

Catskills Astronomy Club News

6/1/05

Club News:

Catskills Astronomy Club News

June - 2005

The Catskills Astronomy Club has been awarded a certificate of appreciation from NASA/JPL for our use of their Space Place column in our monthly newsletters. The image below is of the certificate. The following is the letter that was sent to the club.



To the members of the Catskills Astronomy Club,

We are pleased to award you and your club the enclosed certificate of appreciation. As an active NASA Space Place astronomy club partner and by carrying our NASA column in your newsletter or on your web page (or both), you facilitate science and technology education among club members and through your community. Through your public events, you not only educate, but you also inspire your audiences, both young and old. Through your use of hands-on activities and experiences for children you play a key part in developing tomorrow's scientists.

Please accept this certificate of appreciation with our gratitude.

*Sincerely yours,
The Space Place Team*

The observation sessions scheduled for May 7th and 14th were canceled due to poor weather.

June observation sessions are scheduled for the 4th and 11th.

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, Stardate audio CDs, 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: 2005-084

May 24, 2005

Voyager Spacecraft Enters Solar System's Final Frontier

NASA's Voyager 1 spacecraft has entered the solar system's final frontier. It is entering a vast, turbulent expanse where the Sun's influence ends and the solar wind crashes into the thin gas between stars.

"Voyager 1 has entered the final lap on its race to the edge of interstellar space," said Dr. Edward Stone, Voyager project scientist at the California Institute of Technology in Pasadena. Caltech manages NASA's Jet Propulsion Laboratory in Pasadena, which built and operates Voyager 1 and its twin, Voyager 2.

In November 2003, the Voyager team announced it was seeing events unlike any in the mission's then 26-year history. The team believed the unusual events indicated Voyager 1 was approaching a strange region of space, likely the beginning of this new frontier called the termination shock region. There was considerable controversy over whether Voyager 1 had indeed encountered the termination shock or was just getting close.

The termination shock is where the solar wind, a thin stream of electrically charged gas blowing continuously outward from the Sun, is slowed by pressure from gas between the stars. At the termination shock, the solar wind slows abruptly from a speed that ranges from 700,000 to 1.5 million miles per hour and becomes denser and hotter. The consensus of the team is that Voyager 1, at approximately 8.7 billion miles from the Sun, has at last entered the heliosheath, the region beyond the termination shock.

Predicting the location of the termination shock was hard, because the precise conditions in interstellar space are unknown. Also, changes in the speed and pressure of the solar wind cause the termination shock to expand, contract and ripple.

The most persuasive evidence that Voyager 1 crossed the termination shock is its measurement of a sudden increase in the strength of the magnetic field carried by the solar wind, combined with an inferred decrease in its speed. This happens whenever the solar wind slows down.

In December 2004, the Voyager 1 dual magnetometers observed the magnetic field strength suddenly increasing by a factor of approximately 2-1/2, as expected when the solar wind slows down. The magnetic field has remained at these high levels since December. NASA's Goddard Space Flight Center, Greenbelt, Md., built the magnetometers.

Voyager 1 also observed an increase in the number of high-speed electrically charged electrons and ions and a burst of plasma wave noise before the shock. This would be expected if Voyager 1 passed the termination shock. The shock naturally accelerates electrically charged particles that bounce back and forth between the fast and slow winds on opposite sides of the shock, and these particles can generate plasma waves.

"Voyager's observations over the past few years show the termination shock is far more complicated than anyone thought," said Dr. Eric Christian, Discipline Scientist for the Sun-Solar System Connection research program at NASA Headquarters, Washington.

The result is being presented today at a press conference in the Morial Convention Center, New Orleans, during the 2005 Joint Assembly meeting of Earth and space science organizations.

For their original missions to Jupiter and Saturn, Voyager 1 and sister spacecraft Voyager 2 were destined for regions of space far from the Sun where solar panels would not be feasible, so each was equipped with three radioisotope thermoelectric generators to produce electrical power for the spacecraft systems and instruments. Still operating in remote, cold and dark conditions 27 years later, the Voyagers owe their longevity to these Department of Energy-provided generators, which produce electricity from the heat generated by the natural decay of plutonium dioxide.

For more information about Voyager visit:

http://www.nasa.gov/vision/universe/solarsystem/voyager_agu.html and <http://voyager.jpl.nasa.gov/> .

For information about NASA and agency programs on the Internet, visit:

<http://www.nasa.gov/home/index.html> .

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News Release: 2005-085

May 24, 2005

NASA's Rovers Continue Martian Missions

NASA's Mars rover Opportunity is trying to escape from a sand trap, while its twin, Spirit, has been busy finding new clues to a wet and violent early Martian history.

"Spirit has finally found the kind of geology you can really sink your teeth into," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y. He is principal investigator for the Mars rovers' science instruments. According to Squyres, multiple layers of rock in the hills Spirit is exploring suggest successive deposits of water-altered explosive debris.

Spirit, inside Mars' Gusev Crater, had to share the spotlight with the drama provided by Opportunity on the martian Meridiani plains. The rover has been hindered by soft sand for nearly three weeks. Traction is difficult in the ripple-shaped dune of windblown dust and sand that Opportunity drove into on April 26. Since it began trying to get out, the rover has advanced only 11 inches. Without the slippage caused by the rover's wheels spinning in the soft sand, Opportunity could have driven 157 feet.

"If Opportunity gets free, its next task will be examining the site to give the rover team a better understanding of how this ripple differs from dozens Opportunity easily crossed," said Jim Erickson. He is project manager for the Mars Exploration Rover project at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

The rovers have worked under harsh martian conditions longer than expected. They have been studying geology on opposite sides of Mars for more than a year since successfully completing their three-month primary missions. Shortly after landing in January 2004, Opportunity found layered bedrock bearing geological evidence of a shallow ancient sea. More than one year later, Spirit found extensive layered bedrock after driving more than two miles and climbing into the "Columbia Hills."

Squyres said, "In the last few weeks, we have gone from a state of confusion about the geology of the "Columbia Hills" to having real stratigraphic sequence and a powerful working hypothesis for the history of these layers."

For several months, Spirit climbed a flank of "Husband Hill," the tallest in the range. The slope closely matched the angle of underlying rock layers, which made the layering difficult to detect. Spirit reached an intermediate destination, dubbed "Larry's Lookout," then continued uphill and looked back. "That was the critical moment, when it all began falling into place," Squyres said. "Looking back downhill, you can see the layering, and it suddenly starts to make sense."

Spirit has been examining rocks in a series of outcrops called "Methuselah," "Jibsheet" and "Larry's Lookout." Some of the rocks contain the mineral ilmenite, not found previously by Spirit. "Ilmenite is a titanium-iron oxide formed during crystallization of magma," said Dr. Dick Morris, a rover science-team member at NASA's Johnson Space Center, Houston. "Its occurrence is evidence for diversity in the volcanic rocks in the Gusev region."

Rocks from different layers share compositional traits, high in titanium and low in chromium, which suggests a shared origin. However, the degree to which minerals in rocks have been chemically altered by exposure to water or other processes varies greatly from outcrop to outcrop. The textures also vary. At Methuselah, rocks have thin laminations revealed by Spirit's microscopic imager. At Jibsheet, they are built of bulbous grains packed together. At Larry's Lookout, the rocks are massive, with little fine-scale structure.

"Our best hypothesis is we're looking at a stack of ash or debris that was explosively erupted from volcanoes and settled down in different ways," Squyres said. "We can't fully rule out the possibility the debris was generated in impact explosions instead of volcanic ones. But we can say, once upon a time, Gusev was a pretty violent place. Big, explosive events were happening, and there was a lot of water around."

Rover-team scientists described the robot explorers' activities today at the spring meeting of the American Geophysical Union in New Orleans. For images and information about the rovers and their discoveries, visit:
http://www.nasa.gov/vision/universe/solarsystem/mer_main.html .

For information about NASA and agency programs on the Web, visit:
<http://www.nasa.gov/home/index.html> .

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News Release: 2005-075
13, 2005

May

Deep Impact Mission Status Report

Fifty-nine days before going head-to-head with comet Tempel 1, NASA's Deep Impact spacecraft successfully executed the second trajectory correction maneuver of the mission.

The burn further refined the spacecraft's trajectory, or flight path, and also moved forward the expected time of the Independence Day comet encounter so impact would be visible by ground- and space-based observatories.

The 95-second burn – the longest remaining firing of the spacecraft's motors prior to comet encounter -- was executed on May 4. It changed Deep Impact's speed by 18.2 kilometers per hour (11.3 miles per hour).

"Spacecraft performance has been excellent, and this burn was no different," said Rick Grammier, Deep Impact project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "It was a textbook maneuver that placed us right on the money."

Right on the money is where Deep Impact has to be to place a 1-meter-long (39-inch) impactor spacecraft in the path of a comet about as big as the island of Manhattan that is bearing down on it at 37,100 kilometers per hour (6.3 miles per second). At the same time, from a very comet-intimate distance of 500 kilometers (310 miles), a flyby spacecraft will be monitoring the event. This all occurs in the wee hours of July 4 – at 1:52 am Eastern time (July 3, 10:52 p.m. Pacific time) -- at a distance of 133.6-million kilometers (83-million miles) from Earth.

"With this maneuver our friends working the Hubble Space Telescope are assured a ringside seat," said Deep Impact Principal Investigator Dr. Michael A'Hearn of the University of Maryland, College Park. "Their observations, along with space telescopes Chandra and Spitzer and numerous ground-based observatories, will provide us with the most scientific bang for our buck with Deep Impact."

Deep Impact is comprised of two parts, a "flyby" spacecraft and a smaller "impactor." The impactor will be released into the comet's path before a planned high-speed collision on July 4. The crater produced by the impact could range in size from the width of a large house up to the size of a football stadium, and from 2 to 14 stories deep. Ice and dust debris will be ejected from the crater, revealing the material beneath.

The Deep Impact spacecraft has four data collectors to observe the effects of the collision. A camera and infrared spectrometer, which comprise the High Resolution Instrument, are carried on the flyby spacecraft, along with a Medium Resolution Instrument. A duplicate of the Medium Resolution Instrument on the impactor will record the vehicle's final moments before it is run over by comet Tempel 1 at a speed of about 37,100 kilometers per hour (23,000 miles per hour).

The overall Deep Impact mission management for this Discovery class program is conducted by the University of Maryland in College Park, Md. Deep Impact project management is handled by JPL. The spacecraft was built for NASA by Ball Aerospace & Technologies Corporation, Boulder, Colo.

For more information about Deep Impact on the Internet, visit <http://www.nasa.gov/deepimpact>. For more information about NASA on the Internet, visit <http://www.nasa.gov>.

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Cassini Finds New Saturn Moon That Makes Waves

In a spectacular kick-off to its first season of prime ring viewing, which began last month, the Cassini spacecraft has confirmed earlier suspicions of an unseen moon hidden in a gap in Saturn's outer A ring. A new image and movie show the new moon and the waves it raises in the surrounding ring material.

The moon, provisionally named S/2005 S1, was first seen in a time-lapse sequence of images taken on May 1, 2005, as Cassini began its climb to higher inclinations in orbit around Saturn. A day later, an even closer view was obtained, which has allowed a measure of the moon's size and brightness.

The new images can be seen at <http://saturn.jpl.nasa.gov>, <http://www.nasa.gov/cassini> and <http://ciclops.org>.

The images show the tiny object in the center of the Keeler gap and the wavy patterns in the gap edges that are generated by the moon's gravitational influence. The Keeler gap is located about 250 kilometers (155 miles) inside the outer edge of the A ring, which is also the outer edge of the bright main rings. The new object is about 7 kilometers (4 miles) across and reflects about half the light falling on it -- a brightness that is typical of the particles in the nearby rings.

"It's too early to make out the shape of the orbit, but what we've seen so far of its motion suggests that it is very near the exact center of the gap, just as we had surmised," said Dr. Joseph Spitale, imaging team associate and planetary scientist at the Space Science Institute in Boulder, Colo. The new moonlet orbits approximately 136,505 kilometers (84,820 miles) from the center of Saturn. More Cassini observations will be needed to determine whether the moon's orbit around Saturn is circular or eccentric.

S/2005 S1 is the second known moon to exist within Saturn's rings. The other is Pan, 25 kilometers (16 miles) across, which orbits in the Encke gap. Atlas and other moons exist outside the main ring system, as do the two F ring shepherd moons, Prometheus and Pandora.

Imaging scientists had predicted the new moon's presence and its orbital distance from Saturn after last July's sighting of a set of peculiar spiky and wispy features in the Keeler gap's outer edge. The similarities of the Keeler gap features to those noted in Saturn's F ring and the Encke gap led imaging scientists to conclude that a small body, a few kilometers across, was lurking in the center of the Keeler gap, awaiting discovery.

"The obvious effect of this moon on the surrounding ring material will allow us to determine its mass and test our understanding of how rings and moons affect one another," said Dr. Carl Murray, imaging team member from Queen Mary, University of London. An estimate of the moon's mass, along with a measure of its size, yields information on its physical makeup. For instance, the new moonlet might be quite porous, like an orbiting icy rubble pile. Other moons near the outer edge of Saturn's

rings – like Atlas, Prometheus and Pandora – are also porous. Whether a moon is porous or dense says something about how it was formed and its subsequent collision history.

The Keeler gap edges also bear similarities to the scalloped edges of the 322-kilometer-wide (200-mile) Encke gap, where the small moon Pan (25 kilometers, or 16 miles across) resides. From the size of the waves seen in the Encke gap, imaging scientists were able to estimate the mass of Pan. They expect to do the same eventually with this new moon.

“Some of the most illuminating dynamical systems we might hope to study with Cassini are those involving moons embedded in gaps,” said Dr. Carolyn Porco, imaging team leader at the Space Science Institute. “By examining how such a body interacts with its companion ring material, we can learn something about how the planets in our solar system might have formed out of the nebula of material that surrounded the Sun long ago. We anticipate that many of the gaps in Saturn’s rings have embedded moons, and we’ll be in search of them from here on.”

Additional closer observations of the new body may take place in the next several months, as Cassini continues its intensive survey of Saturn's beautiful and mysterious rings.

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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News Release: 2005-086
25, 2005

May

Odd Spot on Titan Baffles Scientists

Saturn’s moon Titan shows an unusual bright spot that has scientists mystified. The spot, approximately the size and shape of West Virginia, is just southeast of the bright region called Xanadu and is visible to multiple instruments on the Cassini spacecraft.

The 483-kilometer-wide (300-mile) region may be a “hot” spot -- an area possibly warmed by a recent asteroid impact or by a mixture of water ice and ammonia from a warm interior, oozing out of an ice volcano onto colder surrounding terrain. Other possibilities for the unusual bright spot include landscape features holding clouds in place or unusual materials on the surface.

"At first glance, I thought the feature looked strange, almost out of place," said Dr. Robert H. Brown, team leader of the Cassini visual and infrared mapping spectrometer and professor at the Lunar and Planetary Laboratory, University of Arizona, Tucson. "After thinking a bit, I speculated that it was a hot spot. In retrospect, that might not be the best hypothesis. But the spot is no less intriguing."

The Cassini spacecraft flew by Titan on March 31 and April 16. Its visual and infrared mapping spectrometer, using the longest, reddest wavelengths that the spectrometer sees, observed the spot, the brightest area ever observed on Titan.

Cassini's imaging cameras saw a bright, 550-kilometer-wide (345-mile) semi-circle at visible wavelengths at this same location on Cassini's December 2004 and February 2005 Titan flybys. "It seems clear that both instruments are detecting the same basic feature on or controlled by Titan's surface," said Dr. Alfred S. McEwen, Cassini imaging team scientist, also of the University of Arizona. "This bright patch may be due to an impact event, landslide, cryovolcanism or atmospheric processes. Its distinct color and brightness suggest that it may have formed relatively recently."

Other bright spots have been seen on Titan, but all have been transient features that move or disappear within hours, and have different spectral (color) properties than this feature. This spot is persistent in both its color and location. "It's possible that the visual and infrared spectrometer is seeing a cloud that is topographically controlled by something on the surface, and that this weird, semi-circular feature is causing this cloud," said Dr. Elizabeth Turtle, Cassini imaging team associate, also from the Lunar and Planetary Laboratory.

"If the spot is a cloud, then its longevity and stability imply that it is controlled by the surface. Such a cloud might result from airflow across low mountains or outgassing caused by geologic activity," said Jason Barnes, a postdoctoral researcher working with the visual and infrared mapping spectrometer team at the University of Arizona.

The spot could be reflected light from a patch of terrain made up of some exotic surface material. "Titan's surface seems to be mostly dirty ice. The bright spot might be a region with different surface composition, or maybe a thin surface deposit of non-icy material," Barnes added.

Scientists have also considered that the spot might be mountains. If so, they'd have to be much higher than the 100-meter-high (300-foot) hills Cassini's radar altimeter has seen so far. Scientists doubt that Titan's crust could support such high mountains.

The visual and infrared mapping spectrometer team will be able to test the hot spot hypothesis on the July 2, 2006, Titan flyby, when they take nighttime images of the same area. If the spot glows at night, researchers will know it's hot.

For more information about the Cassini-Huygens mission visit <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini> . For additional images visit the visual and infrared

mapping spectrometer page at <http://www.vims.lpl.arizona.edu> and the Cassini imaging team homepage <http://ciclops.org> .

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 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 visual and infrared mapping spectrometer team is based at the University of Arizona. The imaging team is based at the Space Science Institute in Boulder, Co.

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Image Advisory: 2005-080

May 19, 2005

One Mars Orbiter Takes First Photos of Other Orbiters

Photographs from NASA's Mars Global Surveyor spacecraft released today are the first pictures ever taken of a spacecraft orbiting a foreign planet by another spacecraft orbiting that planet.

The new images of the European Space Agency's Mars Express and NASA's Mars Odyssey are available on the Internet from NASA at <http://www.nasa.gov/vision/universe/solarsystem/mgs-images.html> and from Malin Space Science Systems, the San Diego company that built and operates the camera, at http://www.msss.com/mars_images/moc/2005/05/19/index.html .

Mars Global Surveyor has been orbiting Mars since 1997, Mars Odyssey since 2001. Both are managed for NASA by the Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, Calif. Mars Express has been in orbit since late 2003.

Mars Express was passing about 155 miles away when the Mars Orbiter Camera on Mars Global Surveyor photographed it on April 20. The next day, the camera caught Mars Odyssey passing 56 to 84 miles away.

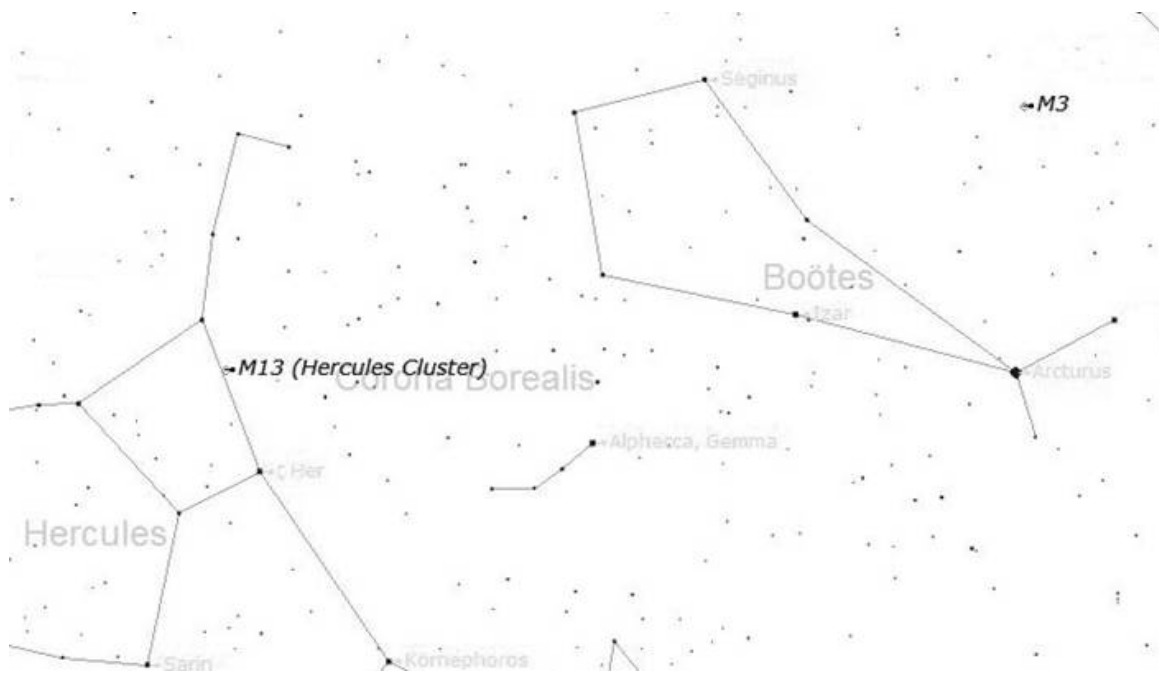
All three spacecraft are moving at almost 7,000 miles per hour, and at 62 miles distance the field-of-view of the Mars Orbiter Camera is only 830 yards across. If timing had been off by only a few seconds, the images would have been blank.

The images were obtained by the Mars Global Surveyor operations teams at Lockheed Martin Space Systems, Denver; JPL and Malin Space Science Systems.

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Mid Evening Observing Highlights for June

The bright star Arcturus is almost directly overhead. The keystone of Hercules is high in the east. Leo is setting in the west. The bright stars Vega, Deneb, and Altair are rising in the east. These three stars form the summer triangle. The bright star Antares is rising in the southeast. The Big Dipper can be seen in the northwestern sky. Scorpius is rising in the southeast. The prominent globular clusters M3 and M13 can be seen almost directly overhead. The image below shows their positions in the sky. New moon occurs on June 6th and full moon occurs on June 22nd. The summer solstice begins on June 21st at 2:46 AM EDT.



NASA Space Place

Seeing in the Dark with Spitzer

by Patrick Barry and Tony Phillips

Have you ever gotten up in the middle of the night, walked to the bathroom and, in the darkness, tripped over your dog? A tip from the world of high-tech espionage: next time use night-vision goggles.

Night vision goggles detect heat in the form of infrared radiation—a “color” normally invisible to the human eye. Wearing a pair you can see sleeping dogs, or anything that’s warm, in complete darkness.

This same trick works in the darkness of space. Much of the exciting action in the cosmos is too dark for ordinary telescopes to see. For example, stars are born in the heart of dark interstellar clouds. While the stars themselves are bright, their birth-clouds are dense, practically impenetrable. The workings of star birth are thus hidden.

That’s why NASA launched the Spitzer Space Telescope into orbit in 2003. Like a giant set of infrared goggles, Spitzer allows scientists to peer into the darkness of space and see, for example, stars and planets being born. Dogs or dog *stars*: infrared radiation reveals both.

There is one problem, though, for astronomers. “Infrared telescopes on the ground can’t see very well,” explains Michelle Thaller, an astronomer at the California Institute of Technology. “Earth’s atmosphere blocks most infrared light from above. It was important to put Spitzer into space where it can get a clear view of the cosmos.”

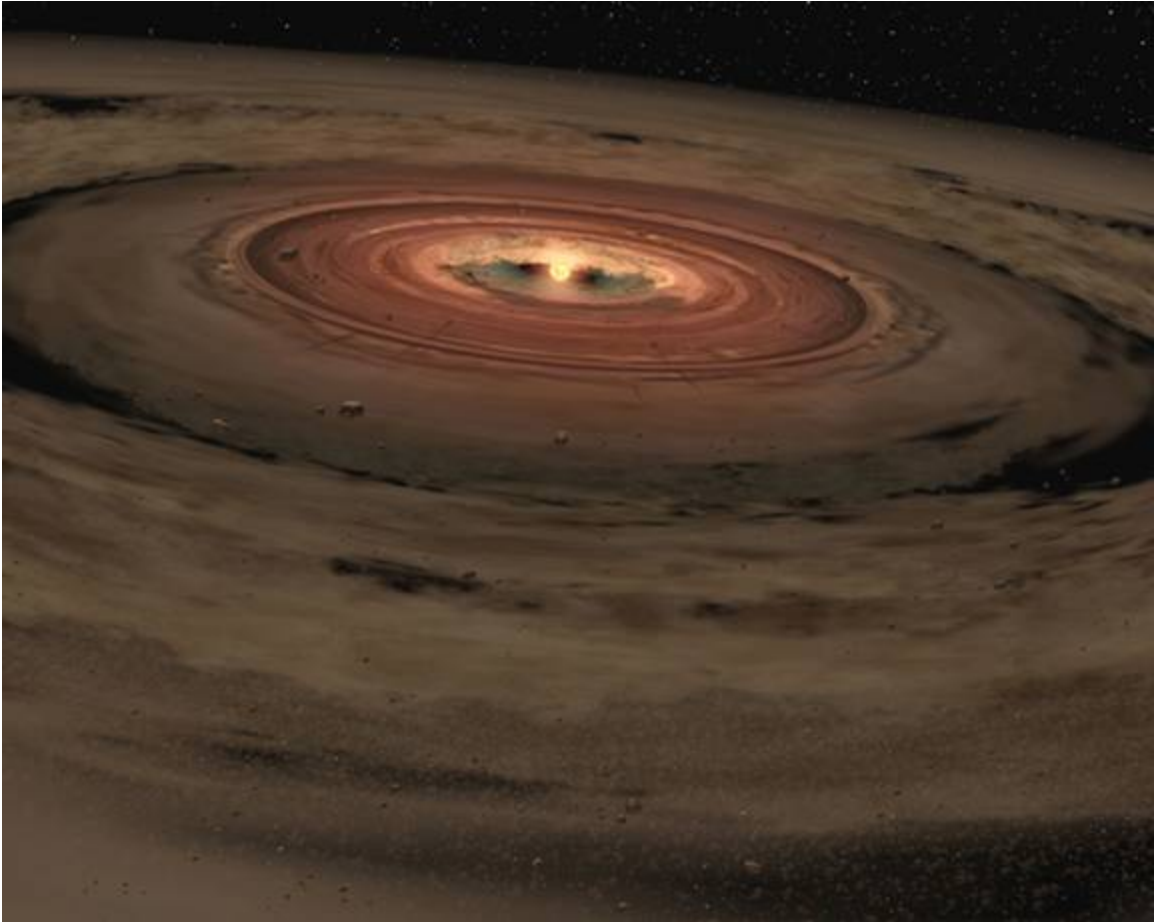
The clear view provided by Spitzer recently allowed scientists to make a remarkable discovery: They found planets coalescing out of a disk of gas and dust that was circling—not a star—but a “failed star” not much bigger than a planet! Planets orbiting a giant planet?

The celestial body at the center of this planetary system, called OTS 44, is only about 15 times the mass of Jupiter. Technically, it’s considered a “brown dwarf,” a kind of star that doesn’t have enough mass to trigger nuclear fusion and shine. Scientists had seen planetary systems forming around brown dwarfs before, but never around one so small and planet-like.

Spitzer promises to continue making extraordinary discoveries like this one. Think of it as being like a Hubble Space Telescope for looking at invisible, infrared light. Like Hubble, Spitzer offers a view of the cosmos that’s leaps and bounds beyond anything that came before. Spitzer was designed to operate for at least two and a half years, but probably will last for five years or more.

For more about Spitzer and to see the latest images, go to <http://www.spitzer.caltech.edu/spitzer>. Kids and grown-ups will enjoy browsing common sights in infrared and visible light at the interactive infrared photo album on The Space Place, http://spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml.

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



Artist's rendering of brown dwarf OTS44 with its rotating planetary disk.

