The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence

Volume 34 Number 08 **August 2008**

Calendar of Events

Summer Break

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INSIDE THIS ISSUE

Report from the Officers:

As we noted last newsletter, our June 25 observing session in the park after the band concert went well in two ways—the weather held up nicely and we were joined by a photographer from the Journal-World. The pictures led to an interview and a nice article in the newspaper the weekend prior to our last scheduled session in the park on July 9. This was very good publicity for the club but, unfortunately, the weather returned to its normal pattern and the last observing session in the parl was cancelled. For your reading pleasure, the JW article and photos are reproduced below and on pg. 5. The rest of the summer is a break from any scheduled events, but we will return to our normal meeting schedule with the start of the Fall semester. With luck, we will have a set of scheduled dates for the Fall meetings in the next newsletter,

As some of you know, the club president, Luis Vargas, (pictured above) is now doing astronomical research in Japan. We are coordinating a transfer of power and should have a new administration in place by the next newsletter. Best of luck to Luis in his future astronomical endeavors. To everyone else, stay cool.

Of Local Interest

Starlight, star bright: Astronomy simple, inexpensive hobby to share with kids—Lawrence Journal World

A hot night, a breeze, a clear, starry sky and a telescope — ingredients for a fun summer memory for the folks at the Astronomy Associates of Lawrence.

On Wednesday, weather permitting, the group will host its third and final Astronomy in the Park event this summer. The free event takes place after the Lawrence City Band concert on the west side of South Park. Between 9 p.m. and 10 p.m., kids and adults alike can get a good look at the stars through various telescopes. For families whose children have a thirst for the stars, there are a number of ways to introduce or enhance learning about the solar system and the universe any day of the year, says Barbara J. Anthony-Twarog, professor of astronomy and astrophysics at Kansas University and a member of the group.

Anthony-Twarog also says it doesn't have to be complicated or expensive to cultivate a child's interest in the starry night. It certainly wasn't expensive for her parents to get her hobby going, and now she's made a career out of it.

"I don't remember not being interested in astronomy, and I did have a small telescope when I was in my teens," she says. "I don't think my parents knew much about the hobby but they encouraged any science interests — just let me do my own thing."

First things first: Anthony-Twarog doesn't recommend buying a telescope right away. A good one can costs hundreds of dollars and might just become an expensive clothes hanger if a child becomes uninterested later on. But there are some cheap and easy tools that are much better for introducing children to astronomy,

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(Continued from page 1)

Anthony-Twarog says — starting with multi-use binoculars.

"I recommend binoculars (because they are) cheaper and usable for other things. Plus they are intuitive to use — point at what you want to see and magnify," Anthony-Twarog says. "Depending on the mount, a telescope may be anything but intuitive to use, might require some setup and assembly and some training or practice to use. It's true, though, that good binoculars are made even better by a good tripod mount for them, to make them more stable." Rachel Ybarra, sales associate at The Toy Store, 936 Mass., also recommends binoculars for their cool price.

"We have several sets of binoculars that start around $6 and they work fine for kids learning to use them," Ybarra says. "We have one telescope. That one actually is relatively complicated, probably at 10 years old they would kind of learn how to use it with parent supervision." Outside of gazing at the sky, Anthony-Twarog says parents can find two good tools for under $20 each: A good book and a planisphere — a circular map to the stars that can be adjusted by the hour and time of year.

"A book with charts for different times/seasons or a reasonably good planisphere is quite helpful," Anthony-Twarog says. "Then, if the parent is willing to explore with the child, the value is increased many times."

Ybarra says those items would be great for the kids she normally sees in the store asking specifically for astronomy gear. "Seems like the kids who really start to get interested in that are a little bit older, 7- to 8-year-old range. It seems like we have a pretty good split of boys and girls," Ybarra says, recommending a night light that displays constellations on the ceiling for younger children. "I think at 6, 7, 8, is when they really start to understand it, younger than that and the night light is really cool, but I don't think they really put it all together."

But when they do put it together, and begin to understand, there can be a lot of fun and learning to be had, says Anthony-Twarog. "It's ... fun to have a planisphere and a flashlight on a nice night," she says. "What a great summer vacation memory." (More photos on pg. 5).

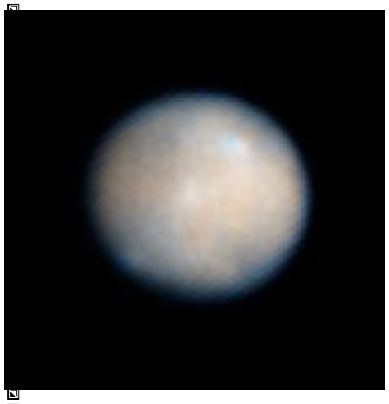
About the Astronomy Associates of Lawrence

The club is open to all people interested in sharing their love for astronomy. Monthly meetings are typically on the second Friday of each month and often feature guest speakers, presentations by club members, and a chance to exchange amateur astronomy tips. Approximately the last Sunday of each month we have an open house on Memorial Stadium. Periodic star parties are scheduled as well. For more information, please contact the club officers:Luis Vargas at lcvargas@ku.edu, Gary Webber at gwebber@ku.edu, our faculty advisor, Prof. Bruce Twarog at btwarog@ku.edu. our events coordinator, Rick Heschmeyer at rcjbm@sbcglobal.net. Because of the flexibility of the schedule due to holidays and alternate events, it is always best to check the Web site for the exact Fridays and Sundays when events are scheduled. The information about AAL can be found at **http://www.ku.edu/~aal.**

Copies of the *Celestial Mechanic* can also be found on the web at
http://www.ku.edu/~aal/celestialmechanic

POSSIBLE ÉMIGRÉ

HST Press Release



A new proposal suggests the largest of all asteroids, Ceres (pictured here as seen by the Hubble Space Telescope), is actually an émigré from the Kuiper belt, a reservoir of frozen bodies that includes Pluto.

If planetary scientist Bill McKinnon's hunch is right, the largest asteroid in the solar system isn't an asteroid at all. Ceres, as the 470-kilometer-wide object is called, may be a relative of Pluto that formed at the solar system's fringes but came in from the cold several billion years ago. McKinnon, based at Washington University in St. Louis, said he was first struck by Ceres' unusually low density — more similar to icy comets from the outer solar system than the rocky bodies found in the asteroid belt that lies between the orbits of Mars and Jupiter. The density of Ceres, referred to as a dwarf planet, is only slightly higher than that of Pluto. Models suggest Ceres "looks remarkably Pluto-like," McKinnon says.

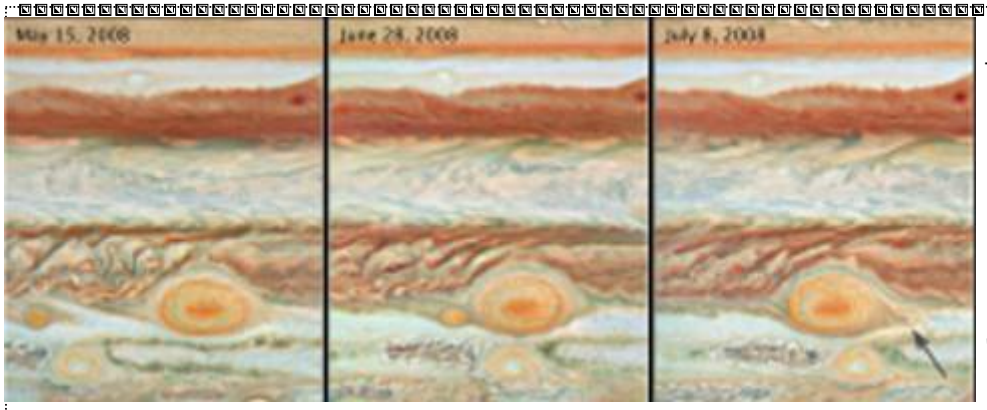
But it was a recently developed model of the early solar system that prompted McKinnon to formally propose that Ceres might be an escapee from the Kuiper belt, an outer solar system reservoir of frozen bodies that includes Pluto. He presented his proposal July 15 in Baltimore at the Asteroids, Comets, Meteors conference.

According to the model, developed by researchers including Hal Levison and Bill Bottke of the Southwest Research Institute in Boulder, Colo., and Alessandro Morbidelli of Observatory of the Côte d'Azur in Nice, France, the orbits of the outer four planets — Jupiter, Saturn, Uranus and Neptune — were initially packed much closer together than they are today. Beyond these planets resided a band of dust, ice and gas particles. Over time, as some of these particles leaked inward, their gravitational tug lengthened the distance between the orbs. For instance, Jupiter migrated inward, while Saturn moved outward.

At some point, according to the theory, Saturn reached a gravitational sweet spot: The time it took to go around the sun became exactly twice that of Jupiter's. That interplay strengthened the planets' mutual tug, and ultimately hurled Uranus and Neptune into the outlying band of dust, ice and gas. The entry of Uranus and Neptune scattered debris from the chilly band, sending some of its denizens into the inner solar system. That's how Ceres might have migrated from the outer solar system into the asteroid belt, McKinnon suggests.

"We are saying that many objects from the outer solar system — what we call the primordial disk of comets that went on to produce the Kuiper belt — are captured in the outer part of the asteroid belt as a byproduct of the model," Bottke says. He and Levison presented updated versions of the theory at the meeting just before McKinnon's presentation. "I consider McKinnon's idea as something of a thought balloon to stimulate thinking," Bottke says. "It is indeed possible that he is correct, but I would not bet for it at this point."

Additional information on Ceres' composition, to be gathered by NASA's Dawn spacecraft when it visits Ceres in 2015, could clarify the body's origin. But proof may require measuring the ratio of hydrogen to its heavier isotope, deuterium, in the ices or water vapor venting from the body, which would require a mission beyond Dawn, McKinnon says. If the ratio matches that observed in comets, "the case is closed" for Ceres being an émigré to the asteroid belt, he says.



JUPITER 3-SPOT

This sequence of Hubble Space Telescope images offers an unprecedented view of a planetary game of Pac-Man among three red spots clustered together in Jupiter's atmosphere. The time series shows the passage of the "Red Spot Jr." in a band of clouds below (south) of the Great Red Spot (GRS). "Red Spot Jr." first appeared on Jupiter in early 2006 when a previously white storm turned red. This is the second time, since turning red, it has skirted past its big brother apparently unscathed. But this is not the fate of "baby red spot," which is in the same latitudinal band as the GRS. This new red spot first appeared earlier this year. The baby red spot gets ever closer to the GRS in this picture sequence until it is caught up in the anticyclonic spin of the GRS. In the final image the baby spot is deformed and pale in color and has been spun to the right (east) of the GRS.

Death of a Supergiant

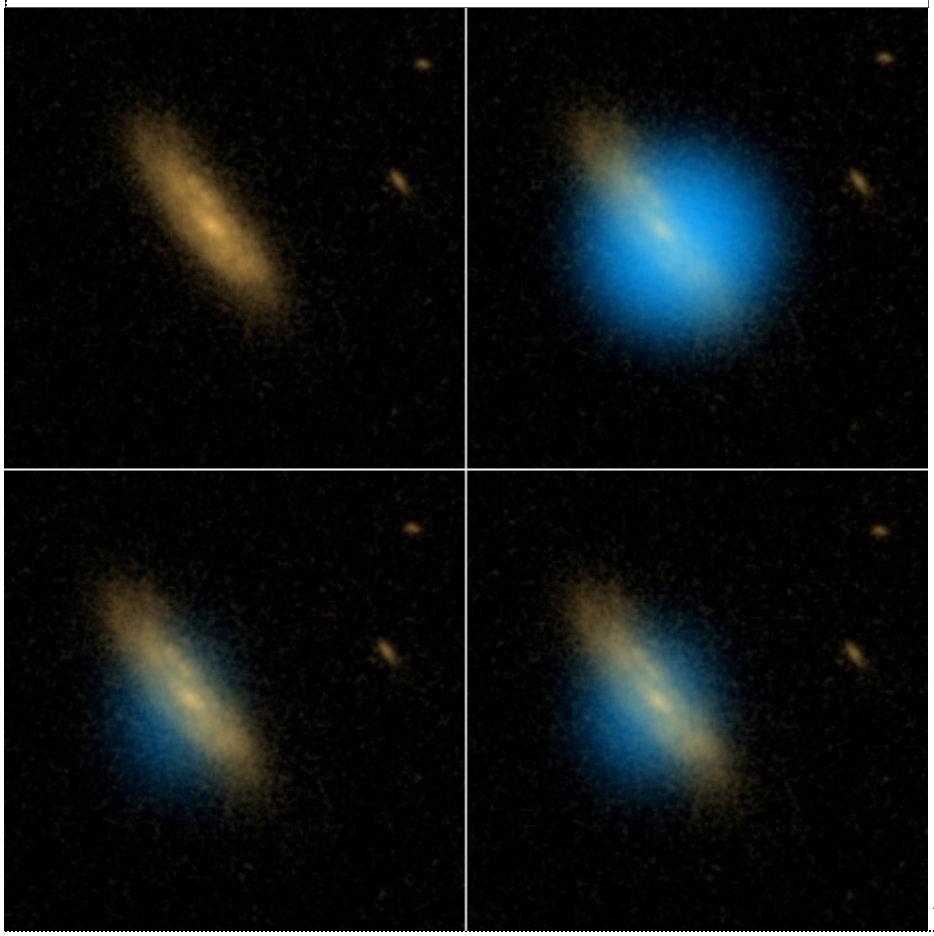
By all outward appearances, the red supergiant appeared normal. But below the surface, hidden from probing eyes, its core had already collapsed into an ultra-dense neutron star, sending a shock wave racing outward from the star's center at around 50 million kilometers per hour.

The shock wave superheated the plasma in its path to almost a million degrees Kelvin, causing the star to emit high-energy ultraviolet (UV) radiation. About six hours later, the shock wave reached the star's surface, causing it to explode in a Type IIP supernova named SNLS-04D2dc. Long before the explosion's visible light was detected by telescopes on Earth, NASA's Galaxy Evolution Explorer (GALEX) space telescope captured the earlier pulse of UV light — scientists' first glimpse of a star entering its death throes.

"This UV light has traveled through the star at the moment of its death but before it was blown apart," explains Kevin Schawinski, the University of Oxford astrophysicist who led the observation. "So this light encodes some information about the state of the star the moment it died."

And that's exactly why astronomers are so excited. Observing the beautiful nebula left behind by a supernova doesn't reveal much about what the star was like before it exploded; most of the evidence has been obliterated. Information encoded in these UV "pre-flashes" could offer scientists an unprecedented window into the innards of stars on the verge of exploding. In this case, Schawinski and his colleagues calculated that just before its death, the star was 500 to 1000 times larger in diameter than our sun, confirming that the star was in fact a red supergiant. "We've been able to tell you the size of a star that died in a galaxy several billion light-years away," Schawinski marvels.

Sequence of images shows supernova start to finish. The top left image shows the galaxy before the supernova. At top right, the bright UV flash called the shock breakout indicates a red supergiant has collapsed. At bottom left, moments later, the flash is mostly gone. As the debris expands, it heats up again and becomes brighter (bottom right). The supernova became 10 times the size of the original over the following few days, thus becoming visible to supernova hunters.

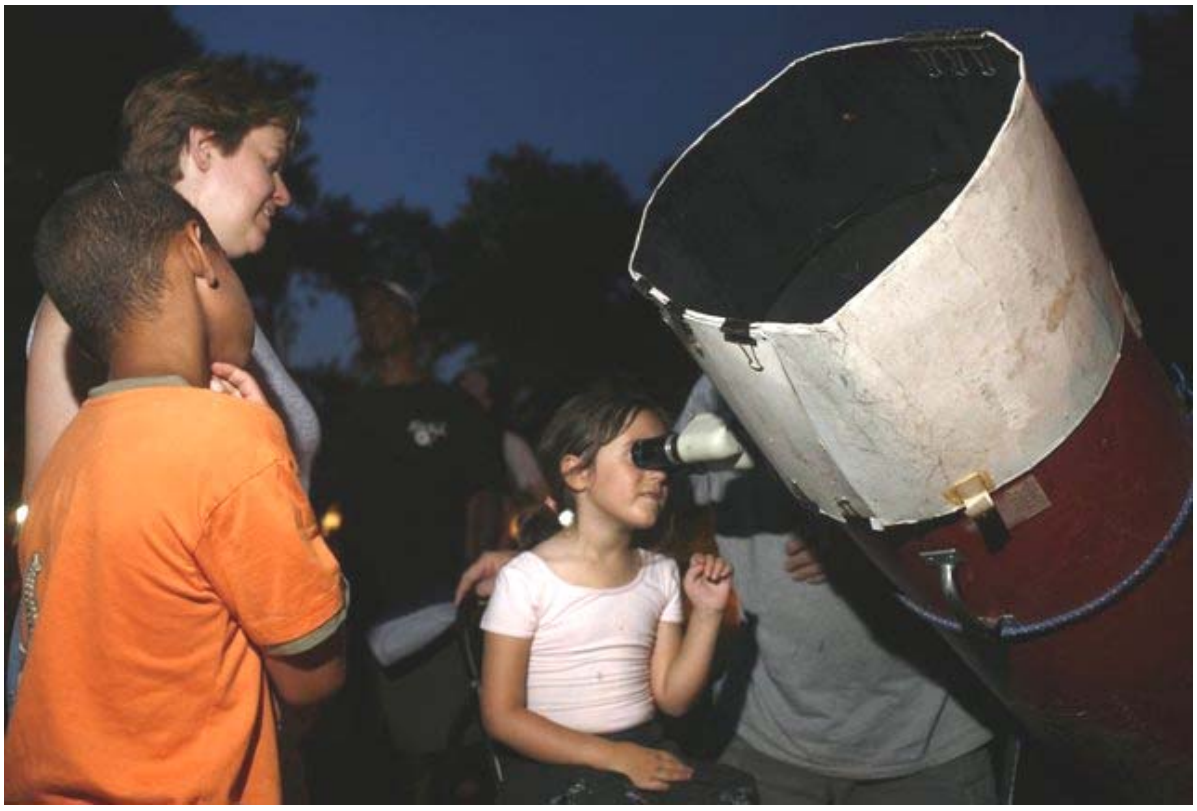


"GALEX has played a very important role in actually seeing this for a few reasons," Schawinski says. First, GALEX is a space telescope, so it can see far-UV light that's blocked by Earth's atmosphere.

Also, GALEX is designed to take a broad view of the sky. Its relatively small 20-inch primary mirror gives it a wide, 1.2-degree field of view, making it more likely to catch the UV flash preceding a supernova. With these advantages, GALEX is uniquely equipped to catch a supernova before it explodes. "Just when we like to see it," Schawinski says.

For more information, visit www.galex.caltech.edu, "Ultraviolet Gives View Inside Real 'Death Star'." Kids can check out how to make a mobile of glittering galaxies at spaceplace.nasa.gov/en/kids/galex_make1.shtml .This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

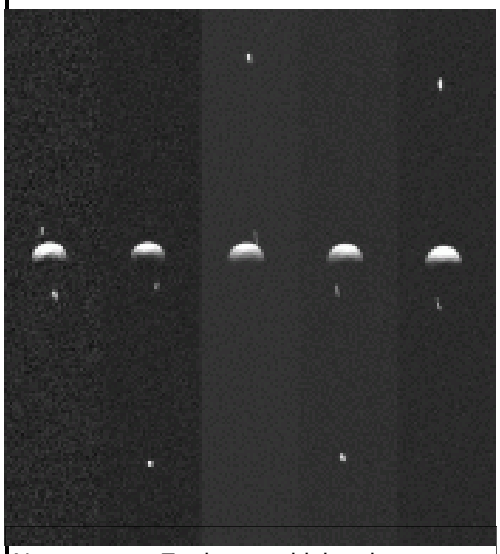
Astronomy Associates of Lawrence members search for planets during a gathering at South Park, 1200 Mass.



Six-year-old Sammi Dunham takes a closer look at Saturn during an Astronomy Associates of Lawrence public viewing June 25 at South Park.

First triple near-Earth asteroid found
Science News

For radio astronomers seeking a detailed study of a near-Earth asteroid, last February proved a perfect opportunity. The large rock known as 2001 SN263 remained in the field of view of the giant radio dish at Arecibo Observatory in Puerto Rico for long periods during the asteroid's 16-day sojourn near Earth. Arecibo astronomers Mike Nolan, Ellen Howell and their colleagues got hours of observing time.



Not one near-Earth asteroid, but three, are visible in this series of radar images of the rocky body known as 2001 SN263. The largest chunk of the trio, which is about 2 kilometers in diameter, appears spherical. The narrowness of the smaller orbiting pieces is due to their slower rotations relative to the primary body. Nolan et al./Arecibo

To their surprise, they found that 2001 SN263 isn't one rock, but three — the first triple system discovered among near-Earth asteroids. The largest chunk has a diameter of about 2 kilometers while two smaller fragments that orbit the main body are 1 km and 400 meters in diameter, Nolan reported July 17 at the Asteroids, Comets, Meteors meeting in Baltimore.

With only one example, "we don't know how common triple or other multiple systems are and if they are similar or different in their formation," says Howell. In attempting to divert a near-Earth asteroid that might hit Earth, it would be important to know which rocks have partners, Nolan notes. "You would need to make sure you pushed all the components aside, not just the primary," he says.

Astronomers have previously identified about 30 binary near-Earth asteroids. Nolan suspects that many of these binaries, as well as the new-found triple, could have formed in a similar manner. When sunlight strikes a near-Earth object that isn't perfectly spherical, the uneven heating of the surface causes the body to spin up. If the object spins too fast, it breaks apart and can sometimes form stable satellites that orbit the main body.

Although binaries and triples have been found farther out, in the main asteroid belt between the orbits of Mars and Jupiter, as well as in the Kuiper Belt of frozen bodies beyond Pluto, these objects probably didn't fragment in the same way, Nolan suggests, because the intensity of sunlight striking these bodies is much more feeble.

Young Galaxies Surprisingly Magnetic - Space.com

Galaxies much like ours harbor mysterious magnetic fields, which turn out to build up much faster than scientists realized, a new study has found. By analyzing light coming from distant galaxies at a time early in the universe's history, astronomers were able to show that these galaxies developed magnetic fields much sooner than expected. The finding may force scientists to rethink their understanding of how magnetic fields grow inside galaxies.

"The magnetic fields in these galaxies were very strong, at least as strong as they are today, at a time when the age of the universe was only one third of its current age," said researcher Francesco Miniati of the Swiss Federal Institute of Technology. "That puts strong constraints on the evolution of magnetic fields." The discovery was made with the help of faraway light sources that served to illuminate the galaxies being studied. Miniati and his colleagues used the European Southern Observatory's Paranal Observatory to observe the very distant bright objects, called quasars, in both visual and radio frequency light. Quasars are the central regions of some galaxies where supermassive black holes generate tremendous emissions across the electromagnetic spectrum, from radio waves to visible light and x-rays.

The radio waves the researchers observed often showed signs of having passed through a magnetic field. It turned out, when a normal galaxy lay between Earth and the quasar, the magnetic field signature on the light was most strong. This told the researchers that it was the foreground galaxies, and not the quasars, that held the responsible magnetic fields. "We were surprised that we could actually measure this so cleanly, and we were surprised that these galaxies had such strong magnetic fields early on," Miniati told *SPACE.com*. "This has been suggested before, but seen convincingly only for some individual galaxies. What we were able to show with this measurement is that all regular galaxies early on have these kinds of strong magnetic fields." Scientists think galactic magnetic fields start from tiny magnetic seeds, perhaps created inside stars or quasars, and are then amplified over time as the turbulent movement of galactic gas, stirred up by stellar explosions, and the galaxy's rotation cause the magnetic fields to grow. This standard picture, however, can only account for strong magnetic fields that build up slowly over time. The new finding means scientists must come up with an improved explanation for how magnetic fields build up inside galaxies in the young universe such as those Miniati and his team observed.

Rare 'Star-Making Machine' Found In Distant Universe

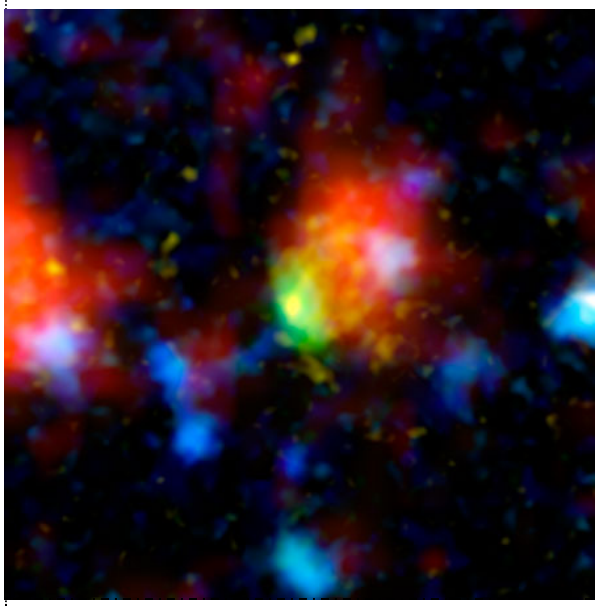
Astronomers have uncovered an extreme stellar machine -- a galaxy in the very remote universe pumping out stars at a surprising rate of up to 4,000 per year. In comparison, our own Milky Way galaxy turns out an average of just 10 stars per year.

The discovery, made possible by several telescopes including NASA's Spitzer Space Telescope, goes against the most common theory of galaxy formation. According to the theory, called the Hierarchical Model, galaxies slowly bulk up their stars over time by absorbing tiny pieces of galaxies -- and not in one big burst as observed in the newfound "Baby Boom" galaxy. "This galaxy is undergoing a major baby boom, producing most of its stars all at once," said Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology, Pasadena. "If our human population was produced in a similar boom, then almost all of the people alive today would be the same age." Capak is lead author of a new report detailing the discovery in the July 10th issue of Astrophysical Journal Letters.

The Baby Boom galaxy, which belongs to a class of galaxies called starbursts, is the new record holder for the brightest starburst galaxy in the very distant universe, with brightness being a measure of its extreme star-formation rate. It was discovered and characterized using a suite of telescopes operating at different wavelengths. NASA's Hubble Space Telescope and Japan's Subaru Telescope, atop Mauna Kea in Hawaii, first spotted the galaxy in visible-light images, where it appeared as an inconspicuous smudge due to is great distance.

It wasn't until Spitzer and the James Clerk Maxwell Telescope, also on Mauna Kea in Hawaii, observed the galaxy at infrared and submillimeter wavelengths, respectively, that the galaxy stood out as the brightest of the bunch. This is because it has a huge number of youthful stars. When stars are born, they shine with a lot of ultraviolet light and produce a lot of dust. The dust absorbs the ultraviolet light but, like a car sitting in the sun, it warms up and re-emits light at infrared and submillimeter wavelengths, making the galaxy unusually bright to Spitzer and the James Clerk Maxwell Telescope.

To learn more about this galaxy's unique youthful glow, Capak and his team followed up with a number of telescopes. They used optical measurements from Keck to determine the exact distance to the galaxy -- a whopping12.3 billion light-years. That's looking back to a time when the universe was 1.3 billion years old (the universe is approximately 13.7 billion years old today). "If the universe was a human reaching retirement age, it would have been about 6 years old at the time we are seeing this galaxy," said Capak.



The green and red splotch in this image is the most active star-making galaxy in the very distant universe. Nicknamed "Baby Boom," the galaxy is churning out an average of up to 4,000 stars per year, more than 100 times the number produced in our own Milky Way galaxy. It was spotted 12.3 billion light-years away by a suite of telescopes, including NASA's Spitzer Space Telescope. Baby Boom is a type of galaxy called a starburst. Like some other starbursts, it is thought to be a collection of colliding galaxies. As the galaxies smash together, gas becomes compressed, triggering the birth of stars. In this multi-wavelength portrait, the color red shows where loads of new stars are forming in Baby Boom.

The astronomers made measurements at radio wavelengths with the National Science Foundation's Very Large Array in New Mexico. Together with Spitzer and James Clerk Maxwell data, these observations allowed the astronomers to calculate a star-forming rate of about 1,000 to 4,000 stars per year. At that rate, the galaxy needs only 50 million years, not very long on cosmic timescales, to grow into a galaxy equivalent to the most massive ones we see today. While galaxies in our nearby universe can produce stars at similarly high rates, the farthest one known before now was about 11.7 billion light-years away, or a time when the universe was 1.9 billion years old.

"Before now, we had only seen galaxies form stars like this in the teenaged universe, but this galaxy is forming when the universe was only a child," said Capak. "The question now is whether the majority of the very most massive galaxies form very early in the universe like the Baby Boom galaxy, or whether this is an exceptional case. Answering this question will help us determine to what degree the Hierarchical Model of galaxy formation still holds true."

"The incredible star-formation activity we have observed suggests that we may be witnessing, for the first time, the formation of one of the most massive elliptical galaxies in the universe," said co-author Nick Scoville of Caltech, the principal investigator of the Cosmic Evolution Survey, also known as Cosmos. The Cosmos program is an extensive survey of a large patch of distant galaxies across the full spectrum of light. "The immediate identification of this galaxy with its extraordinary properties would not have been possible without the full range of observations in this survey," said Scoville.

Brightest Star in the Galaxy has New Competition

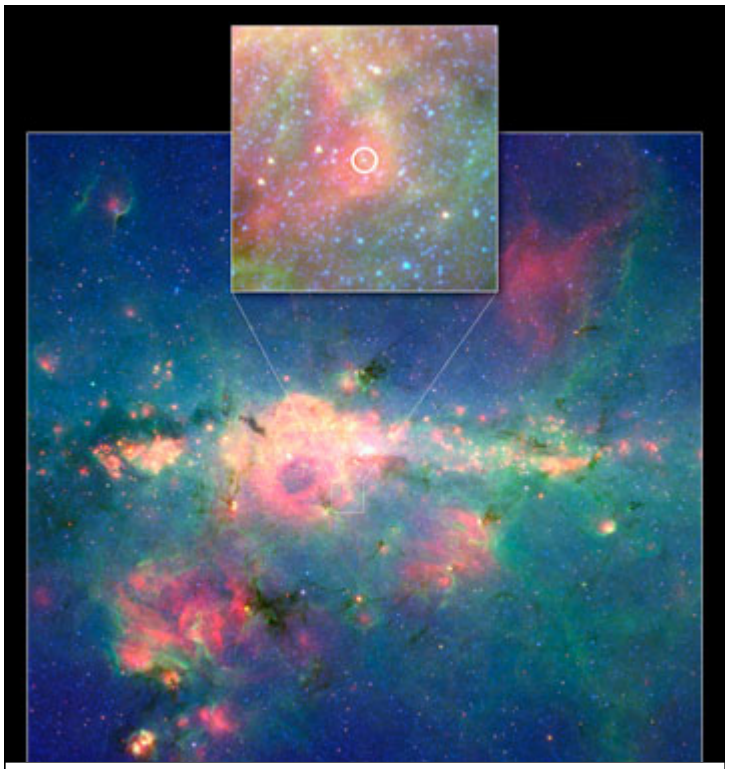
Spitzer Press Release

A contender for the title of brightest star in our Milky Way galaxy has been unearthed in the dusty metropolis of the galaxy's center. Nicknamed the "Peony nebula star," the bright stellar bulb was revealed by NASA's Spitzer Space Telescope and other ground-based telescopes. It blazes with the light of an estimated 3.2 million suns. The reigning "brightest star" champion is Eta Carina, with a whopping solar wattage of 4.7 million suns. But according to astronomers, it's hard to pin down an exact brightness, or luminosity, for these scorching stars, so they could potentially shine with a similar amount of light.

"The Peony nebula star is a fascinating creature. It appears to be the second-brightest star that we now know of in the galaxy, and it's located deep into the galaxy's center," said Lidia Oskinova of Potsdam University in Germany. "There are probably other stars just as bright if not brighter in our galaxy that remain hidden from view." Oskinova is principal investigator for the research and second author of a paper appearing in a future issue of the journal Astronomy and Astrophysics.

Scientists already knew about the Peony nebula star, but because of its sheltered location in the dusty central hub of our galaxy, its extreme luminosity was not revealed until now. Spitzer's dust-piercing infrared eyes can see straight into the heart of our galaxy, into regions impenetrable by visible light. Likewise, infrared data from the European Southern Observatory's New Technology Telescope in Chile were integral in calculating the Peony nebula star's luminosity.

"Infrared astronomy opens extraordinary views into the environment of the central region of our galaxy," said Oskinova. The brightest stars in the universe are also the biggest. Astronomers estimate the Peony nebula star kicked off its life with a hefty mass of roughly 150 to 200 times that of our sun. Stars this massive are rare and puzzle astronomers because they push the limits required for stars to form. Theory predicts that if a star starts out too massive, it can't hold itself together and must break into a double or multiple stars instead. Not only is the Peony nebula star hefty, it also has a wide girth. It is a type of giant blue star called a Wolf-Rayet star, with a diameter roughly 100 times that of our sun. That means this star, if placed where our sun is, would extend out to about the orbit of Mercury.



If our galaxy, the Milky Way, were to host its own version of the Olympics, the title for the brightest known star would go to a massive star called Eta Carina. However, a new runner-up -- now the second-brightest star in our galaxy -- has been discovered in the galaxy's dusty and frenzied interior. This image from NASA's Spitzer Space Telescope shows the new silver medalist, circled in the inset above, in the central region of our Milky Way.

With so much mass, the star barely keeps itself together. It sheds an enormous amount of stellar matter in the form of strong winds over its relatively short lifetime of a few million years. This matter is pushed so hard by strong radiation from the star that the winds speed up to about 1.6 million kilometers per hour (one million miles per hour) in only a few hours. Ultimately, the Peony nebula star will blow up in a fantastic explosion of cosmic proportions called a supernova. In fact, Oskinova and her colleagues say that the star is ripe for exploding soon, which in astronomical terms mean anytime from now to millions of years from now. "When this star blows up, it will evaporate any planets orbiting stars in the vicinity," said Oskinova. "Farther out from the star, the explosion could actually trigger the birth of new stars." In addition to the star itself, the astronomers noted a cloud of dust and gas, called a nebula, surrounding the star. The team nicknamed this cloud the Peony nebula because it resembles the ornate flower. "The nebula was probably created from the spray of dust leaking off the massive Peony nebula star," said Andreas Barniske of Potsdam University, lead author of the study.

Fourth Dwarf Planet Named For Polynesian God

Space.com

A dwarf planet circling the sun out beyond the orbit of Neptune has been rechristened Makemake after a Polynesian god and designated the third of the solar system's new class of plutoids, the International Astronomical Union (IAU) announced Saturday. Makemake is a small, red-tinged world that ranks among the largest objects in the outer solar system. But it is still smaller and dimmer than the already demoted dwarf planet Pluto, which astronomers reclassified as a Plutoid last month.

Astronomers discovered Makemake (pronounced MAH-keh MAH-keh), the fourth dwarf planet so far, in 2005 and believe its surface is covered by a layer of frozen methane. It is bright enough to be seen by a high-end amateur telescope, the IAU said.

"The orbit is not particularly strange, but the object itself is big," said astronomer Mike Brown of the California Institute of Technology in Pasadena, Calif., who led the team that discovered Makemake. "Probably about two-thirds the size of Pluto." Pluto, Makemake and a third object - dubbed Eris - are all classified as Plutoids as well as dwarf planets. The solar system's largest asteroid Ceres is also a dwarf planet, but not in the plutoid class because its orbit, which falls in the belt of asteroids between Mars and Jupiter, is smaller than that of the more distant Neptune.

Originally designated 2005 FY9, the object was nicknamed "Easterbunny" by its discoverers before officially being named Makemake after the Polynesian creator of humanity and the god of fertility, the IAU said. "We consider the naming of objects in the solar system very carefully," said Brown.

Makemake's methane ice-rich surface, while fascinating, did not easily relate to Earthly mythology, he added. But the small dwarf planet, like Eris and the object 2003 EL61 also spotted by Brown and his team, was found while his wife was pregnant with their daughter. It was the discovery of those three objects that led to Pluto's drop from full planet to dwarf planet in 2006. Brown was researching the mythology of Rapa Nui, or Easter Island, in the South Pacific for prospective names when he learned of the creator and fertility god Makemake.

"I am partial to fertility gods," Brown said, recalling the discovery of Makemake, Eris and 2003 EL61. "I have the distinct memory of feeling this fertile abundance pouring out of the entire Universe. Makemake was part of that."

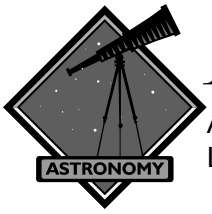
NASA Sets Remaining Space Shuttle Launches

The U.S. space agency says it's selected target launch dates for the remaining eight space shuttle missions for 2009 and 2010.

The National Aeronautics and Space Administration missions include one flight to the Hubble Space Telescope, seven assembly flights to the International Space Station and two station contingency flights, planned to be completed before the end of fiscal year 2010. The agency previously selected Oct. 8 and Nov. 10 as launch dates for Atlantis' STS-125 mission to service Hubble and Endeavour's STS-126 mission to supply the space station and service truss supports that hold equipment and solar arrays.

NASA said the target dates -- subject to change -- reflect its commitment to complete assembly of the station and to retire the shuttle fleet as transition continues to the new launch vehicles, including Ares and Orion.

The final space shuttle mission is to be launched May 31, 2010.The updated shuttle launch manifest is available at http://www.nasa.gov/mission_pages/station/structure/iss_manifest.html.



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