

WASP 12-b

WASP 12-b is one of the most puzzling of the exoplanets found outside the Solar System. It orbits a star in the constellation Auriga, and is about the size of the Sun but gaseous like Jupiter and Saturn.

An international group of astrophysicists determined that **WASP 12-b** is being distorted and destroyed by its host star providing the scientists with a one-of-a-kind opportunity to observe how a planet enters the final stage of its life.

The tremendous tidal forces acting on the planet changes its shape and creates friction in its interior - this produces heat causing expansion.

EXO-PLANETS

The search for planets beyond our solar system has seen the discovery of more than 400 exoplanets to date, a number expected to rise to thousands in the next few years. New techniques and instruments are providing growing observational evidence that the Milky Way alone, with its 100 billion stars, - could contain millions of solar systems.

Detection methods include "transit observation" - measuring the dimming of a star's brightness as a planet passes in front of it, and, direct detection of the visible and infrared light from giant planets in wide orbits is becoming increasingly possible.

ASTEROID PROTECTION ?

An asteroid or comet larger than a kilometer (.62 mile) colliding with the Earth would be a very rare event. One would only expect a collision of this type to occur every several hundred thousand years, but would we have the technology to deflect an object so that it would pass harmlessly past the Earth?

Pieces of the technology are here - we have rockets that can launch the deflection hardware, and there are well-tested means to deliver and operate this hardware in the vicinity of a low-gravity body. In fact, one spacecraft already has landed on an asteroid.

We can only speculate about the effectiveness of planetary protection. The question as to whether or not we have the technology necessary for effective protection ultimately depends on the warning time we are granted by an asteroid or comet on a collision course with Earth.

GAMMA RAY SOURCES

A new study of the ever-present fog of gamma rays from sources outside our galaxy shows that less than a third of the emission arises from what astronomers once considered the most likely suspects - black-hole-powered jets from active galaxies.

Active galaxies possess central black holes containing millions to billions of times the Sun's mass. As matter falls toward the black hole, some of it becomes redirected into jets of particles traveling near the speed of light that can produce gamma rays.

CUBE-SATS

NASA has an initiative to launch small cube-shaped satellites for educational and not-for-profit organizations.

The satellites (CubeSats), are picosatellites - a cube of approximately four inches, with a volume of about one quart and weighing no more than 2.2 pounds.

NGC 1068

NGC 1068 is one of the nearest, brightest galaxies, and it contains a rapidly growing super massive black hole. X-ray data from the *Chandra X-ray Observatory* (red), optical data from the *Hubble Space Telescope* (green), and radio data from the *Very Large Array* (blue) can be seen in a new image.

A strong wind is being driven away from the center of the galaxy at a rate of about one million miles per hour. This wind is likely generated as surrounding gas is accelerated and heated as it swirls toward the black hole. It carries enough energy to heat the surrounding gas and suppress extra star formation. See:

<http://chandra.harvard.edu/photo/2010/ngc1068/>

NGC 1788

Stargazers all over the world are familiar with the distinctive profile of **Orion** (the Hunter). Fewer know about the nebula **NGC 1788**, a subtle, hidden treasure close to the bright stars in **Orion's** belt.

Its powerful winds and light have had a strong impact on the nebula, forging its shape and making it home to a multitude of infant suns. Very few of the stars belonging to the nebula are visible in this image, as most of them are obscured by the dusty cocoons surrounding them. See: <http://www.eso.org/public/videos/eso1009a/>

SOLAR PUZZLE SOLUTION

The solar **chromosphere** is the area separating the Sun's surface--the **photosphere**, from its extended atmosphere, the **corona**. Why the solar **corona** is millions of degrees hotter than the Sun's visible surface has long been an unsolved astronomical puzzle.

Recently, astrophysicists studied images from the high-resolution telescope on the *Hinode* spacecraft and discovered a new type of **spicule**. Typical **spicules** are jets of dense plasma that shoot up from the chromosphere and return along the same path.

But the new **spicules** are hotter, shorter lived and faster moving than their brethren.

These jets likely contain plasma that ranges in temperature from 10,000 to several million degrees Celsius, and have a life span of no more than 10 to 100 seconds.

MOON CRATER

Shortly after the Moon formed, an asteroid smacked into its southern hemisphere and gouged out an enormous crater almost 1,500 miles across and more than five miles deep.

This is the biggest, deepest crater on the Moon - an deep hole that could engulf the United States from the East Coast through Texas.

Asteroid bombardment over billions of years has left the lunar surface pockmarked with craters of all sizes, and covered with solidified lava, rubble, and dust. Glimpses of the original surface, or crust, are rare, and views into the deep crust are rarer still.

Fortunately, a crater on the edge of the crater formed by the later impact of a smaller asteroid may expose a portion of the Moon's lower crust. If correct, this may be one of just a few places on the Moon where we have a view into the deep lunar crust because it's not covered by volcanic material as are many other such deep areas.

LATE-BLOOMING GALAXIES

Astronomers have found the astronomical equivalent of prehistoric life in our intergalactic backyard: a group of small, ancient galaxies that has waited 10 billion years to come together.

These "late bloomers" are on their way to building a large elliptical galaxy. Such encounters between dwarf galaxies are normally seen billions of light-years away and therefore occurred billions of years ago. But these galaxies, members of **Hickson Compact Group 31**, are relatively nearby, only 166 million light-years away.

Everywhere the astronomers looked in this group they found batches of infant star clusters and regions brimming with star birth. The entire system is rich in hydrogen, the stuff of which stars are made. See: <http://www.spacedaily.com/images-lg/hubble-advanced-camera-globular-star-clusters-lg.jpg>

THAT HUNGRY MILKY WAY

A team of Australian scientists says that about a quarter of the globular star clusters in the Milky Way galaxy are invaders from other galaxies - having been born elsewhere and then migrated to the Milky Way. Astronomers had suspected that some globular star clusters, each containing between 10,000 and several million stars, were foreign to our galaxy but it was difficult to positively identify which ones.

They examined globular star clusters and compiled the largest ever high-quality database to record the age and chemical properties of each of these clusters. They determined that these foreign-born globular star clusters actually make up about one quarter of our Milky Way globular star cluster system.

That implies tens of millions of stars have joined and grown in our galaxy from globular star clusters alone! The researchers' work also suggests that the Milky Way may have swallowed up more dwarf galaxies than was previously thought.

3D SUN

A new iPhone app developed by NASA-supported programmers delivers a live global view of the Sun directly to your cell phone. Users can fly around the Sun, zoom in on active regions, and monitor solar activity. See: <http://3dsun.org/>

MARS WATER CONTROVERSY

Whether channels on Mars were formed by water or by lava has been debated for years, and the outcome may influence the likelihood of finding life there. Flowing lava can carve or build paths very much like the riverbeds and canyons etched by water, and this probably explains at least one of the meandering channels. Geologists think that the water currently on the surface is either held in the soil or as ice at the planet's poles. Some researchers contend that water flowed or pooled on the surface sometime in the past.

ICE ON THE MOON

Using data from a NASA radar that flew aboard India's *Chandrayaan-1* spacecraft, scientists have detected ice deposits near the Moon's north pole. They found more than 40 small craters with water ice. The craters range in size from 1 to 9 miles in diameter although the total amount of ice depends on its unknown thickness.

SOLAR STORMWATCH

The Royal Observatory, Greenwich, and partners, launched **Solar Stormwatch** where anyone can help spot and track solar storms, and be involved in the latest solar research. Volunteers can spot these storms and track their progress across space towards the Earth.

Intense magnetic fields churn and pummel the Sun's atmosphere. They store enormous amounts of energy that hurls billions of tons of material out into space. See: <http://solarstormwatch.com/> and <http://www.stfc.ac.uk/PMC/PReI/STFC/Stormwatcherswanted.aspx>

CRAB NEBULA

The Crab Nebula is the result of a supernova recorded in 1054 A.D. It is filled with mysterious filaments that are very complex but appear to have less mass than expelled in the original supernova. See:

http://www.nasa.gov/multimedia/imagegallery/image_feature_1604.html

METEORITES

More than 70 different amino acids have been found in meteorites that fell to Earth. Past studies have tested the survivability of many amino acids, but not to replicate the concentrations of organic molecules in actual meteorites.

Scientists have begun recreating how these molecules might have survived the crash on Earth. Their high-impact experiments could help indicate whether life on Earth got its start from material in space rocks.

Scientists know that roughly 20,000 tons of meteorites and other space particles fall to Earth each year. Any organic-bearing rocks could have made a big difference during the first 500 million years of the Earth's existence as a planet.

DWARF GALAXIES

Lowell Observatory astronomer Deidre Hunter is studying galaxies, small, diffuse galaxies: the dwarf irregulars--to learn all she can about star formation and the birth of the first stars after the Big Bang.

She said, "The problem is that the standard models for galaxies don't work for dwarfs. Dwarfs should not be forming stars at all. Stars form out of clouds of gas. Our quest is to figure out what the molecular clouds in these irregular galaxies are, and the processes that form stars."

THE CARRINGTON STORM

From September 1st to 2nd, 1859, the Sun blasted out a massive, record-breaking eruption of highly charged gases and plasma that may have weighed as much as a billion tons. At several million miles per hour, it collided with the Earth's magnetosphere -- an invisible, atmospheric cocoon surrounding Earth, and filled with charged particles controlled by the Earth's magnetic field. The 1859 magnetosphere temporarily went into a haywire state known as a geomagnetic storm.

Skies were set ablaze all over the world in technicolor auroras, and it blew out global telegraph systems, the highest-tech communication devices of the day.

The YOUNG ASTRONOMERS Newsletter is distributed by the Forsyth Astronomical Society. And is on the Internet through the courtesy of The Summit School, Winston-Salem, NC and FAS

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