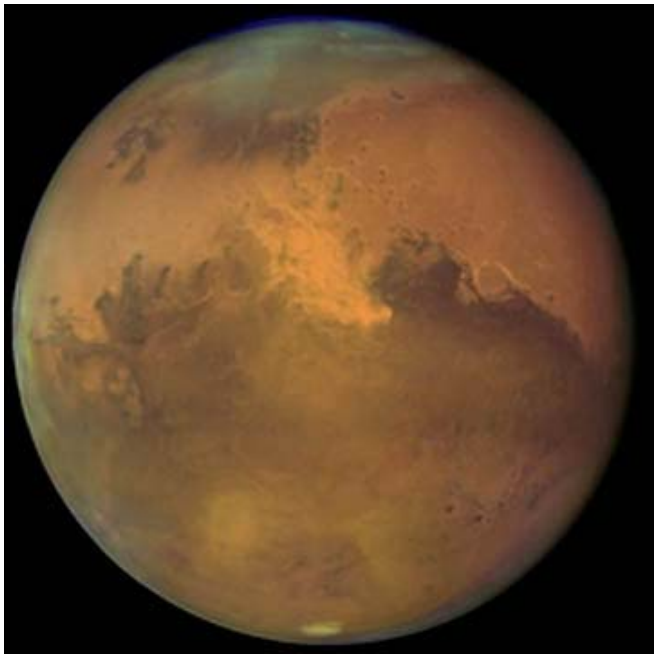
Earthfiles, news category.

Dust Storm On Mars, Cosmic First Light and Black Hole At Our Galaxy's Center

November 9, 2005 -



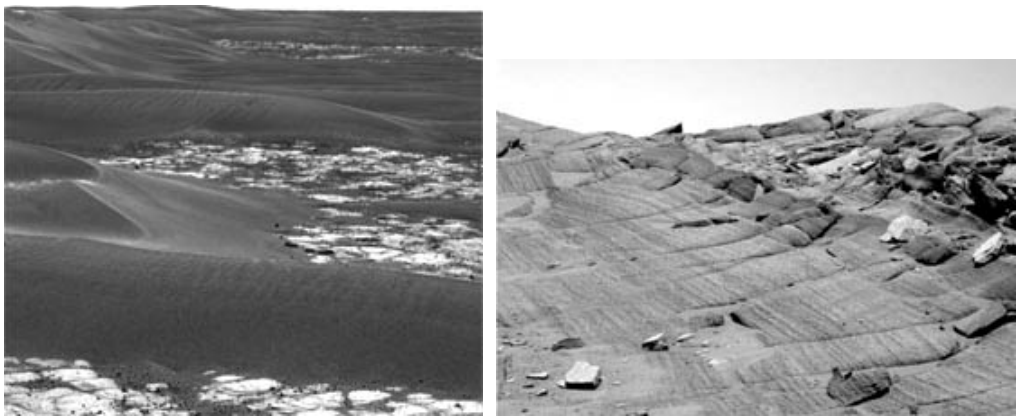
Hubble Space Telescope image of Mars and growing dust storm on October 28, 2005, one night before its close approach to Earth at 41 million miles on October 29, 2005. Image credit: NASA, ESA, The Hubble Heritage Team (STScI/AURA), J. Bell (Cornell University) and M. Wolff (Space Science Institute).

NASA's Hubble Space Telescope snapped this picture of Mars on October 28, 2005, within a day of its closest approach to Earth on the night of October 29, 2005. Hubble astronomers were also excited to have captured a regional dust storm on Mars that has been growing and evolving over the past few weeks. The dust storm, which is the bright "feathery" feature in the middle of the planet in this picture, is about 930 miles (1500 km) long measured diagonally. That's about the size of Texas, Oklahoma and New Mexico combined.

Dust Storm Impact On Opportunity Rover October 29-31, 2005

NASA reported that a dust storm in the Meridiani region reduced sunshine enough the weekend of October 29-31, 2005, that Opportunity "did not wake from deep sleep early enough for the first scheduled activities of that sol. The rover's onboard software properly put Opportunity into self-protective automode for the day, so the rover did not take the post-drive images. Dustiness of the atmosphere above Opportunity diminished a little on sol 630, as indicated by increased output from the solar panels." Now Opportunity is back

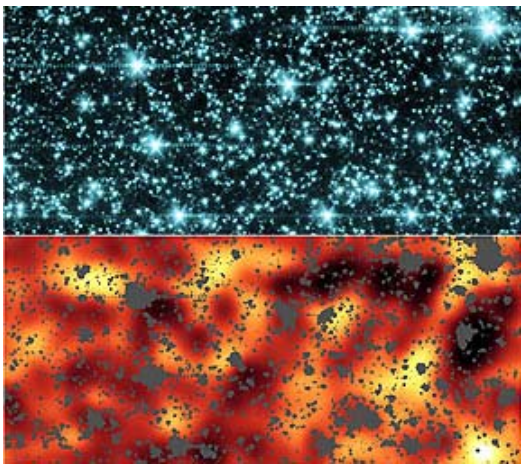
to work.



Left: October 9, 2005, image by NASA's Mars Exploration Rover Opportunity from panoramic camera. The light-colored rock outcrop is on the rim of Erebus Crater. Large, dark, drifts of the Martian red dust have filled
the center of the crater. Opportunity is driving south to the western rim of the crater. **Right:** For travel perspective, where Opportunity was one year ago on November 5, 2004.
Image credit: NASA/JPL-Caltech/Cornell.

Cosmic First Light - 13.9 Billion Years Ago?

"We think we are seeing the collective light from millions of the first objects to form in the universe. The objects disappeared eons ago, yet their light is still traveling across the universe."- Alexander Kashlinsky, Ph.D., Science Systems and Applications, NASA Goddard Space Flight Center



Top: Spitzer Space Telescope infrared image (wavelength 3.6 microns) of stars and galaxies in the constellation Draco. The region photographed is about 50 million by 100 million light-years. **Bottom:** Forefront stars, galaxies and artifacts filtered out. The remaining background glow shown in red and yellow could be the first stars in the universe. Credit: NASA/GSFC/JPL-Caltech.

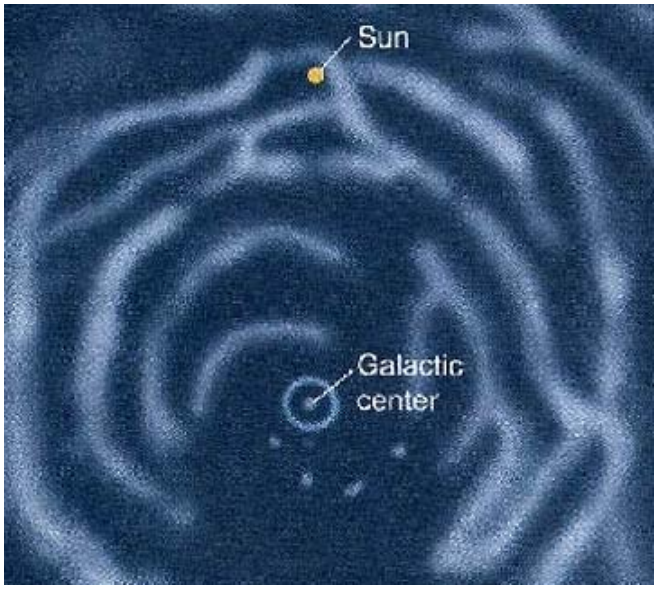
The November 3, 2005 issue of *Nature* featured a report by NASA scientists about a recent breakthrough with the Spitzer Space Telescope infrared study of the Draco Constellation. NASA: "The low noise and high resolution of Spitzer's infrared array camera enabled the team to remove the fog of foreground galaxies made of later stellar populations of stars, until the cumulative light from the first light dominated the signal on large angular scales.

"We removed everything we knew - all the stars and galaxies both near and far. We were left with a picture of part of the sky with no stars or galaxies, but it still had this infrared glow with giant blobs that we think could be the glow from the very first stars," explained John Mather, Ph.D., Senior Project Scientist.

If the red and yellow glow shown above is light from the earliest stars, the date is 13.9

billion years ago. The next step in the research will be to "find the first individual clumps of these stars or the individual exploding stars that might have made the first black holes."

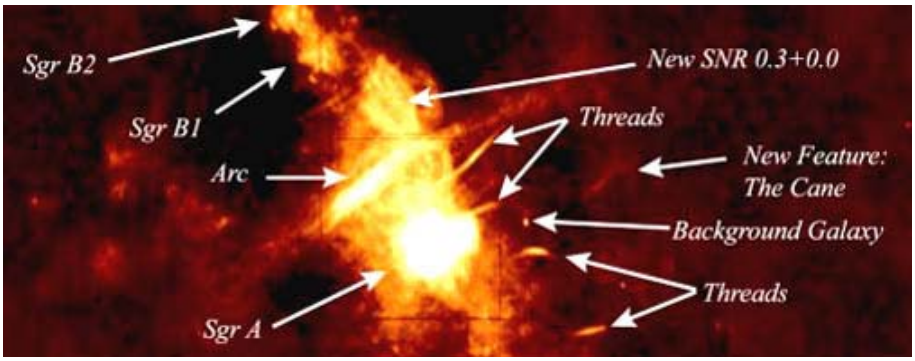
Black Hole At Our Galaxy's Center - "Nurturing" Ring of Young Suns?



Graphic illustrating the location of our sun in a distant Milky Way galactic arm 26,000 light-years from the galactic center. Graphic by Univ. of California-San Diego, Center for Astrophysics & Space Sciences.

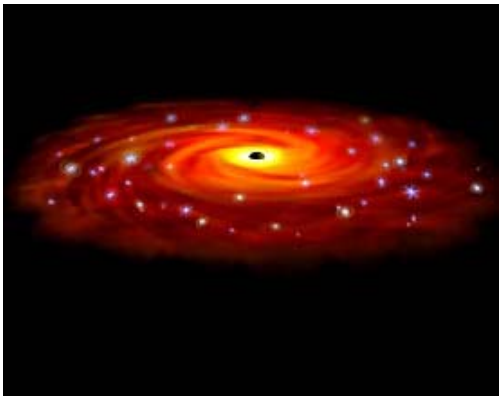
Twenty-six thousand light-years from Earth is the center of our Milky Way galaxy. Astrophysicists have tried radio and infrared to look beyond the visible light spectrum which glows with a lot of dust and gas. With advances in technology, it's now becoming more clear that at our galaxy's center there are three objects: a young supernova remnant on the east side, an unusual ionized hydrogen region on the west side, and a very compact source called Sagittarius A* at the very center. Sagittarius A*, or Sgr A*, is a suspected black hole that is 93 million miles in diameter with the mass of 4 million suns like the one at the center of our solar system. Most surprising of all, there are young stars that encircle the black hole at a distance of one light-year. How could that be? Black holes are considered destroyers of all matter and light around them.

SGR A* is a suspected black hole at the center of the Milky Way galaxy. Image credit: NASA/CXC/MIT.



Radio map of Milky Way galactic center. "At radio wavelengths, where we can peer down to the very center, we see the complex structures shown in the 1-meter wavelength radio map made by NRL astronomers. The map shows
a region about 2000 light-years on a side; the center of the Milky Way coincides with the source marked Sgr A (or Sagittarius A),
which is actually three sources: a young supernova remnant on the east side, an unusual ionized hydrogen region on the
west side, and a very compact source called Sagittarius A* at the very center." That is the suspected black hole.
Graphic by Univ. of California-San Diego, Center for Astrophysics & Space Sciences.

In the November 3, 2005 issue of *Nature*, Chandra X-Ray Observatory scientists Rashid Sunyaev and Sergei Nayakshin counted the ring of stars around the Sgr A* black hole. There calculation was about 10,000 low-mass stars. This supported their hypothesis that the "gravity of the dense disk of gas that swirls around Sagittarius A* is strong enough to offset the black hole's distorting tidal forces. With the two forces in balance, gas clouds can naturally settle in and form stars." Thus, the ring of stars were born there and not collected from passing free-floating stars. Further, the scientists have discovered that the stars born around the black hole are larger than more normal free-floating stars.



An artist's concept of a ring of stars circling Sagittarius A*.
Credit: NASA/CXC/M. Weiss.

Until this Chandra discovery, it was thought that all suns emerged first in a free-floating environment as cold gas in space without light. As gas becomes more dense, it collapses under its own gravity pull. Then as gas clouds shrink, atoms are crunched together and grow hot enough to fuse together. That fusion releases light and heat and the explosive pressure halts gas collapse and a sun is born.

More information:

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Websites:

Mars Rovers: http://marsrovers.jpl.nasa.gov/home/index.html

Spitzer Space Telescope: http://www.spitzer.caltech.edu/

Chandra X-Ray Observatory: http://chandra.harvard.edu/

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