National Aeronautics and Space Administration

KEPLER'S SUPERNOVA REMNANT

chandra.si.edu

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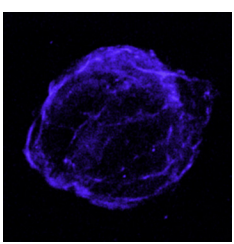
In 1604, a new star appeared in the night sky that was much brighter than Jupiter and dimmed over several weeks. This event was witnessed by sky watchers including the famous astronomer Johannes Kepler. Kepler was so fascinated that he watched the star for a year, making detailed notes about the bright object in a logbook. While working on the laws of planetary motion, Kepler wrote a book called “De Stella Nova” (“The New Star”), where he describes the bright object.

This year marks 450 years that have passed since the birth of Johannes Kepler, but NASA’s telescopes continue to study the Kepler supernova remnant. Analysis of detailed observations from NASA’s Chandra X-ray Observatory, for example, shows that the Kepler supernova was triggered by an interaction between a white dwarf and a red giant star.

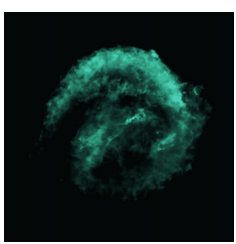
NASA’s three Great Observatories — the Hubble Space Telescope, the Spitzer Space Telescope, and Chandra --have joined forces to probe the expanding remains of the supernova. Each color in the composite image above represents a different region of the electromagnetic spectrum. By color-coding and combining those data, astronomers can present a more complete picture of the supernova remnant.

Johannes Kepler
(1571-1630)

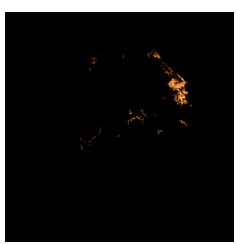
The combined image unveils a bubble-shaped shroud of gas and dust that is 14 light years wide and is expanding at 4 million miles per hour (2,000 km/sec). Observations from each telescope highlight distinct features of the supernova remnant, a fast-moving shell of iron-rich material from the exploded star, surrounded by an expanding shock wave that is sweeping up interstellar gas and dust.



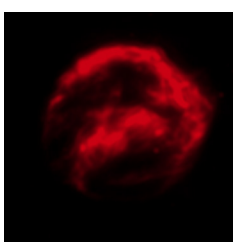
Chandra X-ray
(high energy)



Chandra X-ray
(low energy)



Hubble Optical



Spitzer Infrared