Astronomy Club News
September, 2006

John Kocijanski.... Editor
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The Catskills Astronomy Club will be participating in the Bethel Woods Harvest Festival near White Lake, NY on September 17th. The event is entitled "Sweet Catskills". The following url gives more information. We will be giving out information about the club as well as NASA outreach materials. If the weather is good then we will have a public solar observation session as well. If there is anyone who wants to volunteer to help out at our table please contact John at kocis@verizon.net or 791-5240.

http://www.bethelwoodslive.org/harvestfest_events.htm

The observation sessions scheduled for August 19th and 26th were canceled due to poor weather.

Our next observation sessions are on September 16th and 23rd. The session on the 23rd will be held at the Big Twig recording studio near Roscoe, NY. More details on this will be given in a future email.

Anyone interested in submitting an astronomical observation or photograph for the newsletter, please contact John at kocis@verizon.net.

The club has selection of astronomy books and a Meade eight inch reflector for members to borrow. Please contact John at 791-5240 or kocis@verizon.net if you are interested in borrowing any of these.

Astronomy News:

Here are some articles from various NASA sources that might be of interest.

News Release: 2006-101 August 23, 2006

NASA Galaxy Hunter: Huge Black Holes Stifle Star Formation

Supermassive black holes in some giant galaxies create such a hostile environment, they shut down the formation of new stars, according to NASA Galaxy Evolution Explorer findings published in the August 24 issue of Nature.

The orbiting observatory surveyed more than 800 nearby elliptical galaxies of various sizes. An intriguing pattern emerged: the more massive, or bigger, the galaxy, the less likely it was to have young stars. Because bigger galaxies are known to have bigger black holes, astronomers believe the black holes are responsible for the lack of youthful stars.

"Supermassive black holes in these giant galaxies create unfriendly places for stars to form," said

Dr. Sukyoung K. Yi of Yonsei University in Seoul, Korea, who led the research team. "If you want to find lots of young stars, look to the smaller galaxies."

Previously, scientists had predicted that black holes might have dire consequences for star birth, but they didn't have the tools necessary to test the theory. The Galaxy Evolution Explorer, launched in 2003, is well-suited for this research. It is extremely sensitive to the ultraviolet radiation emitted by even low numbers of young stars.

Black holes are monstrous heaps of dense matter at the centers of galaxies. Over time, a black hole and its host galaxy will grow in size, but not always at the same rate.

Yi and his collaborators found evidence that the black holes in elliptical galaxies bulk up to a critical mass before putting a stop to star formation. In other words, once a black hole reaches a certain size relative to its host galaxy, its harsh effects become too great for new stars to form. According to this "feedback" theory, the growth of a black hole slows the development of not only stars but of its entire galaxy.

How does a black hole do this? There are two possibilities. First, jets being blasted out of black holes could blow potential star-making fuel, or gas, out of the galaxy center, where stars tend to arise.

The second theory relates to the fact that black holes drag surrounding gas onto them, which heats the gas. The gas becomes so hot that it can no longer clump together and collapse into stars.

Other authors of this research include: Drs. Kevin Schawinski, Sadegh Khochfar and Sugata Kaviraj of the University of Oxford, England; Dr. Young-Wook Lee of Yonsei University in Seoul, Korea; Drs. Alessandro Boselli, Jose Donas and Bruno Milliard of the Laboratory of Astrophysics of Marseille, France; Tim Conrow, Drs. Tom Barlow, Karl Forster, Peter G. Friedman, D. Chris Martin, Patrick Morrissey, Mark Seibert, Todd Small and Ted K. Wyder of the California Institute of Technology in Pasadena; Dr. Susan Neff of NASA's Goddard Space Flight Center, Greenbelt, Maryland; Dr. David Schiminovich of Columbia University, N.Y.; Drs. Tim Heckman, Alex Szalay and Luciana Bianchi of Johns Hopkins University, Baltimore, Md.; Dr, Barry Madore of the Observatories of the Carnegie Institute of Washington in Pasadena; and Dr. R. Michael Rich of the University of California, Los Angeles.

Additional information about Galaxy Evolution Explorer is online at http://www.galex.caltech.edu .
The California Institute of Technology in Pasadena, Calif., leads the Galaxy Evolution Explorer mission and is responsible for science operations and data analysis. NASA's Jet Propulsion Laboratory, also in Pasadena, manages the mission and built the science instrument. The mission was developed under NASA's Explorers Program managed by the Goddard Space Flight Center, Greenbelt, Md. Researchers from South Korea and France collaborated on this mission.

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Image Advisory: 2006-099 August 14, 2006

NASA'S Spitzer Digs Up Troves of Possible Solar Systems in Orion

Astronomers have long scrutinized the vast and layered clouds of the Orion nebula, an

industrious star-making factory visible to the naked eye in the sword of the famous hunter constellation. Yet, Orion is still full of secrets.

A new image from NASA's Spitzer Space Telescope probes deep into the clouds of dust that permeate the nebula and its surrounding regions. The striking false-color picture shows pinkish swirls of dust speckled with stars, some of which are orbited by disks of planet-forming dust.

The image can be seen by visiting: http://www.spitzer.caltech.edu/Media/releases/ssc2006-16/ssc2006-16a.shtml .

Spitzer, with its powerful infrared vision, was able to unearth nearly 2,300 such planet-forming disks in the Orion cloud complex, a collection of turbulent star-forming clouds that includes the well-known Orion nebula.

The disks – made of gas and dust that whirl around young suns – are too small and distant to be seen by visible-light telescopes; however, the infrared glow of their warm dust is easily spotted by Spitzer's infrared detectors. Each disk has the potential to form planets and its own solar system.

"This is the most complete census of young stars with disks in the Orion cloud complex," said Dr. Thomas Megeath of the University of Toledo, Ohio, who led the research. "Basically, we have a census of potential solar systems, and we want to know how many are born in the cities, how many in small towns, and how many out in the countryside."

A look at Orion's demographics reveals that the potential solar systems populate a variety of environments. Megeath and his colleagues found that about 60 percent of the disk-sporting stars in the Orion cloud complex inhabit its bustling "cities," or clusters, containing hundreds of young stars. About 15 percent reside in small outer communities, and a surprising 25 percent prefer to go it alone, living in isolation.

Prior to the Spitzer observations, scientists thought that up to 90 percent of young stars, both with and without disks, dwelled in cities like those of Orion.

"The Orion image shows that many stars also appear to form in isolation or in groups of just a few stars," said team member Dr. John Stauffer of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. "These new data may help us to determine the type of environment in which our sun formed."

Astronomers do not know whether our middle-aged sun grew up in the stellar equivalent of the city or countryside, though most favor a large city scenario. Newborn stars like the ones in Orion tend to drift away from their siblings over time, so it is hard to trace an adult star's origins.

Megeath and his colleagues estimate that about 60 to 70 percent of the stars in the Orion cloud complex have disks. "It is an interesting question why this number isn't 100 percent. Eventually, we may be able to understand why some stars don't have disks," said Megeath.

Spitzer's infrared vision also dug up 200 stellar embryos in the Orion cloud complex, most of which had never been seen before. Stellar embryos are still too young to have developed disks.

The Orion cloud complex is about 1,450 light-years from Earth and spans about 240 light-years of space. Spitzer's wide field of view allowed it to survey most of the complex, an area of the sky

equivalent to 28 full moons. The featured image shows a slice of this survey, the equivalent of four full moons-worth of sky, and includes the Orion nebula itself.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center. Caltech manages JPL for NASA. Spitzer's infrared array camera, which made the observations, was built by NASA's Goddard Space Flight Center, Greenbelt, Md. The instrument's principal investigator is Dr. Giovanni Fazio of the Harvard-Smithsonian Center for Astrophysics.

For more Orion graphics and information, visit: www.spitzer.caltech.edu/spitzer .

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News Release: 2006-100 *August 16, 2006*

NASA Findings Suggest Jets Bursting From Martian Ice Cap

Every spring brings violent eruptions to the south polar ice cap of Mars, according to researchers interpreting new observations by NASA's Mars Odyssey orbiter.

Jets of carbon dioxide gas erupting from the ice cap as it warms in the spring carry dark sand and dust high aloft. The dark material falls back to the surface, creating dark patches on the ice cap which have long puzzled scientists. Deducing the eruptions of carbon dioxide gas from under the warming ice cap solves the riddle of the spots. It also reveals that this part of Mars is much more dynamically active than had been expected for any part of the planet.

"If you were there, you'd be standing on a slab of carbon-dioxide ice," said Phil Christensen of Arizona State University, Tempe, principal investigator for Odyssey's camera. "All around you, roaring jets of carbon dioxide gas are throwing sand and dust a couple hundred feet into the air."

You'd also feel vibration through your spacesuit boots, he said. "The ice slab you're standing on is levitated above the ground by the pressure of gas at the base of the ice."

The team began its research in an attempt to explain mysterious dark spots, fan-like markings, and spider-shaped features seen in images that cameras on Odyssey and on NASA's Mars Global Surveyor have observed on the ice cap at the Martian south pole.

The dark spots, typically 15 to 46 meters (50 to 150 feet) wide and spaced several hundred feet apart, appear every southern spring as the sun rises over the ice cap. They last for several months and then vanish -- only to reappear the next year, after winter's cold has deposited a fresh layer of ice on the cap. Most spots even seem to recur at the same locations.

An earlier theory proposed that the spots were patches of warm, bare ground exposed as the ice disappeared. However, the camera on Odyssey, which sees in both infrared and visible-light wavelengths, discovered that the spots are nearly as cold as the carbon dioxide ice, suggesting they were just a thin layer of dark material lying on top of the ice and kept chilled by it. To understand how that layer is produced, Christensen's team used the camera -- the Thermal Emission Imaging System -- to collect more than 200 images of one area of the ice cap from the end of winter through midsummer.

Some places remained spot-free for more than 100 days, then developed many spots in a week. Fan-shaped dark markings didn't form until days or weeks after the spots appeared, yet some fans grew to half a mile in length. Even more puzzling was the origin of the "spiders," grooves eroded into the surface under the ice. The grooves converge at points directly beneath a spot.

"The key to figuring out the spiders and the spots was thinking through a physical model for what was happening," said Christensen. The process begins in the sunless polar winter when carbon dioxide from the atmosphere freezes into a layer about three feet thick on top of a permanent ice cap of water ice, with a thin layer of dark sand and dust in between. In spring, sunlight passing through the slab of carbon dioxide ice reaches the dark material and warms it enough that the ice touching the ground sublimates -- turns into gas.

Before long, the swelling reservoir of trapped gas lifts the slab and eventually breaks through at weak spots that become vents. High-pressure gas roars through at speeds of 161 kilometers per hour (100 miles per hour) or more. Under the slab, the gas erodes ground as it rushes toward the vents, snatching up loose particles of sand and carving the spidery network of grooves.

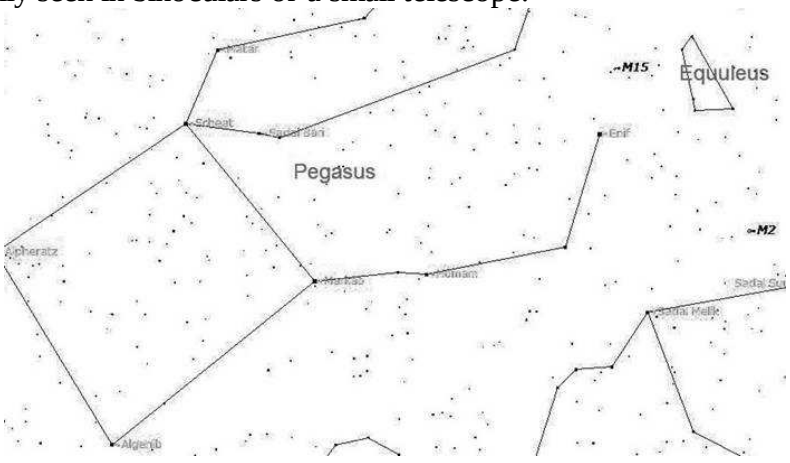
Christensen, Hugh Kieffer (U.S. Geological Survey, retired) and Timothy Titus (USGS) report the new interpretation in the Aug. 17, 2006, issue of the journal "Nature."

JPL, a division of the California Institute of Technology, Pasadena, manages Mars Odyssey and Mars Global Surveyor missions for the NASA Science Mission Directorate. Odyssey's Thermal Emission Imaging System is operated by Arizona State University.

For additional information about Odyssey and the new findings, visit: http://www.nasa.gov/mars and http://themis.asu.edu .

Midevening Observing Highlights for September

The Milky Way stretches across the sky from southwest to northeast. Cygnus can be found directly overhead. The Great Square of Pegasus is rising in the east. Southeast of Pegasus are the globular star clusters M15 and M2. To the northeast of the Great Square the constellation of Andromeda can be seen and just above its center is M31, the Andromeda Galaxy. The Double Cluster (NGC 869 and NGC 884) and open cluster M34 in Perseus can be seen rising in the northeast. Sagittarius and Scorpius are in the southwest. The bright star Arcturus is setting in the west. The Big Dipper is low on the northern horizon. The Summer Triangle of the stars Vega, Deneb, and Altair can be found directly overhead. Full moon is on September 7th and new moon is on September 22nd. The picture below shows the location of the star clusters M15 and M2. Both are easily seen in binoculars or a small telescope.



Deadly Planets

By Patrick L. Barry and Dr. Tony Phillips

About 900 light years from here, there's a rocky planet not much bigger than Earth. It goes around its star once every hundred days, a trifle fast, but not too different from a standard Earth-year. At least two and possibly three other planets circle the same star, forming a complete solar system.

Interested? Don't be. Going there would be the last thing you ever do.

The star is a pulsar, PSR 1257+12, the seething-hot core of a supernova that exploded millions of years ago. Its planets are bathed not in gentle, life-giving sunshine but instead a blistering torrent of X-rays and high-energy particles.

"It would be like trying to live next to Chernobyl," says Charles Beichman, a scientist at JPL and director of the Michelson Science Center at Caltech.

Our own sun emits small amounts of pulsar-like X-rays and high energy particles, but the amount of such radiation coming from a pulsar is "orders of magnitude more," he says. Even for a planet orbiting as far out as the Earth, this radiation could blow away the planet's atmosphere, and even vaporize sand right off the planet's surface.

Astronomer Alex Wolszczan discovered planets around PSR 1257+12 in the 1990s using Puerto Rico's giant Arecibo radio telescope. At first, no one believed worlds could form around pulsars—it was too bizarre. Supernovas were supposed to destroy planets, not create them. Where did these worlds come from?

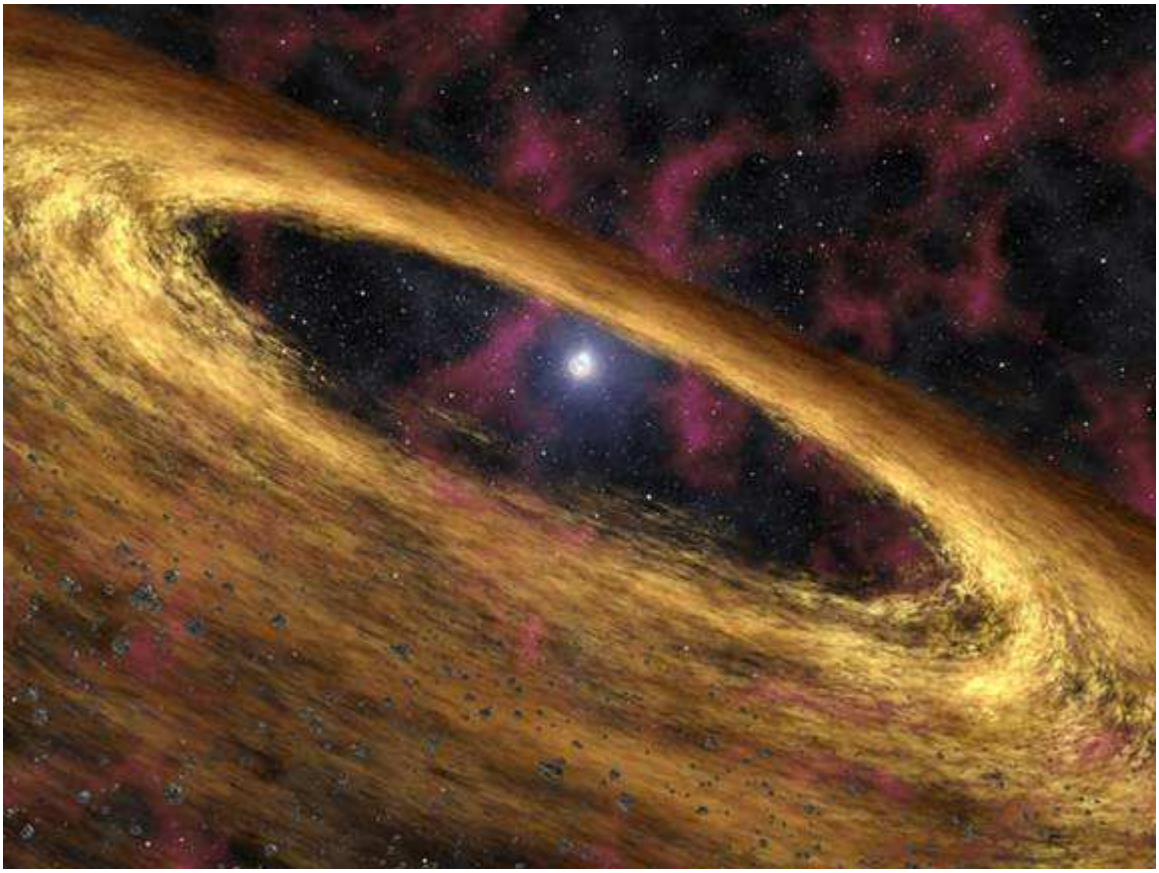
NASA's Spitzer Space Telescope may have found the solution. Last year, a group of astronomers led by Deepto Chakrabarty of MIT pointed the infrared telescope toward pulsar 4U 0142+61. Data revealed a disk of gas and dust surrounding the central star, probably wreckage from the supernova. It was just the sort of disk that could coalesce to form planets!

As deadly as pulsar planets are, they might also be hauntingly beautiful. The vaporized matter rising from the planets' surfaces could be ionized by the incoming radiation, creating colorful auroras across the sky. And though the pulsar would only appear as a tiny dot in the sky (the pulsar itself is only 20-40 km across), it would be enshrouded in a hazy glow of light emitted by radiation particles as they curve in the pulsar's strong magnetic field.

Wasted beauty? Maybe. Beichman points out the positive: "It's an awful place to try and form planets, but if you can do it there, you can do it anywhere."

More news and images from Spitzer can be found at http://www.spitzer.caltech.edu/ . In addition, The Space Place Web site features a cartoon talk show episode starring Michelle Thaller, a scientist on Spitzer. Go to http://spaceplace.nasa.gov/en/kids/live/ for a great place to introduce kids to infrared and the joys of astronomy.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Caption:
Artist's concept of a pulsar and surrounding disk of rubble called a "fallback" disk, out of which new planets could form.