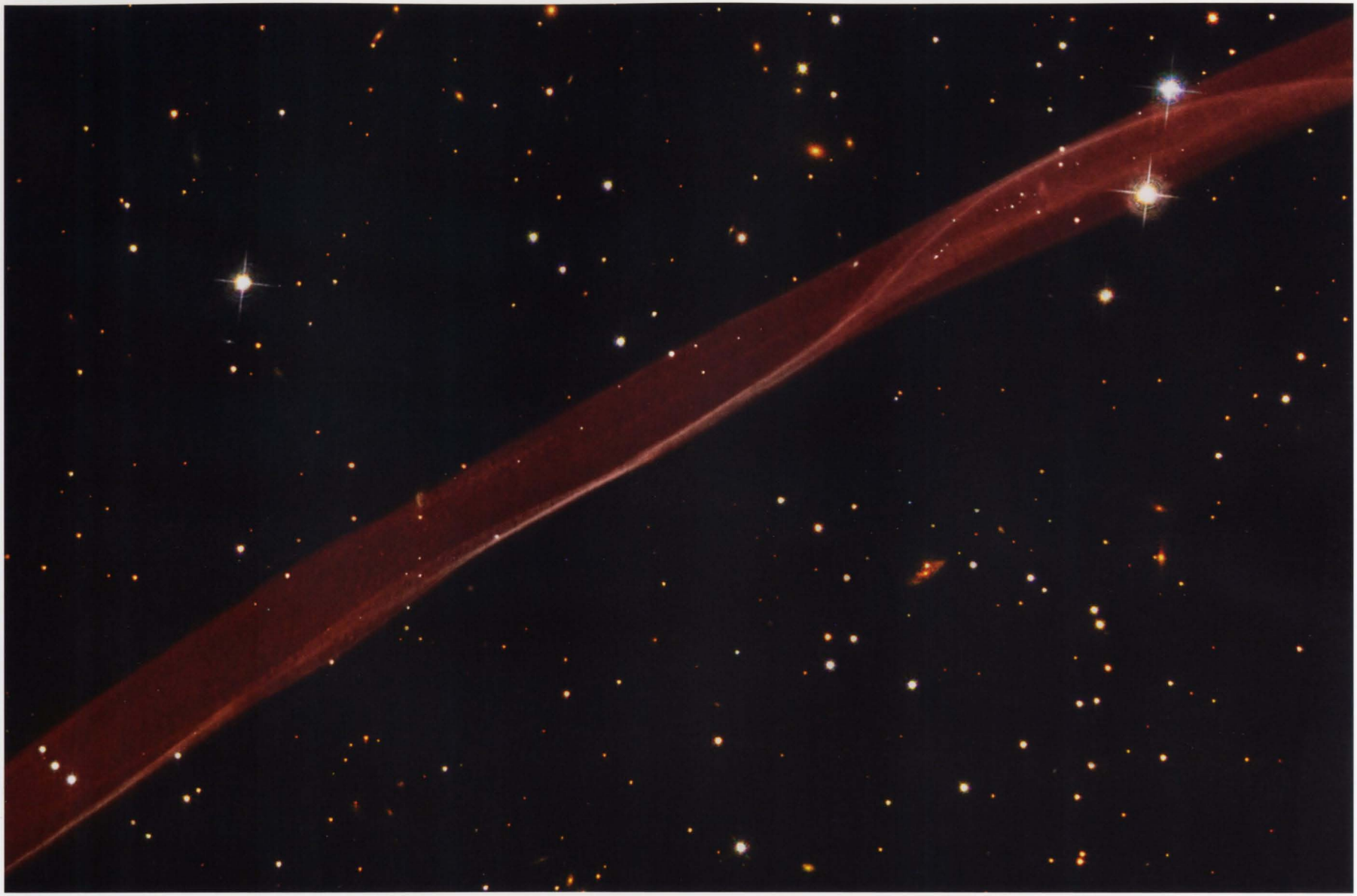
National Aeronautics and Space Administration



Supernova Remnant SN 1006

Ancient Supernova Explosion Creates "Ribbon of Light"

In 1006 A.D., observers from Africa to Europe to the Far East witnessed and recorded the arrival of a "new star" that appeared suddenly in the sky. For several weeks, people could see the star with unaided eyes even during the day, and it remained visible for about 2½ years before fading away. It is likely the brightest star ever observed by humans.

Astronomers now know the object's true identity. It was a star that exploded as a supernova, called SN 1006, about 7,000 light-years from Earth in the constellation Lupus.

The stellar explosion sent a blast wave racing outward through space at nearly 20 million miles an hour for a thousand years. The blast wave is sweeping up and heating any interstellar gas and dust in its path. Today we see a "supernova remnant," a large, nebulous bubble some 60 light-years across, surrounding the site of this explosion.

The Hubble picture shown on the front is a close-up view of a tiny portion of this expanding blast wave. As hydrogen atoms are caught up in the blast wave, they emit wisps of light that are perceived by Hubble's camera as a faint ribbon of light. The hydrogen atoms then quickly become ionized and stop emitting light. Thus, Hubble sees a "snapshot" of how the expanding blast wave appears at any given instant. The orange-colored dots in the image are background galaxies, and the white points of light are background and foreground stars in our Milky Way Galaxy.

The "ribbon of light" is actually a bit of an optical illusion. The ribbon actually has depth. It appears like a ribbon because Hubble is looking almost exactly along the edge of the expanding bubble.

Astronomers have observed the SN 1006 remnant in many different wavelengths of light, each of which reveals different aspects of the supernova remnant. They have combined the observations to make a complete picture of the bubble-shaped object. This full view is shown in the image at right.

Interestingly, the optical emission is only visible along one section of this huge expanding bubble. The blast wave is exciting and ionizing the hydrogen gas in that area, making the gas glow in visible light. Even though the blast wave is still expanding at 6 million miles per hour, it takes years between observations to detect any motion of the ribbon filament against the background stars because it is so far away.

Credit for Hubble image: NASA, ESA, and the Hubble Heritage Team (STScI/AURA).
Acknowledgment: W. Blair (Johns Hopkins University)

National Aeronautics and Space Administration

Goddard Space Flight Center
8800 Greenbelt Road
Greenbelt, Maryland 20771

www.nasa.gov

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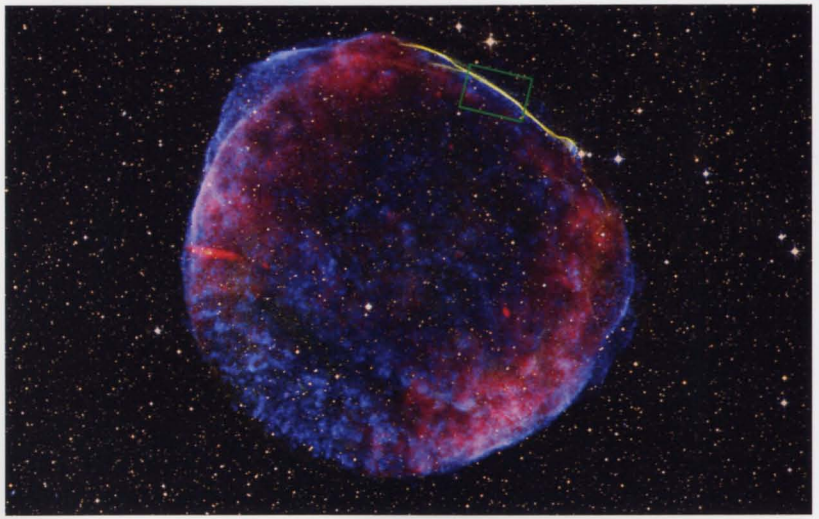

A Multiwavelength View of SN 1006

This multi-color image offers an overview of the leftovers of a dying star that exploded more than 1,000 years ago. The blast wave from this supernova produced a huge, expanding, bubble-shaped structure. To get the full view of this object, astronomers combined observations taken in visible, X-ray, and radio wavelengths. They assigned colors to the X-rays and radio waves because these wavelengths cannot be seen by the human eye. The fluffy red features represent radio waves; the blue, X-rays; and the yellow, visible light. The small green box at the top of the image corresponds to the region shown in the Hubble image.

Photo Credit: NASA, ESA, and Z. Levay (STScI).

VOCABULARY

Blast wave: The leading edge of energy produced by a stellar explosion.
Ionization: The process of removing electrons from neutral atoms.

You can get images and other information about the Hubble Space Telescope on the World Wide Web. Visit **http://www.stsci.edu/outreach** and follow the links.

The corresponding classroom activity for this lithograph can be found at: **http://amazing-space.stsci.edu/** or may be obtained by contacting the Office of Public Outreach at the Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218.

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