

THE YOUNG ASTRONOMERS NEWSLETTER

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STUDY + LEARN = POWER

August 2011

BIG SATURN STORM

Scientists analyzing data from NASA's Cassini spacecraft now have the first-ever, up-close details of a Saturn storm that is eight times the surface area of Earth.

The storm is about 500 times larger than the largest storm previously seen by Cassini and has been raging ever since last December. It is at 35 degrees north and wraps around the entire planet. Weather on Saturn appears to hum along placidly for years and then erupts violently. See and hear: <http://www.nasa.gov/Cassini/whycassini/pia14310.html>

HUBBLE FINDS NEW PLUTO MOON

Astronomers using the *Hubble Space Telescope* discovered a fourth moon orbiting the icy dwarf planet Pluto. The new satellite was uncovered in a *Hubble* survey searching for rings around the dwarf planet.

It is Pluto's smallest moon and has an estimated diameter of 8 to 21 miles. *Charon*, the largest moon, is 648 miles across, - *Nix* and *Hydra*, are about 20 to 70 miles in diameter. See: <http://www.nasa.gov/hubble>

HYDROGEN PEROXIDE IN SPACE

Molecules of hydrogen peroxide have been found for the first time in interstellar space. The discovery gives clues about the chemical link between two molecules critical for life - water and oxygen.

Astronomers observed a region close to the star *Rho Ophiuchi* that contains very cold dense clouds of cosmic gas and dust (around -250° C) in which new stars are being born. They are mostly made of hydrogen, but contain traces of other chemicals and are prime targets for astronomers hunting for molecules in space.

VESTA

A composite image shows the comparative sizes of nine asteroids. Vesta is considered a protoplanet because it is a large body that almost became a planet. It has a diameter of approximately 330 miles. See:

http://www.nasa.gov/multimedia/imagegallery/image_feature_2010.html

HARTLEY 2 DEBRIS

New findings from *NEOWISE*, the asteroid- and comet-hunting portion of NASA's *Wide-field Infrared Survey Explorer* mission, show that comet Hartley 2 leaves a pebbly trail as it laps the Sun, dotted with grains as big as golf balls. They survive farther away from the comet than previously known, winding up in its debris trail.

CHINA'S SPACE PROGRAM

Tiangong 1, China's first space laboratory, is expected to launch by the end of September or before. It does not need a "launch windows" nor is it due to meet up with anything that's already in orbit.

Tiangong 1 will presumably orbit in a solo mode for at least two weeks to give controllers time to "check out" the spacecraft in orbit, and make sure it is ready for its coming tasks. The next stage in this program will be the launch of the unmanned Shenzhou 8 spacecraft, which will dock with Tiangong 1.

GALAXIES GRAZED ON GAS

Galaxies once thought of as voracious tigers are more like grazing cows, according to a new study.

Astronomers discovered that galaxies in the distant universe continuously ingested star-making fuel over long periods of time. A typical galaxy fed itself through a steady stream of gas and not devouring fuel in quick bursts after run-ins with other galaxies as previously thought.

SOLAR EXPLOSION

On June 7th, satellites detected a flash of X-rays coming from the western edge of the solar disk. The blast at first appeared to be a run-of-the-mill eruption--that is, until researchers looked at movies of the event:

"We'd never seen anything like it," -- "Half of the sun appeared to be blowing itself to bits." See:

http://www.nasa.gov/mission_pages/sunearth/news/dark-fireworks.html

PULSAR WITH A LONG TAIL

Astronomers using the *Chandra X-ray Observatory* found a pulsar that apparently has a mysterious long, bright tail. They calculate that the pulsar is about half a million years old, or middle-aged for this type of object.

The tail stretches for 4.2 light years in length making it one of the longest X-ray tails ever associated with this type pulsar. See: http://www.nasa.gov/mission_pages/chandra/multimedia/11-076.html

ON THE ISS

A close-up image shows the small beds for materials and computing elements attached to the outside of the International Space Station. These elements are being evaluated for various effects - ultraviolet, direct sunlight, radiation, and extremes of heat and cold.

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

[imagegallery/image_feature_2006.html](http://www.nasa.gov/multimedia/imagegallery/image_feature_2006.html)

On the inside, astronauts are having "Fruit fun in space", see: <http://www.space.com/12274-space-food-photos-astronauts-nasa-meals.html>

TWO WHITE DWARFS

Astronomers have discovered a pair of white dwarfs spiraling into one another at breakneck speeds - 370 miles per second! These white dwarfs (*burned-out cores of stars like our Sun*) are so close to each other that they make a complete orbit in just 13 minutes, and are gradually moving closer together.

DUST

New *Herschel Space Observatory* research revealed that an exploding star expelled the equivalent of between 160,000 and 230,000 Earth masses of fresh dust. This enormous quantity suggests that supernovae are the answer to the long-standing puzzle of what supplied our early universe with dust.

Sun-like stars had not been around long enough to produce the enormous amounts of dust observed in distant, early galaxies.

SCIWORKS - 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/
 Astronomy Picture of The Day - <http://apod.nasa.gov/apod/astropix.html>

Puzzles

W T H G I N V S T I
 H S H Y N D E I M P
 I A D G D T U A L L
 T L E A I R G I O U
 E B N S F E A W B T
 S A S R O R E T E O
 W T E L T R A R S R
 O S B S O I A W J M
 H E E C L U E S D R
 S V E S N R U T A S
 BLAST NIGHT
 CLUES PLUTO
 DENSE SAROS
 DWARF SATURN
 EIGHT SHOWS
 FRESH SITES
 FRUIT TAILS
 HYDRA TRAIL
 IMAGE VESTA
 LOWER WHITE

THE "SAROS" WEATHER FORECAST

This long range weather forecasting is based on the "saros" climate cycle that generally repeats itself every 6585 days. "Saros" comes from the ancient Chaldeans who used this cycle to predict eclipses. So, the Moon will very nearly return in 6585 days to today's position in its orbital geometry relative to the Earth and Sun.

And Lunar gravitation affects the major circulation patterns of the Earth's oceans and atmosphere. Thus, large scale weather events can be predicted with some accuracy if one looks back at the country's weather 18.03 years ago.

The strength of lunar gravitation will be peaking during 2011 around the New Moon in late October. The Atlantic hurricane season should be similar to that of 1993 when there were eight named storms, four of which became hurricanes. That same year in the eastern Pacific, 11 out of the 15 named storms became hurricanes.

(Based on an article by The Summit School's Phil Wood in Blum's Almanac)

POPULAR ASTRONOMY SITE

Popular Astronomy has a collection of space videos and masses of interesting information about astronomy. See:

<http://www.popastro.com/youngstargazers/skyguide/index.php>

Scrambled Astronomy --- THEY HAVE TAILS!

GELAE _____ KOPECAC _____ ELHWA _____
 OESRH _____ OTMCE _____ (Answers below)

***** INTERNET SITES *****

- o Dramatic collision: http://www.nasa.gov/mission_pages/chandra/multimedia/pandora.html
- o Spacecraft art - <http://spaceplace.nasa.gov/gallery-technology/#spacecraft>
- o Spaceplace info - <http://spaceplace.nasa.gov/menu/parents-and-educators/>
- o Rhea after Titan occultation - http://www.nasa.gov/multimedia/imagegallery/image_feature_1985.html

***** AUGUST MOON *****

First Quarter: 8/6 Full Moon: 8/13 Last Quarter: 8/21 New Moon: 8/28

Perigee: 8/2 5:00 PM 227,270 mi. (365755 km) o The August Full Moon was known as The Red Moon and also as The Sturgeon Moon.

Apogee: 8/18 12:24 PM 251,754 mi. (405159 km)
 Perigee: 8/30 1:36 PM 224,226 mi. (360857 km) o **Best observing nights:** 8/1 – 8/8; 8/21- 8/31

***** PLANETS IN AUGUST *****

VENUS rises just before sunrise on the 1st, and moves behind the Sun on the 18th (*superior conjunction*). On the 31st, it will be just to the upper left of the setting Sun. **MERCURY** is very low in the west after sunset on the 1st, is in front of the Sun on the 16th (*inferior conjunction*), and re-appears very low in the east on the 25th before sunrise. **MARS** rises in the east 3 – 4 hours before sunrise. **JUPITER** stays high in the southeast after twilight and all night this month. At dusk, **SATURN** is in the west-southwest and sinks lower each night.

***** METEOR SHOWERS *****

NAME	DATES	BEST NIGHT	PER HOUR	WHERE TO LOOK
PERSEIDS	7/17 – 8/24	8/12	100!	Northeast. Peak is after midnight but the Full Moon rises about 6 PM and will wash out many of the meteors. Several meteors will be coming from minor showers in the Cygnus constellation overhead and Aquarius in the south.

LOOK FOR: >>>> Asteroid **Vesta**: it's at the limits of detection for naked-eye observers, but will be easily seen with telescopes in late July and August, rising in the east shortly after sunset. >>>> **The Big Dipper** – it is in the northwest with the bowl towards the north. The two stars at the bowl's end point east to Polaris, The Pole Star. The whole sky seems to revolve around this star because Earth's axis points to it. >>>> **Hercules** – overhead with M13, a globular cluster of many thousands of stars.

ENCELADUS

The *Cassini* spacecraft has discovered the best evidence yet for a large-scale saltwater reservoir beneath the icy crust of Saturn's moon Enceladus.

The spacecraft's direct analysis of salt-rich ice grains close to the jets are small and usually low in salt far away from the moon. But closer to the moon's surface, relatively large grains rich with sodium and potassium were found in icy jets of vapor.

This suggests a layer of water between the moon's rocky core and its icy mantle, possibly as deep as about 50 miles beneath the surface. As this water washes against the rocks, it dissolves salt compounds and rises through fractures in the overlying ice to form reserves nearer the surface. See: <http://www.nasa.gov/cassini>

SCIENCECAST

NASA has a new video series that offers the public a fast and fun way to learn about scientific discoveries and facts about Earth, the solar system and beyond.

Called "*ScienceCasts*," the videos are posted online every Thursday afternoon at approximately 4 p.m. EDT. The format is designed to increase understanding of the world of science through simple, clear presentations.

See: <http://www.youtube.com/user/scienceatnasa>
For a complete list of *ScienceCast* episodes, visit: <http://sciencecasts.nasa.gov>

THE SUN – TROUBLE COMING?

In Sept. 1859, the Sun unleashed one of the most powerful storms in centuries with an underlying flare so unusual, researchers still aren't sure how to categorize it.

The blast peppered Earth with the most energetic protons in more than 500 years, induced electrical currents that set telegraph offices on fire, and sparked Northern Lights over Cuba and Hawaii.

In 2011 the situation would be more serious. An avalanche of blackouts carried across continents by long-distance power lines could last for weeks to months as engineers struggle to repair damaged transformers

Planes and ships couldn't trust GPS units for navigation. Banking and financial networks might go offline, disrupting commerce in a way unique to the Information Age. According to a 2008 report, a century-class solar storm could have the economic impact of 20 hurricane Katrinas.

The Sun is once again on the eve of a below-average solar cycle and strong storms can occur even when the underlying cycle is nominally weak.

HALE'S 60-INCH TELESCOPE

When George Hale built Mt. Wilson's 60-inch telescope in 1908, it was the largest telescope in the world. The glass disk for its mirror, cast in 1894 by the Saint-Gobain glassworks in France, was given to Hale by his father while Hale was director of Yerkes Observatory in Wisconsin. Not until he came to Mt. Wilson could Hale finally get the funds to finish up the telescope.

The telescope is one of the most productive telescopes in the history of astronomy. It was used largely for the original studies of the spectral classification of stars that are the basis of much of our modern-day astronomy. It is still a thing of beauty and often used by visitors to the Mt. Wilson Observatory in Pasadena.

HUBBLE'S ONE MILLIONTH OBSERVATION

The *Hubble Space Telescope* crossed another milestone in its space odyssey of exploration and discovery. On July 4th, the Earth-orbiting observatory logged its one millionth science observation during a search for water in an exoplanet's atmosphere 1,000 light-years away.

For 21 years *Hubble* has been the premier space science observatory, providing deeply beautiful imagery and enabling ground-breaking science across a wide range of astronomical interests.

Hubble's discoveries revolutionized nearly all areas of astronomical research from planetary science to cosmology. *Hubble* data is at: <http://hla.stsci.edu/>

PANDORA'S CLUSTER

Using telescopes in space and on the ground, a team of scientists studied the galaxy cluster Abell 2744 nicknamed Pandora's Cluster, and have pieced together the cluster's complex and violent history. Abell 2744 seems to be the result of a simultaneous pile-up of at least four separate galaxy clusters that produced strange effects.

So many different and strange phenomena were unleashed by the collision that had never been seen before. When huge clusters of galaxies crash together, the resulting mess is a treasure trove of information for astronomers. See: [http://www.space.com/12036-](http://www.space.com/12036-strange-galaxy-cluster-collision-abell-2744.html)

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EXTRASOLAR PLANETS

In planet hunting today, there seems to be one burning question - where did these planets come from? When the first extrasolar planets were discovered, it quickly became obvious that the formation theories that we'd built on our own solar system were only part of the story. They did not predict the vast number of hot Jupiters astronomers found nearly everywhere.

Astronomers went back to the drawing board to put more details into the theory, breaking formation down into quick, single collapses and more gradual accretion of gas disks, and worrying about the effects of migration.

GALAXIES IN THE DISTANT UNIVERSE

Astronomers have probed into the distant universe and discovered that galaxies display one of two distinct behaviors: they are either "awake" or "asleep" - actively forming stars, or are not forming any new stars at all.

Galaxies in the nearby universe seem to fall into one of these two states. But a new survey of the distant universe shows that even very young galaxies as far away as 12 billion light years have behaved this way for more than 85 percent of the history of the universe.

Whether the sleeping galaxies have completely shut down remains an open question. The new study suggests the active galaxies are forming stars at rates about 50 times greater than their sleepy counterparts.

HELP LOCATE KUIPER BELT OBJECTS

A team at Southern Illinois University has developed a website to challenge the public to find Kuiper Belt objects in the outer solar system. See: [http://www.siu.edu/](http://www.siu.edu/news/current.shtml#SIUEIceHuntersSeekIcyWorldsIn)

[news/current.shtml#SIUEIceHuntersSeekIcyWorldsIn](http://www.siu.edu/news/current.shtml#SIUEIceHuntersSeekIcyWorldsIn)
OuterSolarSystem (and)

<http://www.icehunters.org>

