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Alien Asteroids?

The Spitzer Space Telescope found warm dust around a faint, nearby star called HD 69830, possible evidence of asteroids smashing together in an asteroid belt. This artist's rendering shows a massive asteroid belt in orbit around a star the same age and size of our Sun. The view is from outside the asteroid belt, where planets such as the one in the foreground might reside. Compared to our own solar system's asteroid belt, this one is larger and closer to its star. Our asteroid belt circles between the orbits of Mars and Jupiter. For more information and images, see: http://www.spitzer.caltech.edu

Credit NASA/JPL-Caltech/T. Pyle (Spitzer Science Center).

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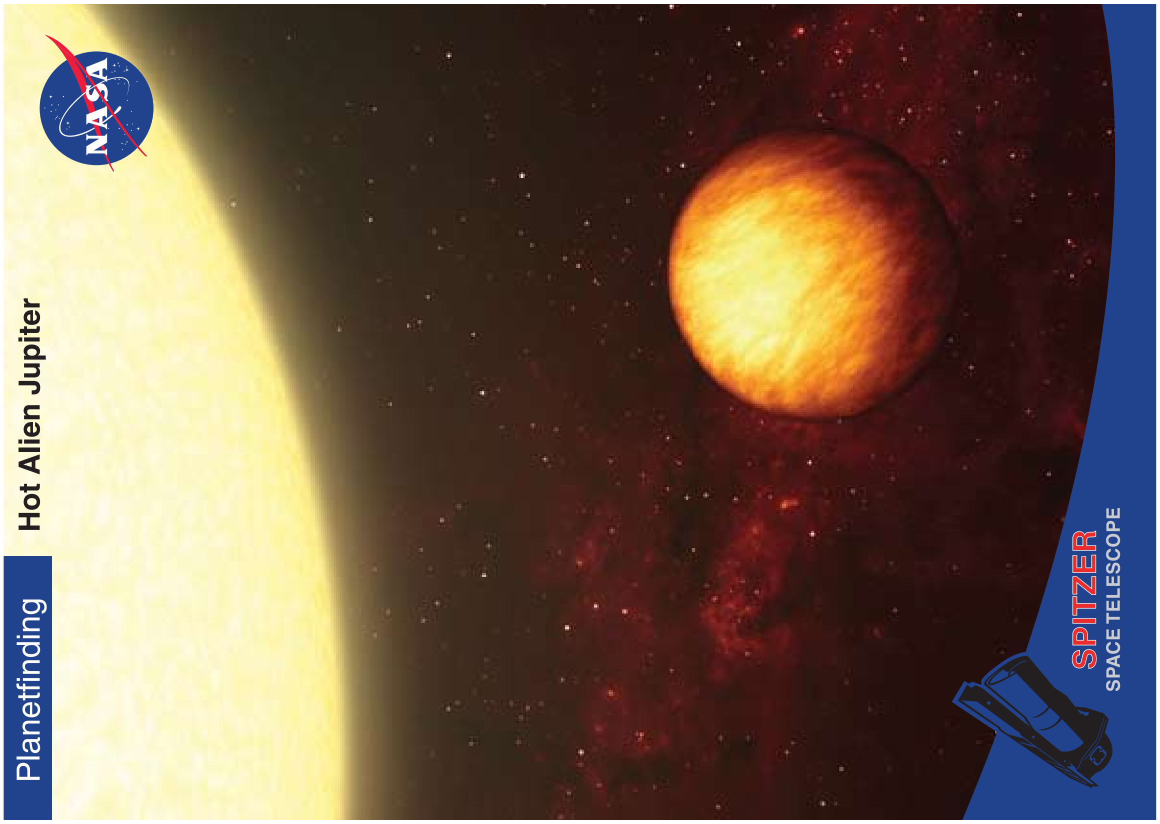

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Hot Alien Jupiter

This artist's concept of a Jupiter-like planet may be similar to one the Spitzer Space Telescope observed using its heat-seeking infrared eyes. The planet, Upsilon Andromedae b, orbits its star once every 4.6 days at one-sixth the distance that our innermost planet, tiny Mercury, orbits the Sun. Unlike our Jupiter with its 10-hour rotation period, this strange gas giant always keeps the same side toward the star. So the side facing the star is hot as molten lava, and the other side could be cold as ice. For more information and images, see: http://www.spitzer.caltech.edu

Credit NASA/JPL-Caltech/R. Hurt (Spitzer Science Center).

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Pulsar Planet System

Pulsars are rapidly rotating neutron stars, which are the collapsed cores of exploded massive stars. This artist's concept depicts the pulsar planet system discovered by Aleksandar Wolszcan in 1992 using the Arecibo radio telescope in Puerto Rico. This system may be a second generation of planets, the first having been destroyed when the star exploded. The Spitzer Space Telescope has discovered a dusty disk around a pulsar that might represent the beginnings of a similarly "reborn" planet system. For more information and images, see: http://www.spitzer.caltech.edu

Credit NASA/JPL-Caltech/R. Hurt (Spitzer Science Center).

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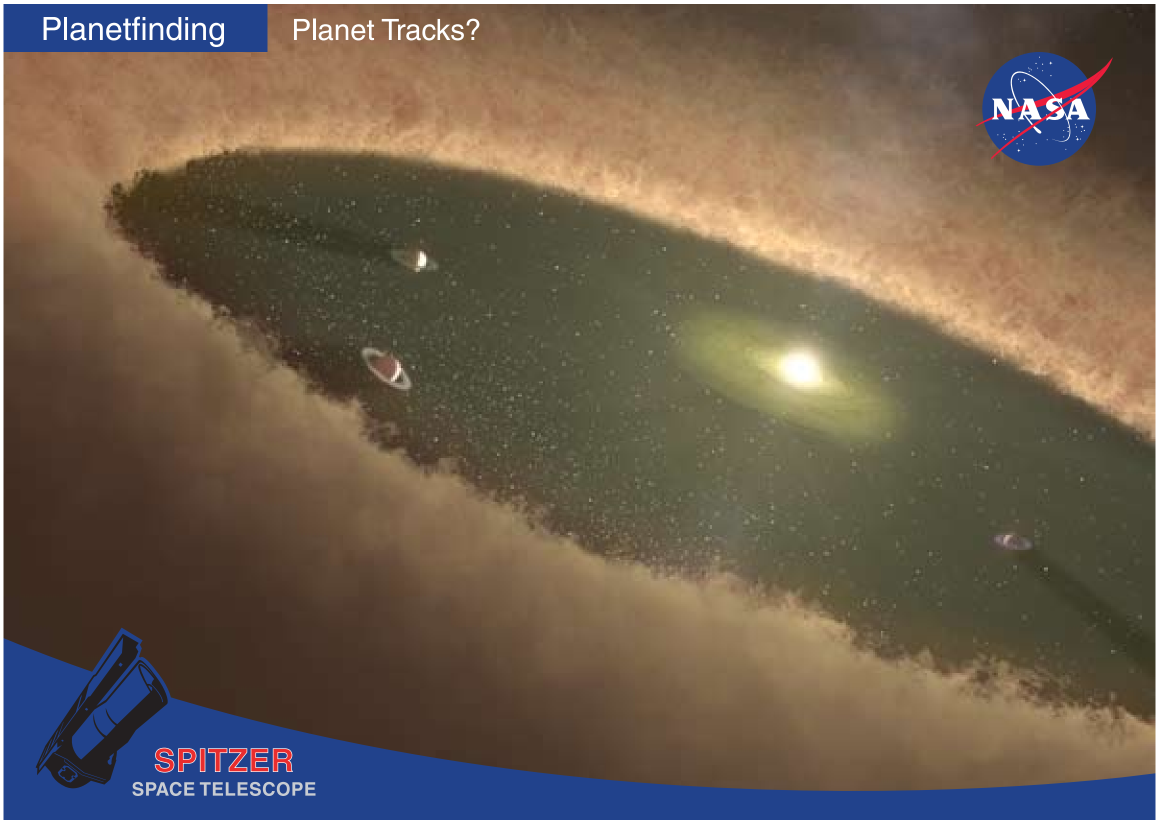

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Planet Tracks?

The Spitzer Space Telescope has revealed a gap in a planet-forming disk surrounding a young star. This artist's concept credits the disk gap to planet formation. The young star at the center pulls in material from an inner disk of dust and gas. The gap between this inner disk and the thick outer disk may be occupied by developing gas giant planets. The gap would span orbits equivalent to those of Jupiter and Saturn. Note that the sizes of the planets in this illustration are exaggerated. The thick outer disk could coalesce into asteroids, comets and possibly more planets. For more information and images, see: http://www.spitzer.caltech.edu

Credit NASA/JPL-Caltech/T. Pyle (Spitzer Science Center).

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Rosette Nebula

This infrared image from NASA's Spitzer Space Telescope shows the central portion of the Rosette Nebula. In optical light, the nebula looks like a rosebud. But lurking inside this delicate cosmic flower are super hot stars, called O-stars, whose radiation and winds have collectively excavated layers of dust (green) and gas away, revealing the cavity of cooler dust (red). Some of the Rosette's O-stars can be seen in the bubble-like red cavity; however, the largest two blue stars in this picture are in the foreground and not in the nebula itself.

Credit: NASA/JPL-Caltech/Z. Balog (Univ. of Ariz./Univ. of Szeged)

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Bubble-blowing Baby Star

In this digitally enhanced image from NASA's Spitzer Space Telescope, baby star HH 46/47 (white spot in the center) blows two massive "bubbles." The bubbles are the elliptical shells of bluish-green material extending from the star. Wisps of green reveal warm molecular hydrogen gas, while the bluish tints are formed by starlight scattered by surrounding dust. These bubbles formed when powerful jets of gas, traveling about 120 to 190 miles per second, smashed into the cosmic cloud of gas and dust that surrounds HH 46/47. The red specks at the end of each bubble are hot sulfur and iron gas.

Credti: NASA/JPL-Caltech/T. Velusamy (Jet Propulsion Laboratory)

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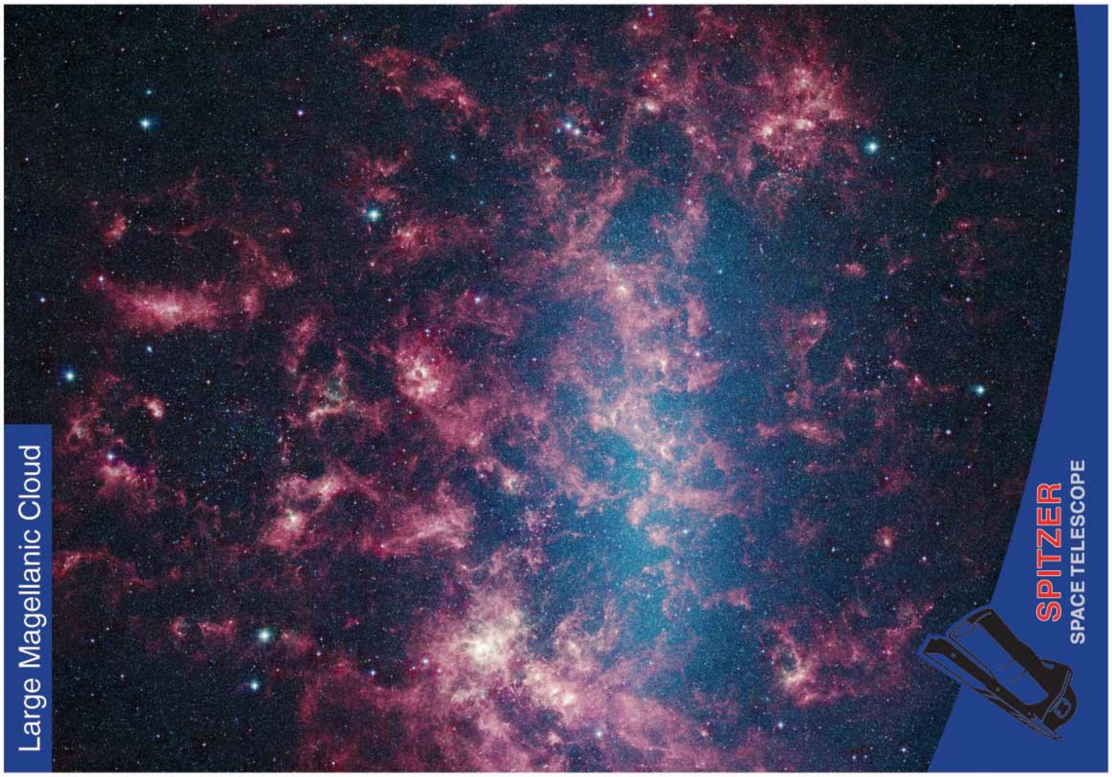

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Large Magellanic Cloud

This vibrant infrared image from NASA's Spitzer Space Telescope shows the Large Magellanic Cloud, which is not a cloud, but a satellite galaxy to our own Milky Way galaxy. This image reveals nearly one million objects never seen before. Blue represents starlight from older stars. The chaotic, bright regions are filled with hot, massive stars buried in thick blankets of dust. The red clouds contain cooler interstellar gas and dust illuminated by ambient starlight.

Credit: NASA/JPL-Caltech/M. Meixner (STScI) and the SAGE Legacy Team

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Dusty Eye of the Helix Nebula

The Helix Nebula, an example of a class of objects called planetary nebulae, is especially striking in this infrared image from NASA's Spitzer Space Telescope. Planetary nebulae are the remains of stars that once looked a lot like our sun. Infrared light from the outer gaseous layers is represented in blues and greens. The remaining white dwarf star is a tiny white dot in the center of the picture. The red in the middle of the "eye" shows the final layers of gas blown out when the star died.

Credit: NASA/JPL-Caltech/K. Su (Univ. of Arizona).

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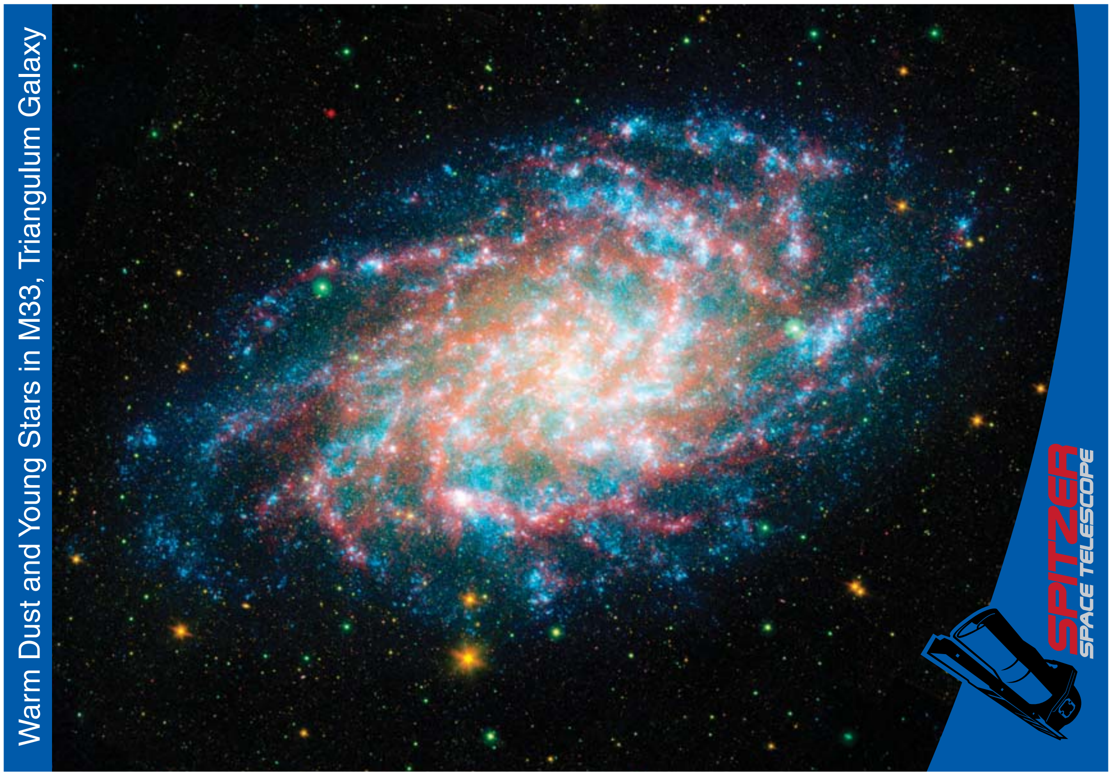

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Warm Dust and Young Stars in M33, Triangulum Galaxy

This image blends a Galaxy Evolution Explorer ultraviolet M33 image and a Spitzer Space Telescope infrared image. M33, in the constellation Triangulum, is one of what's known as our Local Group of galaxies. This combined image shows the beautiful and complicated interlacing of the heated dust and young stars. Far-ultraviolet light from young stars glimmers blue, near-ultraviolet light from intermediate age stars glows green, near-infrared light from old stars burns yellow and orange, and dust rich in organic molecules burns red.

Credit: NASA/JPL-Caltech.

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Star Formation in Cygnus

This cloud in the Cygnus region is bursting with new stars. This is one of the first images to be taken during the “warm mission” of the Spitzer Space Telescope. Spitzer’s sensitive infrared detectors see cold objects in space that do not radiate visible light. The “warm” phase of the mission began when the telescope ran out of liquid coolant after operating more than five and one-half years. However, its infrared array camera continues to operate in two of its four wavelength ranges. Thus, it can still see dust and see through dust, giving it a unique view into star-forming nests.

Credit NASA/JPL-Caltech.

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Baby Stars in Rho Ophiuchi

Rho Ophiuchi is one of the closest star-forming regions to our own solar system. This infrared image from the Spitzer Space Telescope shows the new stars, even though they are surrounded by a blanket of dust. Rho Ophiuchi is a complex made up of a large main cloud of molecular hydrogen, a key molecule allowing new stars to form from cold cosmic gas, with two long streamers trailing off in different directions. More than 300 young stars have been observed within the large central cloud, their median age only 300,000 years, very young for a star.

Credit: NASA/JPL-Caltech/Harvard-Smithsonian CfA.

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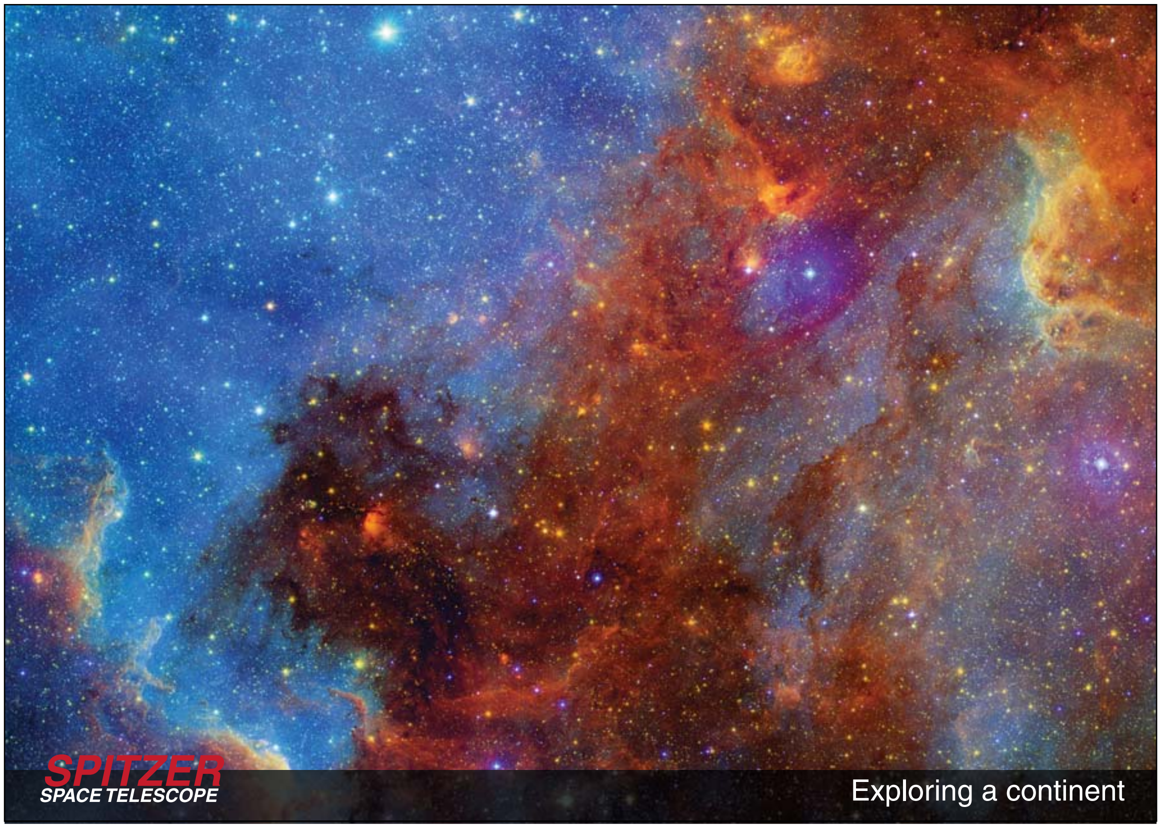

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Exploring a continent

This image of the North American Nebula combines visible light from the Digitized Sky Survey with infrared light from NASA's Spitzer Space Telescope. The nebula's name comes from its apparent shape when viewed in visible light (in blue hues here). Infrared light (red and green here) can penetrate deep into the dust, revealing multitudes of hidden stars and dusty clouds. Clusters of young stars (about one million years old) appear throughout the image. Slightly older stars (about three to five million years) are also liberally scattered across the region. Only the very densest dust clouds remain opaque, like the dark bands seen in the "Gulf of Mexico" area.

Credit: NASA/JPL-Caltech/L. Rebull (SSC/Caltech)/D. De Martin

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Twin jets from a baby star

A baby star in a system called Herbig-Haro 34 sprouts identical twin jets of gas and dust, seen in this image as green lines emanating from a fuzzy star. Although the jet on the right showed up in visible-light images, no one knew about the twin on the left until Spitzer's infrared detectors saw it through the dense, dusty cloud. From the Spitzer data, astronomers have determined that the jets originated from within a sphere around the star, and, based on the spacing of the knots of gas and dust in the jets, that the jet on the left shot out 4.5 years before the jet on the right.

Credit: NASA / JPL-Caltech / A. Raga (ICN/UNAM) and A. Noriega-Crespo (SSC/Caltech)

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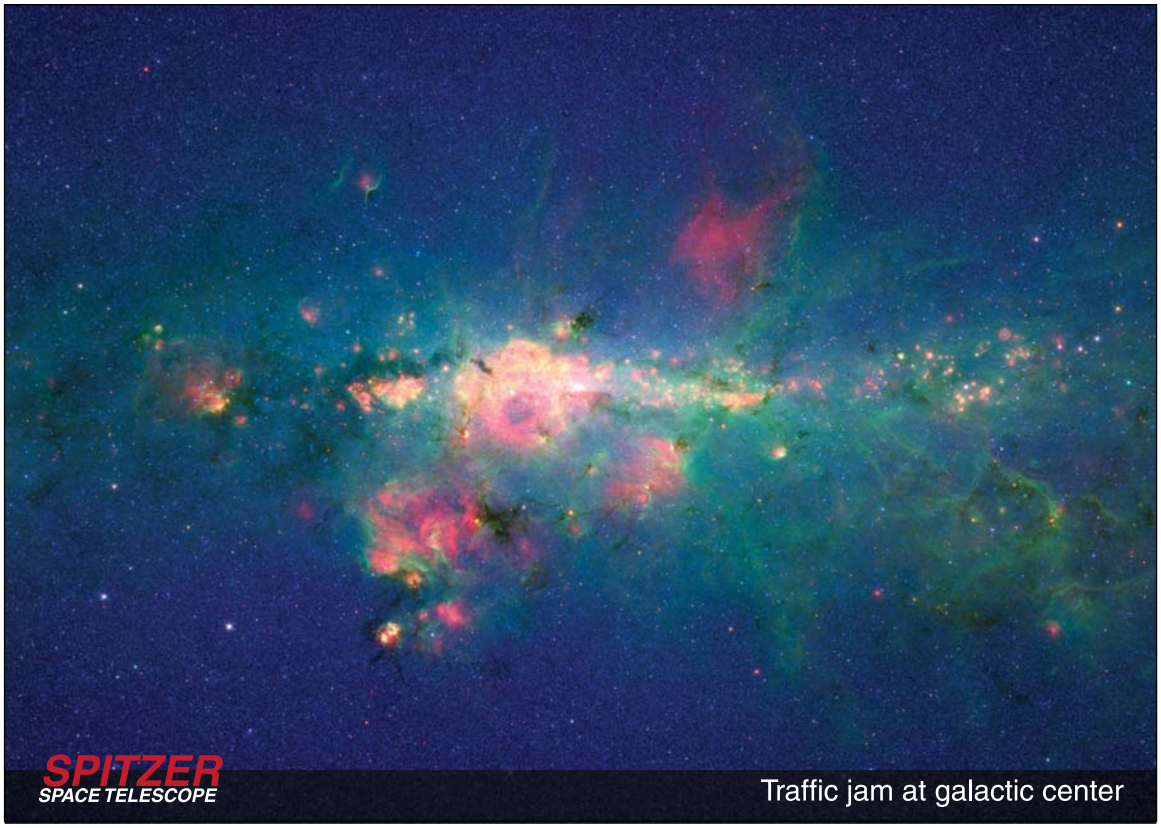

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Traffic jam at galactic center

The region around the center of our Milky Way galaxy glows colorfully in this image taken by NASA's Spitzer Space Telescope. In visible-light pictures, the heart of our galaxy hardly appears. But infrared light penetrates the shroud of dust giving us this unprecedented view. The myriad of stars in this crowded region creates the blue haze. The green features are from carbon-rich dust molecules, called polycyclic aromatic hydrocarbons. The yellow-red patches are the thermal glow from warm dust. These materials are associated with bustling hubs of young stars. The brightest feature is the central star cluster in our galaxy, believed to be orbiting a massive black hole.

Credit: NASA/JPL-Caltech

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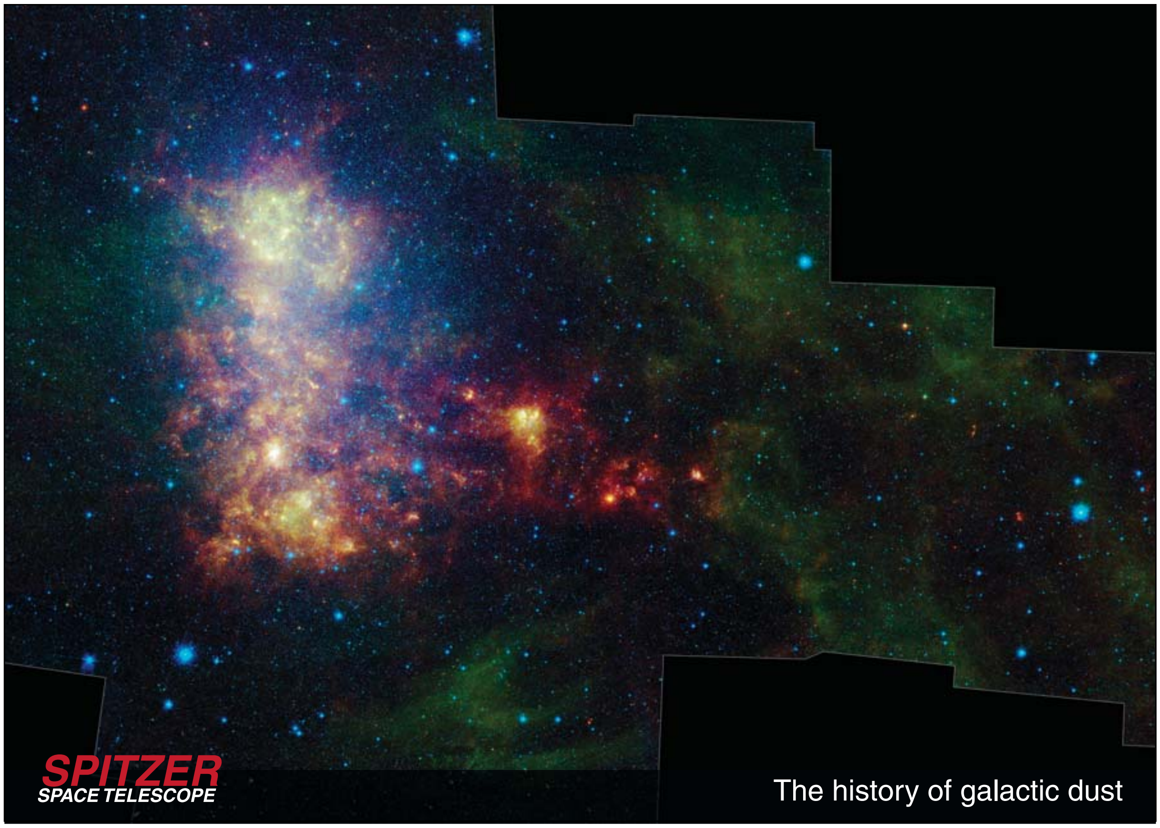

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The history of galactic dust

The Small Magellanic Cloud is a small satellite galaxy of the Milky Way. This infrared image taken by the Spitzer Space Telescope reveals both old stars (in blue) and young stars (in green and red) lighting up the dusty, gassy material from which they formed. Spitzer data confirm that the tail region on the right was recently torn off the main body of the galaxy. The tail contains only gas, dust and newly formed stars. Astronomers are using Spitzer data from both the Small and Large Magellanic Clouds to study the lifecycle of dust in entire galaxies.

Credit: NASA/JPL-Caltech/K. Gordon (STScI)

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Messier 81

The Spitzer Space Telescope's infrared array camera captured this image of spiral galaxy M81, located in the northern constellation Ursa Major, 12 million light-years away. Spitzer's sensitivity at infrared wavelengths clearly distinguishes the old stars, the interstellar dust heated by star formation activity, and the embedded sites of massive star formation. The image is a composite of wavelengths of 3.6 microns (blue), 4.5 microns (green), 5.8 microns (yellow) and 8.0 microns (red).

Winding outward from the bluish-white central bulge of the galaxy, where old stars predominate and there is little dust, the grand spiral arms are dominated by infrared emission from dust. The infrared-bright clumpy knots within the spiral arms denote where massive stars are being born. The 8-micron emission (red) traces the regions of active star formation in the galaxy.

Credit: NASA/JPL-Caltech/S. Willner (Harvard-Smithsonian Center for Astrophysics)

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NGC 7331
The Spitzer Space Telescope infrared array camera captured this image of spiral galaxy NGC 7331, which resembles our own Milky Way. NGC 7331 is found in the constellation Pegasus at a distance of 50 million light-years. The image is a four-color composite of invisible light, showing emissions from wavelengths of 3.6 microns (blue), 4.5 microns (green), 5.8 microns (yellow) and 8.0 microns (red).
At shorter wavelengths (3.6 to 4.5 microns), the light comes mainly from stars, particularly ones that are older and cooler than our Sun. At longer wavelengths (5.8 to 8.0 microns), instead of stars, Spitzer reveals the glow from clouds of interstellar dust, which provides a reservoir of raw materials for future star formation. The longer-wavelength range reveals a ring of dust (red) girdling the galaxy center. This ring, with a radius of nearly 20,000 light-years, may contain enough gas to produce four billion stars like the Sun.

Credit: NASA/JPL-Caltech/M. Regan (STScI), and the SINGS Team.

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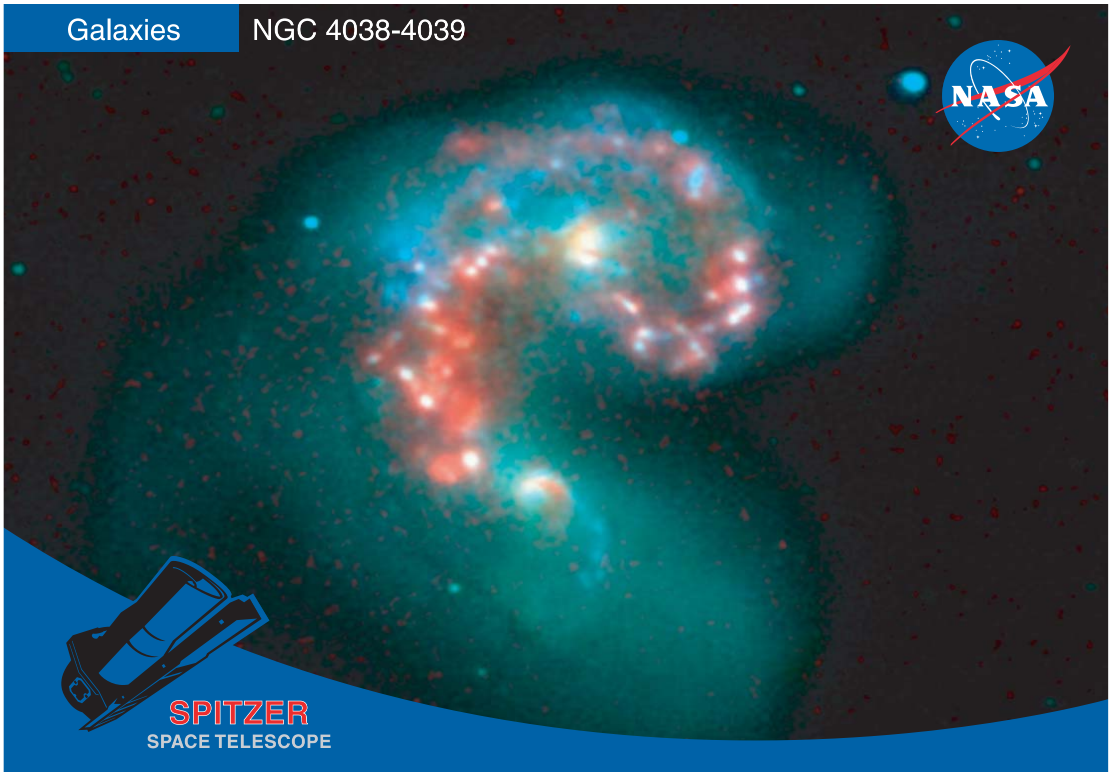

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Antenna Galaxies
This false-color image from NASA's Spitzer Space Telescope reveals newborn stars at the heart of the colliding "Antennae" galaxies. These two galaxies, known individually as NGC 4038 and 4039 and located around 68 million light-years away, have been merging for about the last 800 million years. This image reveals the tremendous burst of star formation this collision has triggered.
The image is a false-color composite of visible and infrared images. Visible light from stars (blue and green) is combined with infrared light from warm dust clouds heated by newborn stars (red). The nuclei of the merging galaxies show up as yellow-white areas, one above the other. The brightest clouds of forming stars lie in the overlap region between and left of the nuclei.

Credit: NASA/JPL-Caltech/Z. Wang (Harvard-Smithsonian CfA); Visible: M. Rushing/NOAO

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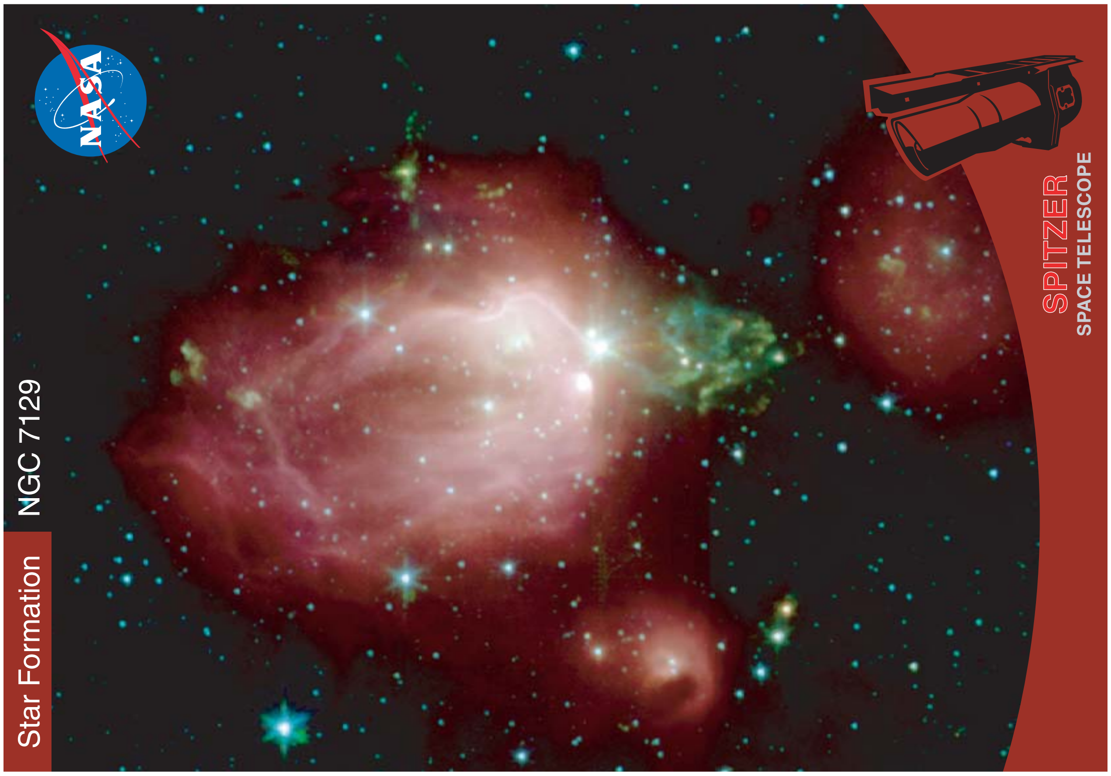

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NGC 7129
The Spitzer Space Telescope infrared array camera revealed a cluster of 130 newborn stars in a rosebud-shaped nebula known as NGC 7129, located 3300 light-years away in the constellation Cepheus. The stars formed from a massive cloud of gas and dust. Fragments of this molecular cloud became so cold and dense that they collapsed into stars. Most stars in our Milky Way galaxy, including our Sun, are thought to form in such clusters.
The rosy pink hue is produced by glowing dust grains being heated by the intense light from the embedded young stars. The reddish colors trace the distribution of molecular material thought to be rich in hydrocarbons. Three very young stars near the center of the image are sending jets of supersonic gas into the cloud, heating molecules of carbon monoxide in the cloud and producing the green nebulosity that forms the stem of the rosebud.

NASA/JPL-Caltech/T. Megeath (Harvard-Smithsonian CfA)

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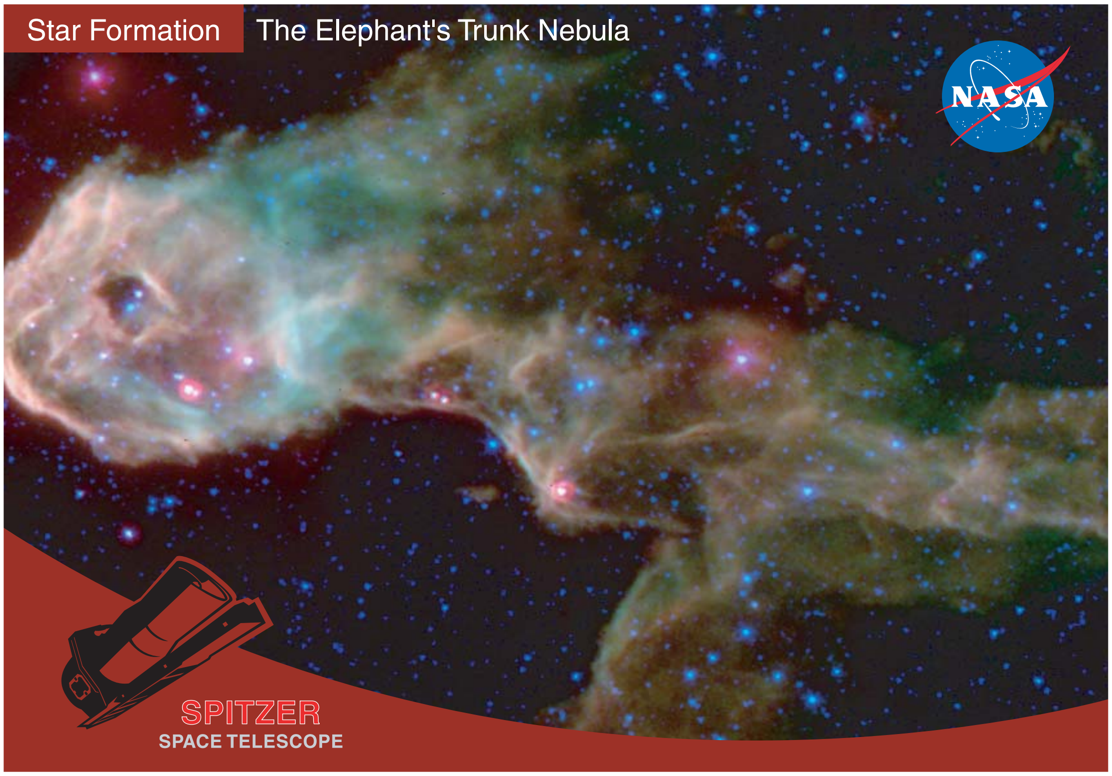

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Star Formation in the Elephant's Trunk Nebula
NASA's Spitzer Space Telescope has captured a glowing stellar nursery within the Elephant's Trunk Nebula, an elongated dark globule within nebula IC 1396 in the constellation Cepheus. Located 2,450 light-years away, the globule is a condensation of dense gas barely surviving the strong ionizing radiation from a nearby massive star (to the left, outside the picture frame). The globule is being compressed by the surrounding ionized gas.
This image combines data from Spitzer's multiband imaging photometer (MIPS) and the infrared array camera (IRAC). Within the globule, a half-dozen protostars appear as bright red-tinted objects, mostly along the southern rim of the globule. These were previously undetected at visible wavelengths, hidden by the thick cloud and by dust surrounding the newly forming stars.

Credit: NASA/JPL-Caltech/W. Reach (SSC/Caltech)

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Star Formation in the Carina Nebula
In this infrared image made by the Spitzer Space Telescope, star embryos (yellow or white) are tucked inside finger-like pillars of thick dust (pink). The most massive star in this nebula is Eta Carinae, above the picture frame. It is 100 times the mass of our Sun and too bright to be seen with an infrared telescope. Eta Carinae and its slightly less massive siblings have shaped and shredded this cloud with their ultraviolet radiation and stellar winds, triggering the birth of new stars. In this picture, hot gases are green, and foreground stars are blue.

The Carina Nebula is located in the southern portion of our Milky Way galaxy 10,000 light-years from Earth. It stretches over 200 light-years of space. This image is a composite of infrared wavelengths, including 3.6 microns (blue), 4.5 microns (green), 5.8 microns (orange), and 8.0 microns (red).

Credit: NASA/JPL-Caltech/N. Smith (Univ. of Colorado at Boulder)

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