

# THE YOUNG ASTRONOMERS NEWSLETTER

Volume 19 Number 5

**STUDY + LEARN = POWER**

April 2011

## A WARM BROWN DWARF

Pennsylvania State University astronomers detected a brown dwarf with a temperature of only 86 degrees Fahrenheit! The discovery contradicts the perception of all stars being hot -- this one is "room temperature".

Like normal stars, brown dwarfs form from collapsing gas clouds but they don't become massive enough to sustain nuclear reactions. They briefly shine red then fade. Before discovering this latest star, the coolest known brown dwarfs were determined to be too hot to sustain life.

The object, orbiting a white dwarf star, has seven times the mass of Jupiter, a figure that would normally classify it as a planet.

## EARLY CLUSTER OF GALAXIES

Astronomers have used an armada of telescopes on the ground and in space to discover and measure the distance to the most remote mature cluster of galaxies yet found.

Although this cluster is seen when the Universe was less than one quarter of its current age it looks surprisingly similar to galaxy clusters in the current Universe. The results showed that we are seeing a galaxy cluster as it was when the Universe was about three billion years old.

## DAWN

Deep in the asteroid belt, the Dawn spacecraft continues to re-shape its orbit around the Sun to match that of unexplored world Vesta, with arrival now less than five months away. Vesta is the third largest known asteroid and the brightest.

Dawn is a robotic spacecraft sent by NASA on a space exploration mission to the two most massive members of the asteroid belt: Vesta and the dwarf planet Ceres. Dawn is scheduled to explore Vesta between 2011 and 2012, and Ceres in 2015.

## TONS OF METEORIODS ARE HITTING EARTH

Every day about 100 tons of meteoroids - fragments of dust and gravel and sometimes even big rocks - enter the Earth's atmosphere.

Stand out under the stars for more than a half an hour on a clear night and you'll likely see a few of the meteors produced by the onslaught. But where does all this stuff come from? Surprisingly, the answer is not well known.

NASA is deploying a network of smart cameras across the United States to answer the question, *What's Hitting Earth?* The Meteoroid Environment Office is setting up groups of smart cameras in a new meteor network to triangulate the fireballs' paths with special software using the data to compute their orbits.

15 cameras will soon be deployed east of the Mississippi River as part of a nationwide program. All cameras in the network send their information to:

<http://fireballs.ndc.nasa.gov>

Teachers can contact [William.J.Cooke@nasa.gov](mailto:William.J.Cooke@nasa.gov) to request workshop slides containing suggestions for classroom use of the data.

(For an interesting "read", see *The Big Splash* by Dr Louis A. Frank- 1990.)

## ☆☆☆ FAS EARTHDAY - 4/6 ☆☆☆

Class and/or family activity: SciWorks presents a laser show followed by an observation session. Telescopes and guides will be provided by members of FAS. Call 767-6730 for information and planetarium schedules

## MESSENGER

The *MESSENGER* spacecraft began an orbit of Mercury on a mission to circle the planet for one year in an unprecedented study of the tiny, hot planet.

Its journey began more than six years ago, traveling through the inner solar system and with flybys of Earth, Venus and Mercury.

On March 23rd, tests of *Messenger's* instruments were started and on April 4th, the mission's primary science phase will begin.

## THE HUBBLE NIGHT SKY

A monthly Hubble video site explores the April sky, featuring many different objects. The site highlights the best viewing opportunities for each month with a wide selection of information. See: [http://hubblesite.org/explore\\_astronomy/tonights\\_sky/](http://hubblesite.org/explore_astronomy/tonights_sky/) (A "keeper"!)

## HAYABUSA

A preliminary analysis of asteroid samples returned last year by Japan's probe show evidence the dust grains have a similar composition to stony meteorites that commonly fall to Earth.

The seven-year robotic mission surveyed asteroid Itokawa, a potato-shaped rock about 1700 feet overall. the size of a city block. *Hayabusa* was the first mission to retrieve samples from the surface of an asteroid and bring them to Earth.

## STUDENT COMPETITION

NASA selected four high school teams of students to test their science experiments in a competition that simulates microgravity in space. The experiments were dropped into a 79-foot tower at NASA's Glenn Research Center in Cleveland. They experience weightlessness for 2.2 seconds.

In physics and material sciences, a **drop tower** or **drop tube** is a structure used to produce a controlled period of weightlessness for an object under study. Air bags, polystyrene pellets, and magnetic or mechanical brakes are sometimes used to arrest the fall of the experimental payload.

## NORTH AMERICAN NEBULA (MORE)

In visible light, the region resembles North America, but in a new infrared view from the *Spitzer Space Telescope*, the continent disappears.

Detectors pick up the glow of dusty cocoons of baby stars, clusters of young stars (about one million years old), and slightly older stars (about 3-5 million years).

Some areas are still very thick with dust and appear dark even in *Spitzer's* view and are likely to be the youngest stars in the complex (less than a million years old) See: <http://apod.nasa.gov/apod/ap960606.html> (and)

[http://www.nasa.gov/multimedia/imagegallery/image\\_feature\\_1901.html](http://www.nasa.gov/multimedia/imagegallery/image_feature_1901.html)

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/)

## Puzzles

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

AREAS	MATCH
ARMADA	MINOR
CAMERAS	NIGHT
CANIS	PEERS
CENTER	SEVEN
CERES	STONY
CIRCLE	SOLAR
COMET	THREE
INNER	TOWER
LASER	VESTA

### INSPIRE

U.S. high-school students are invited to participate in NASA's **INSPIRE**. The program is designed to encourage students in ninth through 12th grades to pursue careers in science, technology, engineering and math. Applications are being accepted through June 30 and selections will be made in September. The selected students and their parents will participate in an online learning community with opportunities to interact with peers, NASA engineers and scientists. See:

<http://www.nasa.gov/education/INSPIRE>

### CHAOS IN A NURSERY

A new ESO image gives a close-up view of the dramatic effects newborn stars have on the gas and dust from which they formed. Although the stars themselves are not visible, material they have ejected is colliding with the surrounding gas and dust clouds and creating a surreal landscape of glowing arcs, blobs and streaks. This star-forming region NGC 6729 is part of one of the closest stellar nurseries to Earth and one of the best studied. See:

<http://www.eso.org/public/images/eso1109a/>

### Astronomy Picture of the Day :

<http://apod.nasa.gov/apod/astropix.html>

## Scrambled Astronomy - Around the house

ETBAL \_\_\_\_\_ COLKC \_\_\_\_\_ CRENUFA \_\_\_\_\_  
EALSC \_\_\_\_\_ EALSE \_\_\_\_\_ (Answers below)

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

- o Mars unusual impact crater - [http://www.esa.int/SPECIALS/Mars\\_Express/SEMDV9BO3DG\\_0.html](http://www.esa.int/SPECIALS/Mars_Express/SEMDV9BO3DG_0.html)
- o Opportunity: Mars crater - [http://www.nasa.gov/mission\\_pages/MRO/multimedia/gallery/pia13803.html](http://www.nasa.gov/mission_pages/MRO/multimedia/gallery/pia13803.html)
- o Far side of the Moon - <http://www.spaceref.com/news/viewsr.rss.html?pid=36395>

### \*\*\*\*\* APRIL MOON \*\*\*\*\*

New Moon: 4/3 First Quarter: 4/10 Full Moon: 4/18 Last Quarter: 4/25

Apogee: 4/2 5:01 AM 252,684 mi. (406655 km) o Northern-most Moon – 4/8  
Perigee: 4/17 2:01 AM 222,509 mi. (358087 km) Southern-most Moon – 4/21  
Apogee: 4/29 2:03 PM 252,303 mi. (406042 km) o **Best observing nights:** 4/1 – 4/9; 4/24 – 4/30

- o The April Full Moon was called *The Egg Moon*, *The Pink Moon* – (seeds and flowers are starting to grow), and the *Paschal Full Moon* -- the first full moon of the spring season.

### \*\*\*\*\* PLANETS IN APRIL \*\*\*\*\*

**VENUS** rises about 1 hour before sunup in the east-southeast. **JUPITER** is behind the Sun on the 6th (*superior conjunction*) and in the east before sunrise on the 29th. **SATURN** – alone in the night sky, is in the east-southeast and opposite the Sun on the 3rd as seen from Earth (*opposition*). **MERCURY** passes in front of the Sun on the 9th (*inferior conjunction*) and joins Venus, Mars, and Jupiter in the east before sunrise during April's final week.

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

<u>NAME</u>	<u>DATES</u>	<u>BEST NIGHT</u>	<u>PER HOUR</u>	<u>WHERE TO LOOK</u>
LYRIDS	4/16 – 4/25	4/23 – 4/24	18 ?	Low in the northeast. Meteors are very fast with a few leaving long trains. In 1803, more than 700 meteors were seen, but the hourly rate stays at 13 - 18 per hour.
PI PUPPIDS	4/15 – 4/28	4/23 - 4/24	Variable	Very low in the southwest - yellow, bright and slow. Activity is usually 5 to 18 per hour at the peak. o April has eight minor showers – 2 to 5 per hour or less.

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**LOOK FOR:** >>>> **Yellow Capella**, a giant star that dominates the northwestern sky. It is part of the pentagon of stars making up Auriga, the Charioteer. >>>> East of Auriga, **the Twins - Castor and Pollux** highlight Gemini above Orion, the Hunter. >>>> **The Hunter's two faithful companions** – Canis Major and Canis Minor to the east of Orion. >>>> **The Sickle** in Leo, and its brightest star **Regulus** overhead this month.

## PLANETS WITH WATER?

Researchers say liquid water may be found on planets that have gone adrift from their stars, and may have acted as stepping stones to spread cosmic life.

Gravitational battles with other planets or passing stars can fling worlds out of their solar systems, but these wandering worlds could continue to stay warm enough to keep water liquid under thick, insulating ice sheets for more than a billion years thanks to the decay of radioactive elements in their cores.

## BIRTH OF A PLANETARY SYSTEM

An international team of astronomers found a short-lived disk of material around a young star that is in the early stages of making a planetary system.

A smaller companion may be the cause of a large gap found in the disk - future observations will determine whether it is a planet or a brown dwarf.

The transition from dust disk to planetary system is rapid and few objects are caught during this phase. This is the first detection of an object much smaller than a star within a gap in the planet-forming dust disk around a young star.

## GREAT MOONBUGGY RACE

Forty years after the first lunar rover rolled across the Moon's surface, 84 teams of enterprising future engineers will demonstrate the same ingenuity and can-do spirit at the 18th annual NASA Great Moonbuggy Race, set for April 1-2 in Huntsville, Ala.

The event challenges high school and college students to design, build and race lightweight, human-powered rovers - "moonbuggies" - with many of the engineering challenges dealt with by Apollo-era lunar rover developers in the late 1960s.

See: <http://www.ustream.tv/channel/the-great-moonbuggy-race-2010>

## THIRTY-METER TELESCOPE PROJECT

Hawaii has moved a step closer to the construction of the **Thirty Meter Telescope** - the world's largest. The state Board of Land and Natural Resources unanimously approved the plans of a consortium of California and Canadian universities.

The board, however, also granted a request by opponents for a case hearing on the telescope. Some Native Hawaiians say the construction would defile Mauna Kea's summit, which they consider sacred.

Environmentalists also oppose the telescope, claiming that it would harm the rare wekiu bug.

The telescope would be able to observe planets that orbit stars other than the Sun, and enable astronomers to watch new planets and stars being formed.

## BLACK HOLE

When two galaxies merge to form a giant, the super-massive black hole in the new galaxy develops an insatiable appetite that can't be sustained. Observations with the Gemini Observatory clearly reveal an extreme, large-scale galactic outflow that brings the cosmic dinner to a halt.

The outflow is depriving the galaxy's monstrous black hole of the gas and dust it needs to maintain its growth. It also limits the material available for the galaxy to make new generations of stars

## ASTEROIDS

In a single night - January 29th, astronomers using the Pan-STARRS PS1 telescope in Maui discovered 19 near-Earth asteroids, the most asteroids discovered by one telescope. During the night and into the next afternoon, they came up with a total of 30 possible new near-Earth asteroids. Asteroids are discovered when they appear to move against the background of stars. They must be carefully observed within 12-72 hours to define their orbits, otherwise they are likely to be "lost."

## RUSSIA'S PLANS

Russia will launch probes to several planets and their satellites, Russia's Federal Space Agency announced. The probes are expected to study the Moon and the Martian satellite Phobos, as parts of a dozen of projects in astrophysical and solar research before 2023.

## BRITISH PLANS

British scientists say they will lead a major program searching for chemical signs of life on planets orbiting distant stars. Researchers at University College London, backed by the European Space Agency, will use a new space telescope to look for the signs in the atmospheres of exoplanets.

## WISE

### A SPEEDY STAR

The *WISE* infra red camera captured an image of the star Alpha Camelopardalis racing through the sky with an arc-shaped cloud of dust and gas - a red bow shock on one side. Its speed is an astonishing rate of between 1.5 and 9.4 million mph!

Such fast-moving stars are called **runaway stars**. Astronomers believe **runaway stars** are set into motion through the supernova explosion of a companion star or through gravitational interactions with other stars in a cluster. See: [http://www.nasa.gov/mission\\_pages/WISE/multimedia/gallery/pia13908.html](http://www.nasa.gov/mission_pages/WISE/multimedia/gallery/pia13908.html)

## "ELEPHANT TRUNKS"

The most famous examples of elephant trunks are the "Pillars of Creation" found in the Eagle Nebula.

The *Wide-field Infrared Survey Explorer* captured an image of a star-forming cloud of dust and gas in the constellation of Monoceros.

Lining up along the edges of a cosmic hole are several monstrous pillars of dense gas and dust also called "elephant trunks". They are seen as small columns of gas stretching to the center of the nebula's void. See: <http://www.spacedaily.com/images-lg/nebula-sh2-284-lg.jpg>

## WISE SHUTS DOWN

As NASA's *Wide-field Infrared Survey Explorer* spacecraft ended its successful survey mission, it took a last snapshot of a patch of the Milky Way galaxy showing the thousands of stars in the **Perseus** constellation.

The sky-mapping telescope spent 13 months cataloging cosmic objects as it roamed through space. *WISE* scanned the sky 1 1/2 times, taking about 1.8 million images of asteroids, stars and galaxies.

The spacecraft spotted 19 previously unseen comets and more than 33,500 asteroids, including 120 near-Earth objects (objects with orbits that pass relatively close to Earth's orbit around the Sun.) See:

<http://www-a.jpl.nasa.gov/wise/images.cfm>

