THE YOUNG ASTRONOMERS NEWSLETTER

Volume 21 Number 9 | *STUDY + LEARN = POWER* | August 2013

BLUE PLANET

Astronomers have deduced the actual color of a planet orbiting another star 63 light-years from Earth The cobalt blue planet is one of the closest exoplanets that can be seen crossing the face of its star. The color comes not from an ocean reflection as on Earth, but the result of a hazy, blow-torched atmosphere containing high clouds laced with silicate particles. Silicates condensing in the heat could form very small drops of glass that scatter blue light more than red light. On this turbulent alien world, the daytime temperature is nearly 2,000 °F and it possibly rains glass -- sideways -- in howling, 4,500-mph winds.

STRANGE RADIO WAVE

A single burst of radio emission of unknown origin was detected outside our Galaxy about six years ago but no one was certain what it was or even if it was real. Four more of the mysterious bursts have removed any doubt that they are real. International research of the brightness and distance of the radio waves suggests that they may come from an extreme astrophysical event involving black holes or neutron stars (magnetars?).

GALAXY GROWTH

An international group of astronomers has spotted a distant galaxy absorbing nearby gas that is seen to fall inward toward the galaxy, creating a flow that both fuels star formation and drives the galaxy's rotation. This is the best direct observational evidence so far supporting the theory that galaxies pull in and devour nearby material in order to grow and form stars.

EARTH'S SECOND MOON ?

A U.S lunar scientist says that the Earth may once have had two moons, one of them a smaller twin that collided with the Moon. It would have orbited Earth at the same speed and distance and just got slowly sucked in until they hit and then combined into one moon. Most scientists have supported the theory the Moon was once part of the Earth that was thrown off after a collision with another body.

A PLANET WITH WATER ?

European astronomers have devised a technique to detect water in the atmosphere of planets orbiting other stars. They found an infra-red signature from water in the atmosphere of a gassy planet called **HD 189733b**, which orbits its star every two days and is hot enough to melt steel. The work is another technical breakthrough in the fast-moving field of exoplanet research, they said.

IOWA CRATER

Scientists say air and ground surveys confirmed the existence of an ancient impact crater buried beneath the town of Decorah in Iowa. The surveys identified the crater as 3.4 miles wide, almost five times the size of the Barringer Meteor Crater in Arizona. The crater's existence was first noted in 2008 when geologists examining cuttings from drilled water wells were surprised to find evidence of a previously unknown shale deposit. The shale layer was preserved within the crater but eroded away nearly everywhere else.

AUSTRALIAN WFA

The Murchison *Widefield Array* telescope *(WFA)* in remote Western Australia is now in operation. The low-frequency, wide-field radio telescope will be able to capture a vast amount of data from the Southern Hemisphere sky.

SPACE COMMUNICATIONS

NASA is testing a new communications technology that could dramatically improve communications with spacecraft, help commercial missions and strengthen transmission of scientific data. It could also improve NASA's data rates for communications with future spacecraft by a factor of 10 to 100.

NEW OBSERVATORY IN TIBET

An observatory being built in Tibet is expected to be the best astronomical observatory in Asia. The observatory, located in Tibet's Ngari prefecture, is sited in an ideal place for astronomical monitoring with its high altitude, transparent atmosphere and mild weather.

It is expected to be completed within 10 years and is the first to be built above 16,000 feet in the northern hemisphere. Astronomers from the Chinese mainland, Taiwan, Japan and the Republic of Korea will use the *Ngari* observatory to carry out joint research programs.

NEW NEPTUNE MOON

A new moon has been discovered orbiting the distant blue-green planet Neptune. It is Neptune's 14th moon and has been designated ***S/2004 N 1*** – (*now 178 in the solar system*). The moon is estimated to be no more than 12 miles across, making it the smallest known moon in the Neptunian system. It completes one revolution around Neptune every 23 hours. See:

http://hubblesite.org/news/2013/30

ANCIENT LUNAR CALENDAR

Archaeologists say they've discovered what they believe is the world's oldest lunar calendar in a field in Scotland. They uncovered a series of 12 pits that appear to mimic the phases of the Moon and mark out lunar months and said the ancient monument was likely created by hunter-gatherers about 10,000 years ago. If so, the *Mesolithic* calendar is thousands of years older than time-measuring monuments found in Mesopotamia.

STAR COLLISIONS

Warsaw astrophysicists have discovered that collisions between the remains of monstrous stars, with masses reaching 200-300 times that of our Sun, will not occur until billions of years from now, if then.

Astronomers have long believed that the biggest stars in the Universe do not exceed 150 solar masses. However, three years ago star clusters in the Magellanic Clouds were discovered to house "impossible" stars - tremendous monsters with masses between 200 and 300 times as large as the Sun.

See:**http://www.eurekalert.org/pub_releases/2013-07/fopu-smd071113.php**

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

The Sky Tonight? **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** *** * * ***

A NEW KIND OF TELESCOPE - A unique new instrument at Gemini South in Chile has released ultra sharp large-field images from the instrument's first science observations, demonstrating its remarkable discovery potential. The system is now in regular use streaming data to scientists around the world – it is providing impressive detail in their studies of the universe.

Puzzles

Find The Word

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

ANNAL
ARRAY
COMES
CRATER
EARTH
GASSY
GLASS
KOREA
MASSES
MIMIC

MOONS
OLDEST
RADAR
RADIO
RAINS
SAVES
SMALL
STEEL
TIBET
WELLS

Scrambled Astronomy:

ASTRONOMERS

ARCDHNA __ __ __ __ __ __ __

IASNICS __ __ __ __ __ __ __

BUHLBE __ __ __ __ __ __

RLPEEK __ __ __ __ __ __

EABRH __ __ __ __ __

(Answers below)

==========

The YOUNG ASTRONOMERS NEWSLETTER is on the Internet at:
http://www.fas37.org *(FAS)* and **http://204.200.153.100/pwood/sfair/yan.html** *(The Summit School)*

==========

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

Spiral galaxy *Messier 61* - **http://www.nasa.gov/images/content/756393main_potw1324a.jpg**
Best Moon image - **http://apod.nasa.gov/apod/astropix.html** Strange cube near Sun –what is it ??:
http://www.disclose.tv/action/viewvideo/146254/Huge_Cube_Caught_Next_To_Sun_2013/

SITE OF THE MONTH

ESO Chile - **http://www.eso.org/public/**

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

New Moon: 8/6 **First Quarter:** 8/14 **Full Moon**: 8/21 **Last Quarter:** 8/28

Apogee: 8/3 4:54 AM 252,173 mi. (405833 km} ****** The August Full Moon is the **Red Moon** and the
Perigee: 8/18 9:27 PM 225,100 mi. (362264 km) **Sturgeon Moon**
Apogee: 8/30 7:47 PM 251,582 mi. (404882 km) **** Best observing nights**: 8/1 – 8/13; 8/27 - 8/31

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

NEPTUNE is opposite the Sun on the night of 8/26-27. It is in the east after sunset and moves towards the southwest during the night. This will be the best telescope viewing of Neptune in 2013. All month, **VENUS** is on the western horizon after the Sun sets. **JUPITER** is in the eastern morning sky and rises in the east around 2 AM by month's end. **MERCURY** forms a trio with Jupiter and Mars in the east's early morning sky and is below the horizon after the 15th. It is behind the Sun on the 24tth (*superior conjunction*). **SATURN**, in Virgo, is at the upper left of Venus and moving closer during August. Small scopes show Saturn's moons and a great view of the planet's rings. **MARS** is at the lower left of Jupiter all month long. **URANUS** is low in the east after midnight. It is an "easy" sight with binoculars – a faint blue-green planet – just a small spot.

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

NAME	DATES	BEST NIGHT	PER HOUR	WHERE TO LOOK
PERSEIDS	8/12 – 8/13	8/12 – 8/13	50 - 75	In the northeast before dawn. The Perseids shower is the best known of all. And there's NO MOONLIGHT to interfere with good seeing - a rarity. The Perseids move very fast - about half leave long trains. The earliest records of this shower are in Chinese annals from 36 AD. The American Meteor Society is investigating 115 reports about fireballs in 23 states.

LOOK FOR: **>>>>> CLUSTERS: M7** and **M6** just above the tail of The Scorpion low in the south. **>>>>> A bright open cluster** to their upper left near the Teapot's Spout in Sagittarius. **>>>>> THE HAIR OF BERNICE** – an *Open Cluster* below Bootes in the west. **>>>>> THE PERSEUS DOUBLE CLUSTER** is between Cassiopeia and Hercules in the northeast. **>>>>> M13** in **HERCULES** is overhead, to the west of bright Vega. It is a *Globular Cluster* – a compact concentration of thousands of stars. Also, the **Pleiades** and **Hyades** are *open clusters*.

EXOPLANET'S ATMOSPHERE

A Japanese research team has observed the atmosphere of super-Earth "GJ3470b", an exoplanet in **Cancer**, for the first time in the world using two telescopes. This super-Earth is about 14 times the mass of Earth, and the second lightest one among already-surveyed exoplanets.

The observational data revealed that this planet is highly likely to NOT be covered by thick clouds. The researchers expect that future detection of the specific composition of the planet's atmosphere based on highly accurate observations with larger aperture telescopes, such as the Subaru Telescope.

We don't yet understand the formation process of such planets. If any substance is found, such as water or methane which becomes ice at low temperatures, it probably means that this planet was originally formed at a distance (a few astronomical units) from the primary star, where ice could exist, and moved toward the primary star thereafter.

BLACK HOLES

~ *A COOL WIND !*

Over the last twenty years, astronomers have found that almost all galaxies have a huge black hole at their center. Some are growing by drawing in matter from their surroundings, creating in the process the most energetic objects in the Universe.

Rather than finding all of the glowing dust in a doughnut-shaped "ring" (torus) around a black hole, astronomers observing NGC 3783 found that much of it is located above and below the torus. These observations show that dust is being pushed away from the black hole as a cool wind - a surprising finding that challenges current theories and tells us how supermassive black holes evolve and interact with their surroundings.

~ *BLACK HOLE'S LIGHT*

A new study by astronomers at NASA, Johns Hopkins, and Rochester Institute of Technology confirms long-held suspicions about how stellar-mass black holes produce their highest-energy light. By analyzing a supercomputer simulation of gas flowing into a black hole, the team finds they can reproduce a range of important X-ray features long observed in active black holes.

Gas falling toward a black hole initially orbits around it and then accumulates into a flattened disk. The gas stored in this disk gradually spirals inward and becomes compressed and heated as it nears the center. Ultimately reaching temperatures up to 20 million degrees Fahrenheit the gas shines brightly in low-energy, or soft, X-rays.

BACKYARD SUPERNOVA

August, 2011, saw the dazzling appearance of the closest and brightest ***Type Ia supernova*** since Type Ia's were established as "standard candles" for measuring the expansion of the universe.

The brilliant visitor, labeled **SN 2011fe**, was caught by the Palomar Transient Factory less than 12 hours after it exploded in the **Pinwheel Galaxy** in the Big Dipper.

Easy to see through binoculars, **2011fe** was soon dubbed the Backyard Supernova.

ASTEROID DESTROYER

A Russian scientist said Soviet-era **Satan** missiles can be used to destroy Earth-threatening asteroids like the one that exploded over Chelyabinsk in February. The senior researcher said the SS-18 Satan heavy intercontinental ballistic missiles can remain in a condition of readiness for launching for 10 or more years, with some reequipping and can be used for demolishing objects with a diameter of up to 328 feet if equipped for that purpose. A missile reequipped with a booster would be able to destroy objects five or six hours before their collision with the planet, he added.

ARP 142

A *Hubble Space Telescope* image of a celestial bird with two galaxies. They are called ***Arp 142*** and the pair contains the disturbed, star-forming spiral galaxy **NGC 2936**, along with its elliptical companion, **NGC 2937** at lower left. Once part of a flat, spiral disk, the orbits of the galaxy's stars have become scrambled due to gravitational tidal interactions with the other galaxy. This warps the galaxy's orderly spiral, and interstellar gas is strewn out into giant tails. For more info, see: **http://heritage.stsci.edu/2013/23/**

A STAR WITH SEVEN PLANETS

Gliese 667C is part of a triple star system known as ***Gliese 667*** in the constellation of **Scorpius**. Studies had found that **Gliese 667C** hosts three planets with one of them in the habitable zone.

Now a team of astronomers has found evidence for up to seven planets around the star. Since the new planets fill up the star's habitable zone, there are no more stable orbits in which a planet could exist at the right distance to it. Three of the planets are more massive than Earth, but less than Uranus or Neptune.

They are within their star's habitable zone, a thin shell around a star in which water may be present in liquid form if conditions are right. This is the first time that three such planets have been spotted orbiting in this zone in the same system. *(Compare to the Sun.)*

TELESCOPES ON MARS

The launch of Man's first-ever mission to the Moon's south pole was announced by two private US companies which plan to set telescopes on top of a lunar mountain as early as 2016. The private $100 million enterprise mission will be both scientific and commercial. The telescopes' location will be able to provide the clearest images of the Milky Way galaxy that are expected to exceed anything produced by the best space-based instruments.

RUSSIAN METEORITE

A fragment of a meteorite that slammed into Russia's Urals region in February has been located on the bottom of a lake. The meteorite broke into approximately seven large fragments and one of them fell into the lake forming a hole in the ice over two feet in diameter.

Scientists who measured the magnetic field in the area where the meteorite chunk has presumably fallen said that the measurements indicated that an object, most likely a meteorite fragment about two feet in diameter and weighting approximately over 661 lbs is lying on the bottom of the lake.

STARS IN CLUSTERS

All stars begin their lives in groups. Most stars, including our Sun, are born in small, benign groups that quickly fall apart. Others form in huge, dense swarms that survive for billions of years as rich, dense clusters where stars jostle for room with thousands of neighbors while strong radiation and harsh stellar winds scour interstellar space, stripping planet-forming materials from nearby stars.

It would seem an unlikely place to find alien worlds, yet 3,000 light-years from Earth, in the star cluster **NGC 6811**, astronomers have found two planets smaller than Neptune orbiting Sun-like stars. Of the more than 850 known planets beyond our solar system, four - all similar to or greater than Jupiter - were found in clusters.

NEO'S

More than 10,000 asteroids and comets that can pass near Earth have now been discovered. "Finding 10,000 near-Earth objects is a significant milestone," said Lindley Johnson, program executive for NASA's Near-Earth Object Observations Program. "But there are at least 10 times that many more to be found before we can be assured we will have found any and all that could impact and do significant harm to the citizens of Earth."

A NEO hitting Earth would need to be about 100 feet or larger to cause significant devastation in populated areas. Almost 30 percent of the 460-foot-sized NEOs have been found, but less than 1 percent of the 100-foot-sized NEOs have been detected.

MATERIAL FOR THE FIRST STARS

The *Australia Telescope Compact Array telescope* has detected the raw material for making the first stars in galaxies that formed when the Universe was just three billion years old - less than a quarter of its current age.

The raw material for making stars is cold molecular hydrogen gas, H2. It can't be detected directly but its presence is revealed by a 'tracer' gas, carbon monoxide (CO), which emits radio waves. This opens the way to studying how these early galaxies made their first stars

MARTIAN BORATE

University of Hawaii researchers have discovered high concentrations of boron in veins of clay in a Martian meteorite. They determined boron abundances in these clays are over ten times higher than in any previously measured meteorite. When present in its oxidized form (borate), boron may have played a key role in the formation of RNA, one of the building blocks for life

VOYAGER 1

Data from *Voyager 1*, now more than 11 billion miles from the Sun, suggest the spacecraft is closer to becoming the first human-made object to reach interstellar space. It is the last region the spacecraft will cross before it leaves the *heliosphere* - the bubble around the Sun, and enters interstellar space.

Scientists have seen two of the three signs of interstellar arrival: charged particles disappearing as they zoom out along the solar magnetic field and cosmic rays from far outside zooming in.

But they have not yet seen the third sign, an abrupt change in the direction of the magnetic field, which would indicate the presence of the interstellar magnetic field

A DUST TRAP

Astronomers with Chile's ALMA space observatory said that a "dust trap" surrounding a young star could explain how planets are formed. In a system called **Oph-IRS 48,** they discovered that the star was circled by a ring of gas with a central hole, but what surprised them was the view of where millimeter-sized dust particles were found. They noted that the conditions in the "comet factory" were right for the particles to grow from millimeter to comet size, but not to planet size. What they had come across was a so-called dust trap -- a place where larger dust grains were trapped and could grow in size by colliding and sticking together.

SPIRAL GALAXIES

Normal spiral galaxies are surrounded by halos of gas that can extend to over 1 million light-years in diameter. The current estimated diameter of the Milky Way, for example, is about 100,000 light-years – *a light-year is roughly 6 trillion miles.*

University of Colorado Boulder researchers say that this gas is stored and then recycled through an extended galaxy halo, falling back onto the galaxies to reinvigorate a new generation of star formation. And, "In many ways this is the 'missing link' in galaxy evolution that we need to understand in detail in order to have a complete picture of the process."

SUN'S OUTER ATMOSPHERE

Researchers at the University of Central Lancashire report the discovery of fast-moving "highways" and intriguing "sparkles" that may help answer long-standing questions about the coronal mass ejections that carry billions of tons of plasma into space. **T**he NASA *C-1* sounding rocket has captured the sharpest images yet of the Sun's outer atmosphere.

See: **http://www.disclose.tv/news/Rocket_camera_catches_Sun_sparkles/90501**

PLUTO'S MOONS

The names of Pluto's two smallest known moons, previously referred to as "P4" and "P5," have been formally approved by the International Astronomical Union (IAU). P4 has been named **Kerberos**, after the three-headed dog of Greek mythology. P5 has been named **Styx**, after the mythological river that separates the world of the living from the realm of the dead.

They join Pluto's moons Charon, Nix and Hydra. According to IAU rules, Pluto's moons are named for characters in the Underworld of Greek and Roman mythology.

New Horizons will provide up-close looks at Kerberos, Styx and companion moons in 2015, when it becomes the first spacecraft to fly through the Pluto system.

MERGING GALAXIES

In Triangulum (The Triangle) in the northern sky, two galaxies, PGC 9074 and PGC 9071 that will gradually attract each other. See: **http://www.nasa.gov/sites/default/files/potw1325a_0.jpg?itok=s-KWCu4I**

****

The YOUNG ASTRONOMERS NEWSLETTER is distributed by the Forsyth Astronomical Society.

:SREWSNA YMONORTSA DELBMARCS
EHARB ,RELPEK ,ELBBUH ,INNISAC ,ARDNAHC