VLBA) an international team of astronomers has accurately measured the distance to a star-forming region located on the far side of the Milky Way galaxy. This region labeled G007.47 + 00.05 is just over 65,500 light years away. This beats the previous record of about 36,000 LY.

This accomplishment is a step toward the goal of VLBA astronomers to create a complete 3D picture of the Milky Way.

The VLBA is a coordinated system of ten (expandable to other international telescopes) identical radio telescope dishes situated in widely spaced locations on the Earth (Caribbean, New Mexico, Hawaii, California, Arizona, Washington state, etc.). Each radio telescope feeds its data to the central control facility located in Socorro, New Mexico.

Radio telescopes are able to peer through interstellar dust that is impenetrable to visible light telescopes.

It is estimated that it will take close to ten years to complete the mapping of our galaxy. The Milky Way is in the form of a flat disk and is about 100,000 light years in diameter. [Astronomy, Feb. 2018].



PERSPECTIVE OF TRANS GALAXY STUDY

NEW HORIZONS: ONE YEAR UNTIL MU69

In eleven months, the New Horizons spacecraft will buzz by the most primitive and most distant object ever explored by man. This is the Kuiper Belt object 2014 MU69 which orbits a billion miles beyond Pluto.

The Kuiper Belt is a region that surrounds the solar system beyond the planet Neptune. Its closest noteworthy body is the dwarf planet Pluto, which was studied by New Horizons in 2015. The Kuiper Belt consists of numerous small, icy particles as well as larger bodies and dwarf planets.

After its brilliant success at studying Pluto and its moons, New Horizons was given an extended mission to have a look at other Kuiper Belt objects. The next target, MU69 is a billion miles beyond Pluto.

Currently, we don't have a clear picture of MU69. Preliminary distant views by New Horizons instruments and the Hubble space telescope indicate that it might actually be two bodies and possibly accompanied by a moon.

So, we look forward to New Year's Day, 2019 when New Horizons makes a pass by MU69. The approach will be even closer than the flyby of Pluto.

New Horizons is currently in its hibernation mode. It will be awakened in June, and after checkup of spacecraft systems, MU69 approach operations will commence in August. [http://pluto.jhuapl.edu]

NEW TECHNIQUES TO USE FOR FINDING EXTRASOLAR PLANETS

Astronomers use a variety of techniques for finding extrasolar planets. Starlight dimming and wobble are commonly used. Direct imaging

by telescope is very difficult due to the glare of the central star. Now special devices and techniques are being developed which allows astronomers to minimize this star glare.

An instrument known as a coronagraph, is now being used to block out star light. But this becomes more difficult when two or more stars are gravitationally bound with included planets. Researchers at the NASA Ames Research Center in California are combining the coronagraph with an instrument called *the multi-star wavefront control.* This involves deformable mirrors which can correct for imperfections within the optical components of the telescope.

Dr. Ruslan Belikov of the Ames Center is hoping that this device will help find planets in the Alpha Centauri system, the closest star system to Earth (about 4 light years away). The aim is to be able to identify gases in the atmospheres of planets by looking at their spectra. Then, we could speculate whether life could exist there.

The coronagraph-deformable mirror dual device could be used on ground-based and space-based telescopes. [space.com-alpha-centauri-planet-spotting].

'OUMUAMUA, AN INTERLOPER FROM INTERSTELLAR SPACE

Your editor checked the pronunciation and the closest we can describe is: Oh – mooah-mooah. In Hawaiian it means "scout" or "reach out". This is an object that was discovered on October 19 by Robert Weryk while using the Pan-STAARS-1 telescope atop Haleakala on Maui. Trajectory analysis tells us that 'O had already zipped by the Sun on September 9 and was headed out of the solar system in the direction of Pegasus.

At first, 'O was labeled as being a comet. But it has no tail. Next, it was claimed to be an asteroid. The International Astronomical Union has now labeled 'O as an interstellar object and given it the new class label "I".

Joseph Masiero of Jet Propulsion Laboratory, using the Hale telescope at Palomar, examined the spectrum and other characteristics of 'O. It has an extremely elongated shape, kind of like a cigar. Its spectrum indicates a red and rocky, weathered surface, with high metal content. It has a high spinning rate: about one revolution every 7 hours.

Its incoming velocity was around 26 km/s (58,000 mph), which puts it at moving close to galactic velocities.

The Hubble telescope has been looking at 'O until the end of 2017. So, we expect to glean more information from these studies.

'Oumuamua is not likely to ever return to our solar system. We can wish it *au revoir* and *bon voyage.* Stay out of trouble. [Sky & Tel., Feb. 2018 and Wikipedia].

ON MARS: GO DIG THE WATER

As far back as the 1970's, various landers and orbiters of Mars gave hints that there could be deposits of water on the red planet. This could be subsurface deposits of liquid water or ice. Radar and spectroscopic studies picked up strong signals for H_2O. The Mars Reconnaissance Orbiter (MRO) used ground-penetrating radar and its spectrometer to strongly indicate that water was present.

Back in 2008, the Phoenix lander located in the polar region of the Red Planet, actually dug down a few centimeters and exposed deposits of ice.

The MRO has examined the exposed surfaces of eight eroding slopes that show layers of ice. These exposed deposits are located in the temperate regions of the planet, which is very good news, since the climate there would be more hospitable for human occupation. It is estimated that ice may exist under about a third of the Martian surface.
[Astrobob.com.areavoices.com; Space.com}.

BIRTHDAYS IN FEBRUARY: Galileo Galilea, (Ital.) b. Feb. 15, 1564, d. Jan. 8, 1642. First to use a telescope to study heavenly bodies. Discovered moons around Jupiter and rings of Saturn. Proposed heliocentric Solar System.

Nicolaus Copernicus (Polish), b. Feb. 19, 1473, d. May 24, 1543. Proposed heliocentric Solar System.

Fritz Zwicky (Swiss-Amer.), b. Feb. 14, 1898, d. Feb. 8, 1974. Coined the term "supernova". First to suggest existence of neutron stars. Proposed gravity lensing by galaxies. Proposed "unseen matter".

Ralph Asher Alpher (Amer.) b. Feb. 3, 1921; d. Aug. 12, 2007. Cosmologist. Carried out early studies on Big Bang model, and nucleosynthesis.

MOON PHASES IN FEBRUARY: Last Qtr.: Wed. the 7th; New: Thurs. the 15th; First Qtr.: Fri. the 23rd. There is no full Moon in February of this year.

THE PLANETS DURING FEBRUARY: Near the end of the month and right after sunset, **Mercury** and **Venus** begin to show themselves in the southwest. They both climb higher, and close together into March. Look in the early morning eastern sky as **Jupiter, Mars** and **Saturn** line up along the ecliptic in the 4 to 6 a.m. time period. They are joined by the waning Moon from the 7th to the 11th. **Jupiter** is the first to rise above the horizon before 2 a.m. with a magnitude of -2.0 to -2.2 . **Mars** rises about an hour after Jupiter. The gap between Mars and the Earth closes during the month and we see a slight boost in magnitude from 1.2 on the 1st to 1.0 on the 15th. **Saturn** rises about an hour before sunrise with a magnitude of 0.6 .

WORD SEARCH: TWENTIETH CENTURY ASTRONOMERS

K H A L T G O S A G A N
U R Z E H A L E D H I A
I U W M A M E F S U M V
P L I A W O O R T B W B
E M C I K W C F G B O E
R A K T I K B N P L U T
B G Y R N H O Y L E T H
A T K E G M T B A A D E
O J A N S K Y L V Y Z S
K U R G H S H A P L E Y
W T O M B A U G H S F H
B U R N E L L I N J Y D

BAADE
Bell-**BURNELL**
BETHE
GAMOW
HALE
HAWKING
HOYLE
HUBBLE
JANSKY
KUIPER
LEMAITRE
OORT
SAGAN
SHAPLEY
TOMBAUGH
ZWICKY

FROM THE INTERNATIONAL SPACE STATION:

- Stars do not twinkle. Above Earth's atmosphere, the starlight is not scattered.
- ISS astronauts see the same constellations that we do from the Earth's surface.
- Toilets on the ISS are run by vacuum (let's not give too much detail here).
- The crew of the ISS is six people, but more can be accommodated in a "pinch".

Happy Valentine's Day! Forsyth Astronomical Society website: http://www.fas37.org
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