

Sky News

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SATURN AND RING INTERACTION

The *Cassini* spacecraft ended its mission in September 2017, flying through Saturn's magnetized environment, through icy, rocky ring particles, "smelling" the atmosphere between Saturn's rings and upper atmosphere, plunging into Saturn and vaporizing. Scientists are still studying the data from *Cassini's* Grand Finale. What has already been discovered is fascinating. Learn more at www.jpl.nasa.gov/news.

Complex organic compounds in water nanograins (smoke size particles) rain down from the inner rings into Saturn's upper atmosphere. Besides water and silicates, there was methane, ammonia, carbon monoxide, nitrogen, and carbon dioxide. The organic molecules were different from Saturn's moons Enceladus and Titan. Scientists now know there must be another source of organic molecules in the Saturnian system.

Particles and gasses fall directly into Saturn's atmosphere from the rings. Some particles are electrically charged and follow magnetic field lines into Saturn. These are called "ring rain" at higher latitudes. Some material falls quickly at the equator. About 22,000 pounds (10,000 kilograms) of particles rain down per second!

NEW DWARF PLANET

A new dwarf planet has been discovered called 2015 TG387, temporarily named Goblin. Goblin is about 200 miles (300 kilometers) in diameter. It's currently located at 80 AUs from the Sun, about two and a half times farther than Pluto, at 34 AUs. Goblin is in the inner Oort Cloud, where comets are located. Its farthest point from the Sun (aphelion) is 2,300 AUs, and its closest point to the Sun (perihelion) is 65 AUs. Its orbit is very elongated and takes 44,000 years. It can't be seen from Earth 99% of that time.

JAXA LANDS ON ASTEROID

The Japan's Aerospace Exploration Agency (JAXA) has landed 2 robot spacecraft on asteroid Ryugu. Rover 1A and 1B left the spacecraft *Hayabusa2* from less than 100 meters (328 feet) above Ryuga's surface. The Rovers are very small and lightweight. Because of the low gravity of Ryuga, the Rovers move by bouncing along the surface. They have returned many images that show the rocky terrain.

Ryuga is a diamond-shaped asteroid about 900 meters (2,952 feet) wide. Ryuga is an NEO, or Near Earth Object. Since its path can (theoretically) pass between the Earth and Moon, it's a potential danger to Earth. Because of its close trajectory, it could be used for its mineral content in the future.

Hayabusa2 will orbit Ryuga for about 18 months before it returns to Earth. *Hayabusa2* will return samples of the asteroid for analysis. Mineral content and some of the chemical history of the early solar system may be revealed.

PINK LAGOON

Sixty miles south of Madrid, Spain, there is a pink lagoon called Laguna de Pena Hueca. The pink color comes from the red cells of a very small organism that can live in extreme conditions, or an extremophile microorganism. The lagoon has a high concentration of salt and sulphur, similar to chloride deposits in the Martian highlands and Europa's ocean under its icy surface. Scientists believe extremophile microbes may be found there too.

The following sources were used for this issue of *Sky News*:

www.casonline.org, www.physics.valpo.edu,
www.jpl.nasa.gov/news, www.esa.int,
www.spaceweather.com, <https://in-the-sky.org>
<http://www.astropixels.com>

Astronomy, Sky and Telescope.

NOVEMBER PLANETS

Mercury appears for a short time during early and mid-November low in the southwestern sky in the constellation Scorpius (the Scorpion). Mercury will pass Jupiter twice, passing higher than Jupiter, then lower by the end of the month when they disappear in the Sun's glare. Mercury looks like a small white star.

Jupiter may be seen rising late in the month in the predawn eastern sky in the constellation Scorpius (the Scorpion). Jupiter moves into the Sun's glare by the end of the month. Jupiter looks like a bright, yellow-colored star.

Saturn can be seen for after sunset passing through the southwestern sky in the constellation Sagittarius (the Archer), just above the teapot. Saturn is visible for a few hours and sets soon after the Sun by the end of November. Saturn looks like an amber-colored star.

Mars can be seen in the south-southeastern sky after sunset in the constellation Aquarius (the Archer). Mars passes through Aquarius all month. Mars sets by midnight at the end of the month. Mars looks like a dim, ruddy-colored star.

Venus is emerges from the predawn Sun's glare in the eastern sky in the constellation Virgo (the Maiden). Venus rises earlier every night. By the end of November, Venus can be seen high in the eastern sky at dawn. Venus is the "Morning Star". Venus looks like a bright white star.

NOVEMBER SUNRISE AND SUNSET (times are for mid-month)

sunrise: 6:38 a.m.
 sunset: 4:30 p.m.
 length of daylight: 9 hours, 52 minutes
 length of darkness: 14 hours, 8 minutes

This edition of the
Sky News
 was written by
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SKY DATES

November

- 1 - Moon passes 2.1° N of Regulus
- 2 - VU FREE Observatory viewing at 8:30
 - VU SARA Telescope Demonstration from South America at 9:30 p.m.
- 4 - Change clocks back one hour at 2:00 a.m.
- 5 - Southern Taurid meteor shower
- 6 - Mercury at greatest eastern elongation
- 7 - New Moon at 10:02 a.m.
- 8 - Mercury passes 1.8° N of Antares
- 10 - CAS hosts FREE viewing at Conway from 5:30 to 7:30 p.m.
- 11 - **Kimmel Beach** FREE telescopic viewing
 - Moon passes 1.4° N of Saturn
- 12 - Northern Taurid meteor shower peaks
- 14 - Moon at apogee (farthest point from Earth) at 250,691 miles at 9:57 a.m.
 - Venus passes 0.2° S of Spica
- 15 - First quarter moon at 8:54 a.m.
 - Moon occults Mars
- 17 - Leonid meteor shower peaks (Class 1) under poor conditions
- 22 - Full moon called Frosty, Beaver, White, Trading, or Dark Moon at 11:39 p.m.
- 23 - Moon passes 1.7° N of Aldebaran
- 26 - Jupiter in conjunction with the Sun
 - Moon at perigee (closest point to Earth) at 227,306 miles at 6:10 p.m.
- 27 - Mercury at inferior conjunction
 - Moon passes 0.8° S of Beehive cluster
- 29 - Mercury at perihelion
 - Moon passes 2.3° N of Regulus
 - Last quarter moon at 6:19 p.m.
- 30 - VU FREE Observatory viewing at 8:30

GAIA SEES FALLING STARS

The European Space Agency's (ESA) GAIA mission was looking for stars being ejected from the Milky Way galaxy by the center's supermassive black hole. Stars that interact with black holes can achieve high speeds and are called hypervelocity stars. What they discovered were hypervelocity stars falling into the Milky Way galaxy from interstellar space. The rogue stars can be from the Large Magellanic Cloud or from other distant galaxies.