"We're made of star-stuff. We are a way for the cosmos to know itself." Carl Sagan

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Astro

Volume 12, Issue 12

August 18, 2019

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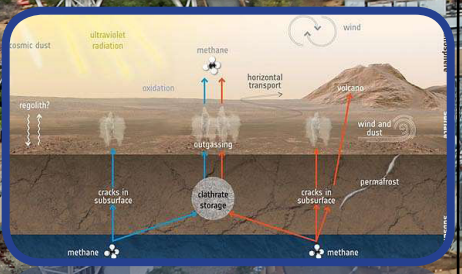


Methane Not Released by Wind on Mars

Wind erosion has been ruled out as the primary cause of methane gas release on Mars, Newcastle University academics have shown.

Methane can be produced over time through both geological and biological routes and since its first detection in the Martian atmosphere in 2003, there has been intense speculation about the source of the gas and the possibility that it could signal life on the planet.

Previous studies have suggested the methane may not be evenly distributed in the atmosphere around Mars, but instead appear in localised and very temporary pockets on the planet's surface. And the previous discovery of methane 'spikes' in the Martian atmosphere has further fuelled the debate.

MarsDaily.com

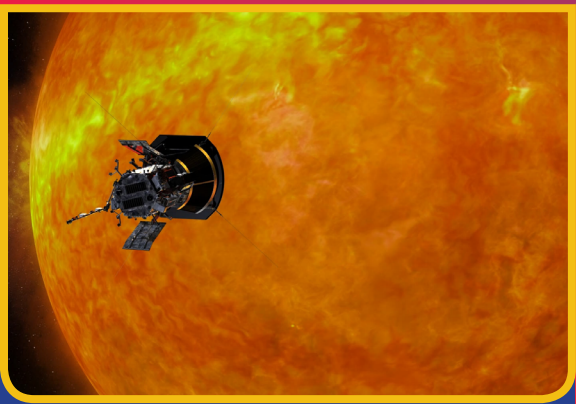
India's Chandrayaan-2 Spacecraft Leaves Earth Behind for Trip to the Moon

India's Chandrayaan-2 mission has marked another milestone in its journey to the moon, leaving Earth's orbit and heading toward lunar orbit with an engine burn.

The burn, called a translunar injection, occurred on Aug. 13 (2:21 a.m. local time Aug. 14 at mission control in India) and lasted for 1,203 seconds, according to a statement from the Indian Space Research Organisation, which oversees the mission.

The spacecraft is due to enter lunar orbit in less than a week. The mission includes an orbiter as well as a lander and rover that will touch down in early September. The orbiter should continue working for about a year; the lander and rover will spend one lunar day (about two weeks here on Earth) studying the surface before succumbing to the frigid lunar night.

Space.com



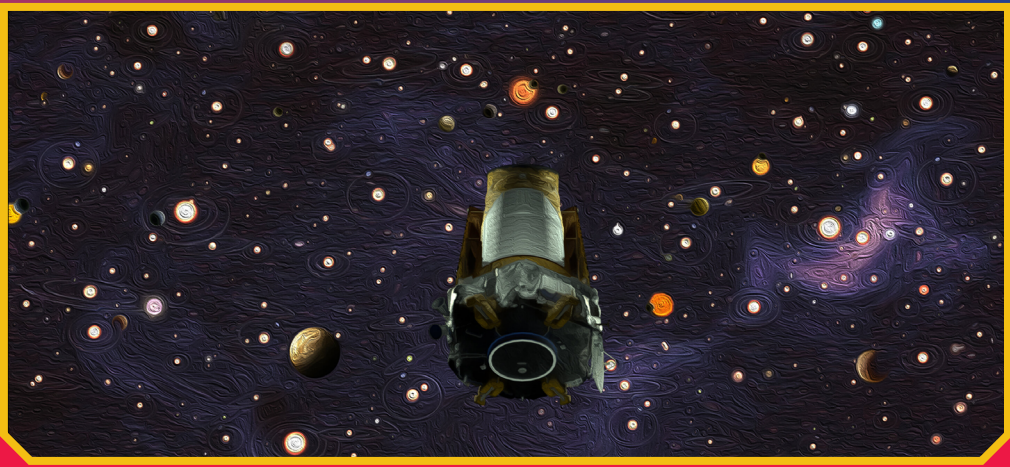
One Year, 2 Trips Around Sun for NASA's Parker Solar Probe

Since NASA's Parker Solar Probe launched on Aug. 12, 2018, Earth has made a single trip around the Sun — while the daring solar explorer is well into its third orbit around our star. With two close passes by the Sun already under its belt, Parker Solar Probe is speeding toward another close solar approach on Sept. 1, 2019.

Parker Solar Probe is named for Eugene Parker, the physicist who first theorized the solar wind — the constant outflow of particles and magnetic fields from the Sun — in 1958. Parker Solar Probe is the first NASA mission to be named for a living person.

In the year since launch, Parker Solar Probe has collected a host of scientific data from two close passes by the Sun. The spacecraft carries four suites of scientific instruments to gather data on the particles, solar wind plasma, electric and magnetic fields, solar radio emission, and structures in the Sun's hot outer atmosphere, the corona. This information will help scientists unravel the physics driving the extreme temperatures in the corona — which is counterintuitively hotter than the solar surface below — and the mechanisms that drive particles and plasma out into the solar system.

Technology.org

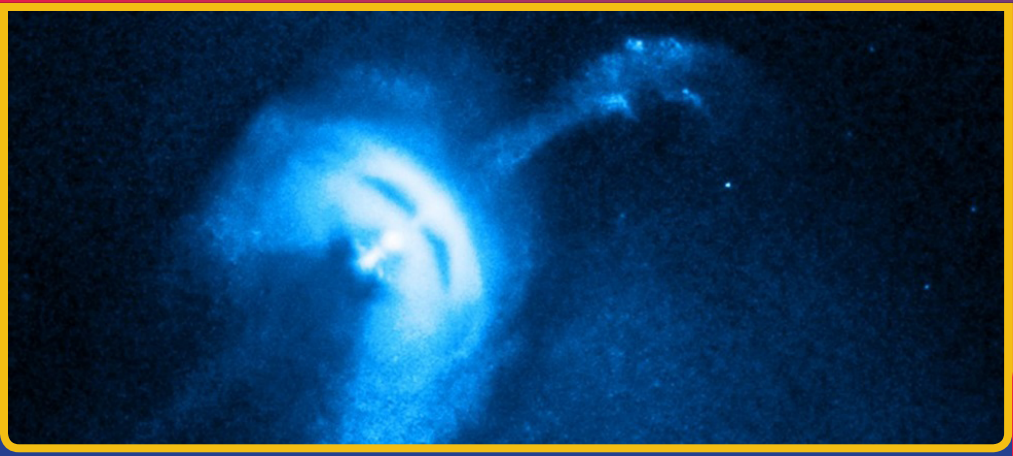


How Many Earth-Like Planets are around Sun-Like Stars?

A new study provides the most accurate estimate of the frequency that planets that are similar to Earth in size and in distance from their host star occur around stars similar to our Sun. Knowing the rate that these potentially habitable planets occur will be important for designing future astronomical missions to characterize nearby rocky planets around sun-like stars that could support life. A paper describing the model appears August 14, 2019 in The Astronomical Journal. Thousands of planets have been discovered by NASA's Kepler space telescope. Kepler, which was launched in 2009 and retired by NASA in 2018 when it exhausted its fuel supply, observed hundreds of thousands of stars and identified planets outside of our solar system—exoplanets—by documenting transit events. Transits events occur when a planet's orbit passes between its star and the telescope, blocking some of the star's light so that it appears to dim. By measuring the amount of dimming and the duration between transits and using information about the star's properties astronomers characterize the size of the planet and the distance between the planet and its host star.

"Kepler discovered planets with a wide variety of sizes, compositions and orbits," said Eric B. Ford, professor of astronomy and astrophysics at Penn State and one of the leaders of the research team. "We want to use those discoveries to improve our understanding of planet formation and to plan future missions to search for planets that might be habitable. However, simply counting exoplanets of a given size or orbital distance is misleading, since it's much harder to find small planets far from their star than to find large planets close to their star." The results of this study are particularly relevant for planning future space missions to characterize potentially Earth-like planets. While the Kepler mission discovered thousands of small planets, most are so far away that it is difficult for astronomers to learn details about their composition and atmospheres.

Phys.org



Astronomers Catch a Pulsar 'Glitching,' Offering Insights into the Strange Stars

When a massive star dies, it leaves behind a dense core called a neutron star. Many of these exotic suns spin rapidly, sending out beams of radiation like lighthouses, and these are called pulsars. They can rotate thousands of times a second, and spin so steadily that they can be used as cosmological clocks – except sometimes, when they glitch.

Some five percent of pulsars are known to glitch, when they spin faster for only a few seconds. It's a puzzling hiccup in their otherwise precise spin rates. One example is the Vela pulsar, which sits roughly 1,000 light-years away from Earth and glitches as much as once every three years. It lurks inside the cloud of gas and dust left over from when its star went supernova more than 10,000 years ago.

In 2016, the Vela pulsar glitched again, and astronomers caught the event with the Mount Pleasant Radio Observatory in Tasmania, Australia. Some of the details of the event helped to back up astronomers theories and models of these stellar hiccups. But the pulsar also revealed a totally new surprise: the neutron star actually slowed down briefly just before the faster rotation kicked in, marking the glitch itself.

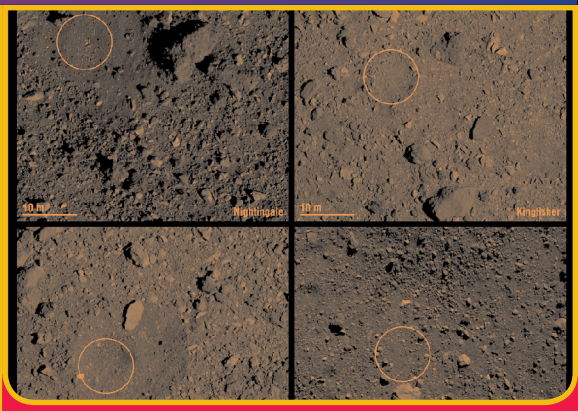
Slow Down and Speed Up

It's not entirely clear what's making these pulsars glitch. Astronomers' best understanding is that an inner layer of the star suddenly sloshes outward. When it hits the pulsar's outer crust, it causes the star to spin faster, though it quickly reverts back to its previous spin rate. The whole event was over in less than 13 seconds.

The 2016 observations of the Vela pulsar glitch are some of the most detailed ever made of such a glitch. In general, their observations matched with what astronomers saw during glitch observations in 2000 and 2004, though those came from a less sensitive telescope. The big surprise for Ashton's group was the pulsar slowing down in the seconds just before it sped up.

There's a lot yet to learn about pulsar glitches in general, but other astronomers will be on the lookout for these slow-down periods as well as any speed-up glitches.

Astronomy.com



NASA Mission Selects Final Four Site Candidates for Asteroid Sample Return

After months grappling with the rugged reality of asteroid Bennu's surface, the team leading NASA's first asteroid sample return mission has selected four potential sites for the Origins, Spectral Interpretation, Resource Identification, Security-Regolith Explorer (OSIRIS-REx) spacecraft to "tag" its cosmic dance partner.

Since its arrival in December 2018, the OSIRIS-REx spacecraft has mapped the entire asteroid in order to identify the safest and most accessible spots for the spacecraft to collect a sample. These four sites now will be studied in further detail in order to select the final two sites – a primary and backup – in December.

The team originally had planned to choose the final two sites by this point in the mission. Initial analysis of Earth-based observations suggested the asteroid's surface likely contains large "ponds" of fine-grain material. The spacecraft's earliest images, however, revealed Bennu has an especially rocky terrain. Since then, the asteroid's boulder-filled topography has created a challenge for the team to identify safe areas containing sampleable material, which must be fine enough – less than 1 inch (2.5 cm) diameter – for the spacecraft's sampling mechanism to ingest it.

NASA.gov

Astronomy Picture of the Day

The Perseids and the Plough

Image Credit & Copyright: *Jeff Dai*

Despite interfering moonlight, many denizens of planet Earth were able to watch this year's Perseid meteor shower. This pastoral scene includes local skygazers admiring the shower's brief, heavenly flashes in predawn hours near peak activity on August 13 from Nalati Grassland in Xinjiang, China. A composite, the image registers seven frames taken during a two hour span recording Perseid meteor streaks against a starry sky. Centered along the horizon is the Plough, the north's most famous asterism, though some might see the familiar celestial kitchen utensil known as the Big Dipper. Perhaps the year's most easily enjoyed meteor shower, Perseid meteors are produced as Earth itself sweeps through dust from periodic comet Swift-Tuttle. The dust particles are vaporized at altitudes of 100 kilometers or so as they plow through the atmosphere at 60 kilometers per second.

apod.nasa.gov

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