



Club News
November, 2005
John Kocijanski, Editor

Jim McKeegan, President
John Kocijanski, Vice President
Lisa Brody, Treasurer
Bud Wertheim, Secretary

On October 2nd our club attended the Bethel Farm Market at the Woodstock concert site in Bethel. Our table was full of NASA and club handouts. Almost all the freebies were given away by the end of the day. Traffic at the table was brisk. Many people who stopped by expressed interest in the club. We treated the public to a solar observation session as well. Three telescopes were setup to view the sun. Two were setup for hydrogen alpha views and one for a white light view. The sun showed some nice prominences for the public to enjoy. Many were “wowed” by the view. The day was a great success. The following images show the public enjoying the sun.





An observation session was held at Walnut Mountain Park on October 1st. Seven people attended. We observed many deep sky objects including the faint galaxies NGC 7332 and NGC 7339 in Pegasus. We also observed Uranus and Mars. Uranus appeared as a small blue disk in Aquarius. Mars was very bright and rising in the eastern sky. It was low in the sky so seeing was poor but we did see some dark surface areas on its surface.

The observation session on October 8th was cancelled due to cloudy skies.

The November club observation sessions are on the 1st and 26th.

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

Each month the photo section of our newsletter will highlight the telescopes and equipment of club members. If you have a photo of your scope or equipment and a brief description of it that you would like to contribute please send it to John at kocis@verizon.net.

The club has selection of astronomy books, a Macintosh computer with astronomy software, 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: 2005-160

Oct. 20, 2005

NASA'S Spitzer Finds Failed Stars May Succeed in Planet Business

NASA's Spitzer Space Telescope has spotted the very beginnings of what might become planets around the puniest of celestial orbs – brown dwarfs, or "failed stars."

The telescope's infrared eyes have for the first time detected clumps of microscopic dust grains and tiny crystals orbiting five brown dwarfs. These clumps and crystals are thought to collide and further lump together to eventually make planets. Similar materials are seen in planet-forming regions around stars and in comets, the remnants of our own solar system's construction.

The findings provide evidence that brown dwarfs, despite being colder and dimmer than stars, undergo the same initial steps of the planet-building process.

"We are learning that the first stages of planet formation are more robust than previously believed," said Dr. Dániel Apai, an astronomer at the University of Arizona, Tucson, and member of the NASA Astrobiology Institute's Life and Planets Astrobiology Center. "Spitzer has given us the possibility to study how planets are built in widely different environments."

The observations also imply that brown dwarfs might be good targets for future planet-hunting missions. Astronomers do not know if life could exist on planets around brown dwarfs.

Brown dwarfs differ from stars largely due to their mass. They lack the mass to ignite internally and shine brightly. However, they are believed to arise like stars, out of thick clouds of gas and dust that collapse under their own weight. And like stars, brown dwarfs develop disks of gas and dust that circle around them. Spitzer has observed many of these disks, which glow at infrared wavelengths.

Apai and his team used Spitzer to collect detailed information on the minerals that make up the dust disks of six young brown dwarfs located 520 light-years away, in the Chamaeleon constellation. The six objects range in mass from about 40 to 70 times that of Jupiter, and they are roughly 1 to 3 million years old.

The astronomers discovered that five of the six disks contain dust particles that have crystallized and are sticking together in what may be the early phases of planet assembling. They found relatively large grains and many small crystals of a mineral called olivine.

"We are seeing processed particles that are linking up and growing in size," said Dr. Ilaria Pascucci, a co-author also of the University of Arizona. "This is exciting because we weren't sure if the disks of such cool objects would behave the same way that stellar disks do."

The team also noticed a flattening of the brown dwarfs' disks, which is another sign that dust is gathering up into planets.

A paper on these findings appears online today in *Science*. Authors of the paper also include Drs. Jeroen Bouwman, Thomas Henning and Cornelis P. Dullemond of the Max Planck Institute for Astronomy, Germany; and Dr. Antonella Natta of the Osservatorio Astrofisico di Arcetri, Italy.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer mission for NASA's Science Mission Directorate. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology in Pasadena. Spitzer's infrared spectrograph, which made the observations, was built by Cornell University, Ithaca, N.Y. Its development was led by Dr. Jim Houck of Cornell. The NASA Astrobiology Institute, founded in 1997, is a partnership between NASA, 16 major U.S. teams and six international consortia.

For artist concepts, graphics and more information about Spitzer, visit <http://www.spitzer.caltech.edu/spitzer/> . For more information about the NASA Astrobiology Institute, visit <http://nai.arc.nasa.gov/> . For more information about NASA and agency programs on the Web, visit <http://www.nasa.gov/home/> .

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Image Advisory: 2005-159

October 13, 2005

Lady in Red: Andromeda Galaxy Shines in Spitzer's Eyes

NASA's Spitzer Space Telescope has captured a stunning infrared view of Messier 31, the famous spiral galaxy also known as Andromeda.

Andromeda is the most-studied galaxy outside our own Milky Way, yet Spitzer's sensitive infrared eyes have detected captivating new features, including bright, aging stars and a spiral arc in the center of the galaxy. The infrared image also reveals an off-centered ring of star formation and a hole in the galaxy's spiral disk of arms. These asymmetrical features may have been caused by interactions with the several satellite galaxies that surround Andromeda.

"Occasionally small satellite galaxies run straight through bigger galaxies," said Dr. Karl Gordon of the Steward Observatory, University of Arizona, Tucson, lead investigator of the new observation. "It appears a little galaxy punched a hole through Andromeda's disk, much like a pebble breaks the surface of a pond."

The new false-color Andromeda image is available at <http://www.spitzer.caltech.edu/spitzer/> .

Approximately 2.5 million light-years away, Andromeda is the closest spiral galaxy and is the only one visible to the naked eye. Unlike our Milky Way galaxy, which we view from the inside, Andromeda is studied from the outside. Astronomers believe that Andromeda and the Milky Way will eventually merge together.

Spitzer detects dust heated by stars in the galaxy. Its multiband imaging photometer's 24-micron detector recorded approximately 11,000 separate infrared snapshots over 18 hours to create the new comprehensive mosaic. This instrument's resolution and sensitivity is a vast improvement over previous infrared technologies, enabling scientists to trace the spiral structures within Andromeda to an unprecedented level of detail.

"In contrast to the smooth appearance of Andromeda at optical wavelengths, the Spitzer image reveals a well-defined nuclear bulge and a system of spiral arms," said Dr. Susan Stolovy, a co-investigator from the Spitzer Science Center at the California Institute of Technology, Pasadena.

The galaxy's central bulge glows in the light emitted by warm dust from old, giant stars. Just outside the bulge, a system of inner spiral arms can be seen, and outside this, a well-known prominent ring of star formation.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology. The Jet Propulsion Laboratory is a division of Caltech.

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Cassini's Doubleheader Flybys Score Home Run

Cassini performed back-to-back flybys of Saturn moons Tethys and Hyperion last weekend, coming closer than ever before to each of them. Tethys has a scarred, ancient surface, while Hyperion is a strange, spongy-looking body with dark-floored craters that speckle its surface.

New images, mosaics and a movie of these bodies are available at <http://saturn.jpl.nasa.gov> , <http://www.nasa.gov/cassini> and <http://ciclops.org> .

Images of Tethys taken during Cassini's close approach to the moon on Sept. 24, 2005, reveal an icy land of steep cliffs and craters. Cassini photographed the moon's south pole, a region not seen by NASA's Voyager spacecraft.

A giant rift called Ithaca Chasma cuts across the disk of Tethys. Much of the topography in this region, including that of Ithaca Chasma, has been thoroughly hammered by impacts. This appearance suggests that the event that created Ithaca Chasma happened very long ago.

Near a prominent peaked crater named Telemachus are the remnants of a very old crater named Teiresias. The ancient impact site is badly overprinted and eroded by impact weathering and degradation. All that remains is a circular pattern of hummocks that mark where the old crater rim existed. Many of the fresh-appearing craters exhibit unusually bright crater floors, in contrast to the dark-floored craters seen on Saturn's oddly tumbling moon Hyperion.

Images of Hyperion taken on Sept. 26 show a surface dotted with craters and modified by some process, not yet understood, to create a strange, "spongy" appearance, unlike the surface of any other Saturn moon.

A false-color image of Hyperion reveals crisp details and variations in color across the strange surface that might represent differences in the composition of materials. Hyperion has a notably reddish tint when viewed in natural color.

Scientists are extremely curious to learn what the dark material is that fills many craters on this moon. Features within the dark terrain, including a 200-meter-wide (650-foot) impact crater surrounded by rays and numerous bright-rimmed craters, indicate that the dark material may be only tens of meters thick with brighter material beneath.

Scientists will also be examining Cassini's sharp views in hopes of determining whether there have been multiple episodes of landslides on Hyperion. Such "downslope" movement is evident in the filling of craters with debris and the near elimination of many craters along the steeper slopes. Answers to these questions may help solve the mystery of why this object has evolved different surface forms from other moons of Saturn.

Cassini flew by Hyperion at a distance of only 500 kilometers (310 miles). Hyperion is 266 kilometers (165 miles) across, has an irregular shape, and spins in a chaotic rotation. Much of its interior is empty space, explaining why scientists call Hyperion a rubble-pile moon. This flyby was Cassini's only close encounter with Hyperion in the prime mission four-year tour. Over the next few months, scientists will study the data in more detail.

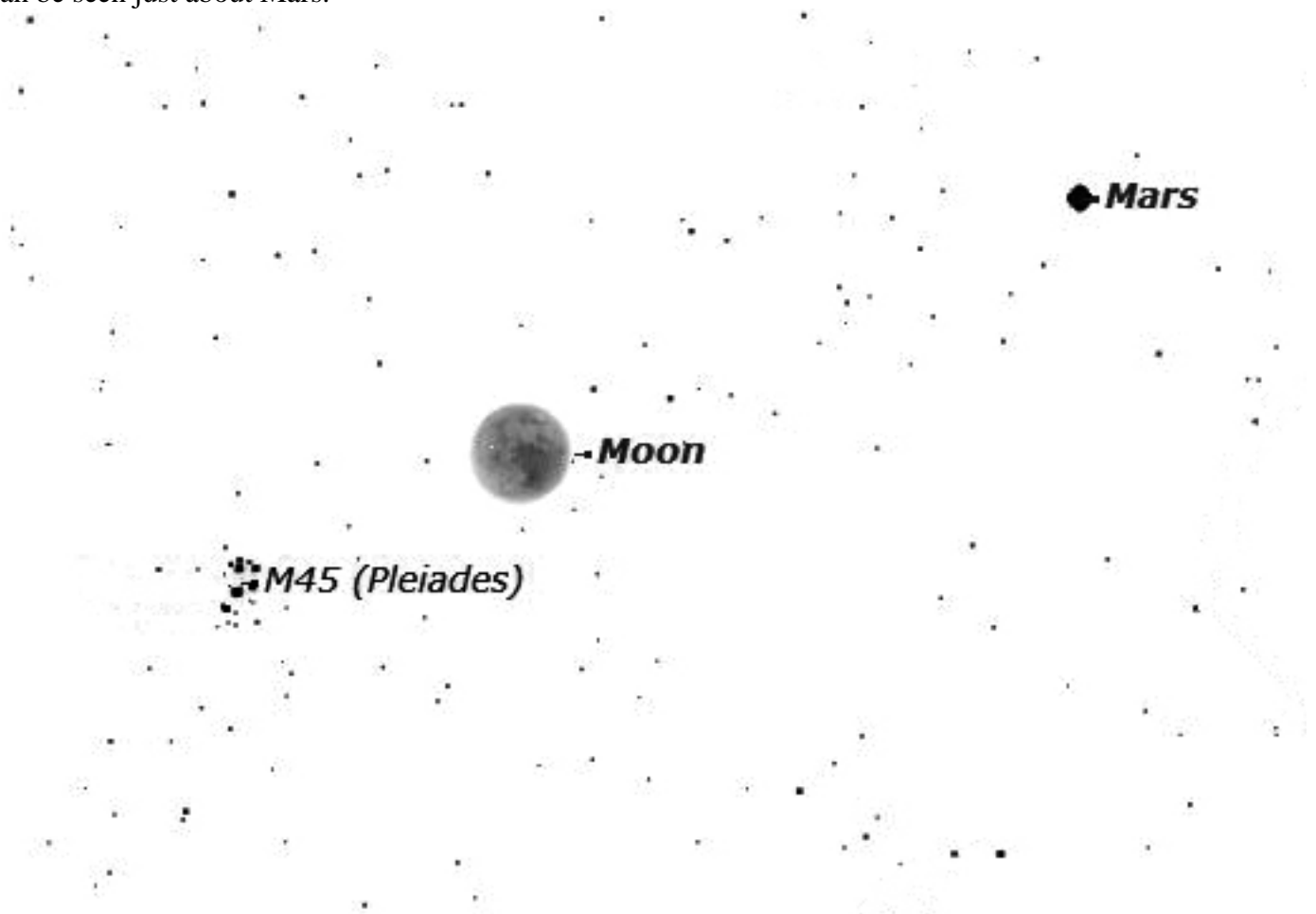
Cassini flew by Tethys at a distance of approximately 1,500 kilometers (930 miles) above the surface. Tethys is 1,071 kilometers (665 miles) across and will be visited again by Cassini in the summer of 2007.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging team is based at the Space Science Institute, Boulder, Colo.

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Mid Evening Observing Highlights for November

The Keystone of Hercules is setting in the west. The Summer Triangle (Vega, Altair, and Deneb) is in the western sky. The Great Square of Pegasus is directly overhead with M31 (the Andromeda Galaxy) almost overhead. Perseus is high in the northeastern sky. Taurus and Auriga are rising in the east. Later in the month Orion will be rising in the east. The Big Dipper is low on the northern horizon. The Pleiades (M45) is also rising in the east. Mars is bright in the eastern sky. The Leonid meteor shower peaks on November 17th before dawn. New moon is on November 2nd and full moon is on the 16th. The image below shows the waxing gibbous moon in between Mars and M45 in the eastern sky on the evening of November 15th. On the 14th the moon can be seen just about Mars.



A Wrinkle in Space-Time

By Trudy E. Bell

When a massive star reaches the end of its life, it can explode into a supernova rivaling the brilliance of an entire galaxy. What's left of the star fades in weeks, but its outer layers expand through space as a turbulent cloud of gases. Astronomers see beautiful remnants from past supernovas all around the sky, one of the most famous being the Crab Nebula in Taurus.

When a star throws off nine-tenths of its mass in a supernova, however, it also throws off nine-tenths of its gravitational field.

Astronomers see the light from supernovas. Can they also somehow sense the sudden and dramatic change in the exploding star's *gravitational field*?

Yes, they believe they can. According to Einstein's general theory of relativity, changes in the star's gravitational field should propagate outward, just like light—indeed, at the speed of light.

Those propagating changes would be a gravitational wave.

Einstein said what we feel as a gravitational field arises from the fact that huge masses curve space and time. The more massive an object, the more it bends the three dimensions of space and the fourth dimension of time. And if a massive object's gravitational field changes suddenly—say, when a star explodes—it should kink or wrinkle the very geometry of space-time. Moreover, that wrinkle should propagate outward like ripples radiating outward in a pond from a thrown stone.

The frequency and timing of gravitational waves should reveal what's happening deep inside a supernova, in contrast to light, which is radiated from the surface. Thus, gravitational waves allow astronomers to peer inside the universe's most violent events—like doctors peer at patients' internal organs using CAT scans. The technique is not limited to supernovas: colliding neutron stars, black holes and other exotic objects may be revealed, too.

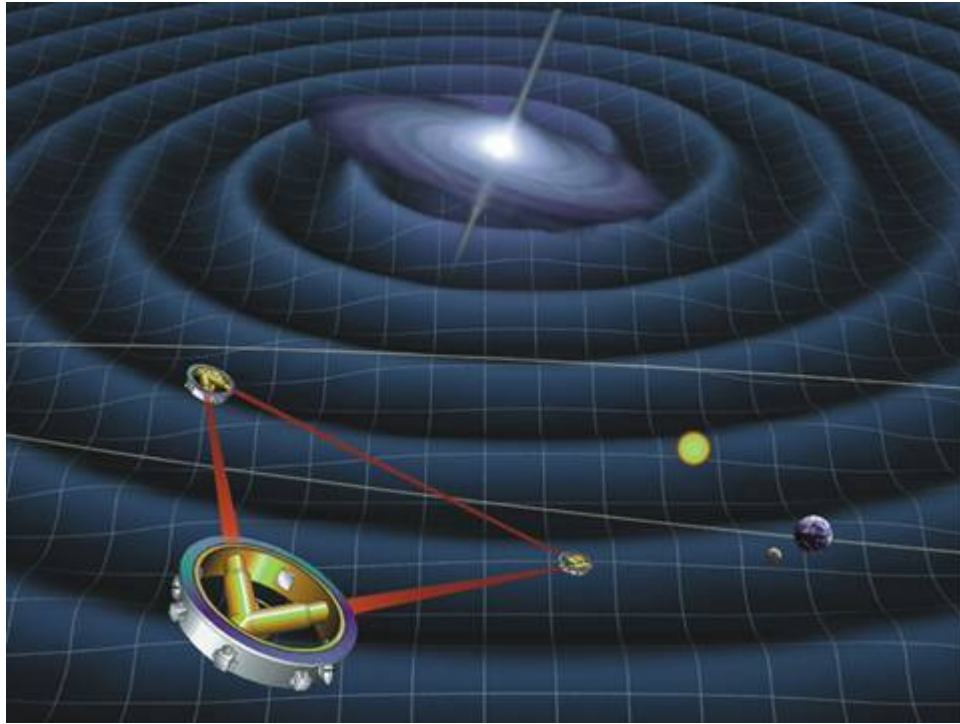
NASA and the European Space Agency are now building prototype equipment for the first space experiment to measure gravitational waves: the Laser Interferometer Space Antenna, or LISA.

LISA will look for patterns of compression and stretching in space-time that signal the passage of a gravitational wave. Three small spacecraft will fly in a triangular formation behind the Earth, each beaming a laser at the other two, continuously measuring their mutual separation. Although the three 'craft will be 5 million kilometers apart, they will monitor their separation to one *billionth* of a centimeter, smaller than an atom's diameter, which is the kind of precision needed to sense these elusive waves.

LISA is slated for launch around 2015.

To learn more about LISA, go to <http://lisa.jpl.nasa.gov>. Kids can learn about LISA and do a gravitational wave interactive crossword at <http://spaceplace.nasa.gov/en/kids/lisaxword/lisaxword.shtml>.

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



Caption:

LISA's three spacecraft will be positioned at the corners of a triangle 5 million kilometers on a side and will be able to detect gravitational wave induced changes in their separation distance of as little as one billionth of a centimeter.