

# THE YOUNG ASTRONOMERS NEWSLETTER

Volume 19 Number 12

**STUDY + LEARN = POWER**

November 2011

**NOTE :DAYLIGHT SAVINGS TIME ENDS ON  
NOVEMBER 6.**

## MARS ATMOSPHERE SURPRISE

New analysis of data from the *Mars Express* spacecraft has revealed for the first time that the planet's atmosphere is supersaturated with water vapor. Supersaturation may occur when some of the water vapor remains in the atmosphere, instead of condensing or freezing. It occurs frequently in Mars' middle atmosphere when the planet is near its farthest point from the Sun.

There is much more water vapor in the upper Martian atmosphere than anyone ever imagined. This surprising discovery has major implications for understanding the Martian water cycle and its atmosphere.

## CURIOSITY

*Curiosity* is about to go to Mars. The car-sized rover (the *Mars Science Lab*) is scheduled for launch in late November or early December and after an eight-month voyage will land at the foot of a 3 mile high mountain in a crater named "Gale."

Some scientists believe the 96 mile wide crater filled in with sediments over time and relentless Martian winds carved a mountain in the center, where it now stands nearly three times higher than the Grand Canyon is deep. This may be one of the thickest exposed sections of layered sedimentary rocks in the solar system. The rock record preserved in those layers holds stories that are billions of years old.

## MOST ANCIENT SUPERNOVAS ARE DISCOVERED

The most ancient stellar explosions (supernova) are so away that their light is reaching us only now. A project spearheaded by Tel Aviv University has uncovered a record-breaking number of supernovas in the **Subaru Deep Field**, a patch of sky the size of a Full Moon.

The supernovae of the so-called "thermonuclear" type were exploding about five times more frequently in the young universe, than they do today, and are a major source of iron.

## HUGE BLACK HOLE

A fleet of spacecraft have shown details close to a super massive black hole. This black hole is colossal, containing 300 million times the mass of the Sun and growing more massive every day as it continues to feed.

**Markarian 509** was chosen because it is known to vary in brightness caused by the flow of turbulent matter into the black hole. Radiation drives an outflow of huge 'bullets' of gas away from the black hole.

## PLUTO AND ERIS

The dwarf planet Eris, responsible for Pluto's demotion from planet status in 2006, is not bigger than Pluto and may even be smaller, French scientists say. When Eris was discovered in 2005, *Hubble Space Telescope* images suggested its diameter was about 1,500 miles - about 5 percent bigger than that of Pluto. Eris remains the heavyweight of the dwarf planets, however, with much more mass than Pluto, they said.

## FAS OBSERVATION

11/19 at Pilot Mountain State Park

**Everyone is invited – this is a public event on top of the mountain and can be a great class or family outing. Plenty of telescopes and astronomy answers provided by FAS members.**

## LIKE EARTH?

The *Spitzer Space Telescope* has detected signs of icy bodies raining down in an alien solar system. The downpour resembles our own solar system several billion years ago during a period known as the "Late Heavy Bombardment" which may have brought water and other life-forming ingredients to Earth.

Certain chemical fingerprints were observed, including water ice, organics, and rock, which indicate a giant comet source. See: <http://www.nasa.gov/spitzer>

## CRAB NEBULA RADIATION

Astronomers were stunned when they detected intense radiation pumping out of the Crab Nebula at higher energies than anyone thought possible.

The powerful gamma-rays beam radiation like a lighthouse that appears to pulse when it crosses Earth's line of sight, but the "why" is not known.

See: <http://www.space.com/9709-crab-nebula-gamma-ray-flares.html>

## BROWN DWARFS

An international team of astronomers has discovered over two-dozen new free-floating brown dwarfs residing in two young star clusters. One brown dwarf is about six times heavier than Jupiter and one cluster contains a surprising surplus of brown dwarfs; it harbors half as many of these astronomical oddballs as normal stars.

Sometimes described as failed stars, brown dwarfs are unusual celestial objects that straddle the boundary between stars and planets.

## THE 7 STRANGEST ASTEROIDS

There are many unusual and strange objects in our solar system and universe. Astronomers make discoveries almost daily. See: <http://www.space.com/12282-7-strangest-asteroids-solar-system-space-rocks.html>

## TITAN

**Titan**, the fascinating moon of Saturn, has a nitrogen-rich atmosphere, Earth-like geology, weather patterns and liquid hydrocarbon seas and a relatively good chance to support life.

Astrobiologists view its atmosphere as what the Earth's atmosphere may have been billions of years ago.

## NEW SYSTEM FOUND

A team of researchers used data from NASA's *Kepler* spacecraft to discover an unusual multiple-planet system containing a super-Earth and two Neptune-sized planets orbiting in resonance with each other.

**SCIWORKS – for information and planetarium  
schedules call: 767-6730**

The Sky Tonight? See - <http://www.skymaps.com/downloads.html>  
 and also [http://amazing-space.stsci.edu/tonights\\_sky/](http://amazing-space.stsci.edu/tonights_sky/)  
 Astronomy Picture of The Day - <http://apod.nasa.gov/apod/astropix.html>

**YOUTUBE SPACE LAB** -- A few lucky teenagers will soon get a chance to help perform some science that's truly out of this world. YouTube, NASA and several other partners have announced the creation of YouTube Space Lab, a global effort challenging students between the ages of 14 and 18 to design an experiment that can be conducted in space. Two winning entries will be selected and performed by astronauts aboard the International Space Station and streamed live on YouTube. See: <http://www.youtube.com/SpaceLab>.

**Puzzles**

**Find The Word**

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

ALIEN PATCH  
 ARCHER POINT  
 CARINA PULSE  
 CLASS RIGHT  
 ENCKE SITTA  
 GAMMA TIMES  
 GIANT TITAN  
 MAJOR TRAILS  
 OTHER WATER  
 PARENT YEARS

**Scrambled Astronomy  
PEOPLE**

SPESERU \_ \_ \_ \_ \_  
 TCROAS \_ \_ \_ \_ \_  
 ENDIO \_ \_ \_ \_ \_  
 RINOO \_ \_ \_ \_ \_  
 OLUXPL \_ \_ \_ \_ \_

(Answers below)

\*\*\*\*\* INTERNET SITES \*\*\*\*\*

- ☆☆☆ **SITE OF THE MONTH** ☆☆☆ Chris Dolan's home page - <http://www.astro.wisc.edu/~dolan/>
- ☆ Dissecting the Crab Nebula - <http://news.discovery.com/space/crab-nebula-hubble-spitzer-chandra.html>
- ☆ A chicken ? - <http://news.discovery.com/space/can-you-see-the-chicken-in-this-nebula-110922.html>
- ☆ The Galactic Center - [http://www.nasa.gov/multimedia/imagegallery/image\\_feature\\_2077.html](http://www.nasa.gov/multimedia/imagegallery/image_feature_2077.html)
- ☆ Orion's "eyeglasses" - [http://www.nasa.gov/multimedia/imagegallery/image\\_feature\\_2078.html](http://www.nasa.gov/multimedia/imagegallery/image_feature_2078.html)
- ☆ Carina Nebula - [http://www.nasa.gov/multimedia/imagegallery/image\\_feature\\_2081.html](http://www.nasa.gov/multimedia/imagegallery/image_feature_2081.html)

\*\*\*\*\* NOVEMBER MOON \*\*\*\*\*

**First Quarter:** 11/3    **Full Moon:** 11/10    **Last Quarter:** 11/18    **New Moon:** 11/25  
**Apogee:** 11/8 7:21 AM 252,386 mi. (406176 km)    **Perigee:** 11/23 7:25 PM 223,502 mi. (359691 km)  
 ☆ This month's Full Moon was called the Frosty Moon and The Beaver Moon.  
 ☆ **Best observing nights:** 11/1 – 11/3; 11/17 – 11/27

\*\*\*\*\* PLANETS IN NOVEMBER \*\*\*\*\*

**MARS** rises in the east before midnight and is high in the southeast in morning twilight.  
**JUPITER** shines brightly in the eastern sky at twilight and the sets in the west before sunrise.  
**MERCURY** is close to the southwest horizon after sunset. It is at the lower left of Venus, and moves to the lower right by the end of November.  
**SATURN** rises in the east about 1.5 hours before sunrise and by 3.5 hours at month's end.  
**VENUS** is very low in southwest and sets about 1 to 1.5 hours after sunset.

\*\*\*\*\* METEOR SHOWERS \*\*\*\*\*

<u>NAME</u>	<u>DATES</u>	<u>BEST NIGHT</u>	<u>PER HOUR</u>	<u>WHERE TO LOOK</u>
<b>Northern Taurids</b>	10/20 – 12/10	11/12	5+	East. This shower produces bright yellow meteors, radiating not far from the Pleiades star cluster in Taurus. The parent comet is 2P/Encke.
<b>Leonids</b>	11/6 – 11/30	11/18 (3 AM)	15 – 20+	Northeast. The Leonids are fast meteors, mostly blue or green in color. Many leave persistent dust trails behind as they disintegrate.

**LOOK FOR: >>>>** The **Bow and Arrow** that Sagittarius, The Archer, carries. It's low in the southwest on the 20th+ (also the front of the Teapot). >>>> **Venus** setting furthest south on the 28th and 29th. >>>> **Mercury, Venus, and Antares** (in Scorpius) group together during the first two weeks of November, very low in the southwest. >>>> Bright, yellow giant **Capella** rising in the northeast as the month begins.

## VESTA

The latest 3D images and videos reveal a most unusual celestial object and present a large number of challenges for the scientists on the *Dawn* team. A huge impact crater in the south polar region has a shape and structure that differs from every other impact crater in the Solar System. And a question is whether there has been any volcano activity on **Vesta**.

**Vesta's** wide variety of impact craters, valleys, canyons and mountains are among the highest in the Solar System. Differences in altitude of up to 12 miles, suggests a powerfully dynamic surface formation process as do the diversity and large number of features and great differences in the brightness of surface materials. See: [http://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10081/151\\_read-1502/](http://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10081/151_read-1502/)

## CERES

From July 2012 to February 2015, *Dawn* will continue its journey to **Ceres**, Where **Vesta** is a 'dry' asteroid whose lighter materials have been vaporized as a result of its volcanic past and proximity to the Sun, **Ceres** is the exact opposite. It may have 15 to 25% water content and is considered to be a 'wet' asteroid.

## BLACK HOLES – SMALL GALAXIES

Astronomers found supermassive black holes growing in small galaxies, suggesting that central black holes formed at an early stage in galaxy evolution.

All massive galaxies host a central supermassive black hole, which may shine brightly if the black hole is pulling in nearby gas clouds.

These galaxies are about 10 billion light years away giving astronomers a view of galaxies as they appeared when the universe was less than a fourth of its age.

## SPACE MISSION SOUNDS

Sounds from NASA space missions are available for download as ringtones or on your computer for events, errors, alarms and notifications. Sound bites are at:

<http://www.nasa.gov/connect/sounds>

## BLACK HOLE'S FLARING JET

Astronomers used *WISE* to capture rare data of a flaring black hole and have new details about the black holes and their blazing jets.

Like other black holes, it is an ultra-dense collection of matter, with gravity that is so great even light cannot escape.

In this case, the black hole is orbited by a companion star that feeds it. Most of the material is pulled into the black hole, but some is blasted away as a jet flowing at nearly the speed of light.

See: <http://www.nasa.gov/wise>

## THE SUN'S FUTURE?

About 5000 million years from now, our Sun will expand into a red giant, swelling to such a size that it may swallow Earth.

It will then begin to shed huge amounts of dust, surrounding itself with an expanding envelope that ultimately will become a planetary nebula. A similar star has evolved into a red giant, several thousand times bigger than the Sun, and is now nearing the final stages of its life.

Nuclear reactions in its core have transformed most of its hydrogen into helium, and the star's core is surrounded a layer of helium and another of hydrogen.

## SATURN'S MOONS

A *Cassini* spacecraft portrait of five Saturn's moons shows: (left to right) Janus, Pandora, Enceladus, Mimas, and Rhea. See: [http://www.nasa.gov/mission\\_pages/Cassini/multimedia/gallery/pia14573.html](http://www.nasa.gov/mission_pages/Cassini/multimedia/gallery/pia14573.html)

## OLDEST SUPERNOVAE

A team of astronomers assembled the largest sample of the most distant supernovae that emitted light about ten billion years ago. They were exploding about five times more frequently in the young universe than they do today.

## VENUS

Earth has seasons because its rotation axis is tilted by about 23° which changes the intensity of sunlight and the length of a day. Venus is tilted so that it's almost upside down. Its orbit prevents it from getting hotter or cooler by moving further away from or closer to or the Sun. Venus rotates so slowly that its night lasts almost two Earth months. Sulfuric acid clouds and thick atmosphere act like a blanket and winds keep temperatures pretty even.

## FORMALHAUT'S "PLANET"?

A tiny planet orbiting Fomalhaut b was the first exoplanet to be directly imaged by telescopes on Earth when it was found in 2008. But new data shows the planet tracing a textbook orbit just inside a luminous ring of dust encircling Fomalhaut. A scientist now says that the planet crossed into the dust disk but did not disrupt the disk; and, therefore, may not be a "planet".

## PACMAN NEBULA NGC 281

High-mass stars are mainly responsible for most of the energy pumped into our galaxy over its lifetime. They are poorly understood because they are often relatively far away and can be obscured by gas and dust.

The **NGC 281** star cluster is an exception to this rule. Its location gives astronomers a nearly open view of the cluster's star formation and there is evidence that the cluster formation was triggered by a previous generation of star formation. See: [http://www.nasa.gov/multimedia/Imagegallery/image\\_feature\\_2071.html](http://www.nasa.gov/multimedia/Imagegallery/image_feature_2071.html)

## NAME MOON-BOUND SPACECRAFT

The twin spacecraft headed to orbit around the moon need new names. A naming contest is open to students in kindergarten through 12th grade at schools in the United States.

Entries must be submitted by teachers using an online entry form by November 11th. See:

<http://grail.nasa.gov/contest> -- and *GRAIL* information is at: <http://www.nasa.gov/grail>

## ENCELADUS

Saturn's moon Enceladus spews out dramatic plumes of water vapor and ice. It has simple organic particles and it may have liquid water beneath its surface.

Its weather forecast is for ongoing snow flurries - particles from plumes of moisture falling back onto the surface lasting probably tens of million years or more. They have blanketed areas of the surface in a thick layer of tiny ice particles.

The *Herschel Space Observatory* found a huge donut-shaped cloud, of water vapor created by Enceladus encircling Saturn and appears to be the source of water in Saturn's upper atmosphere.

