Chandra Science Highlight

Kepler's Supernova Remnant

Chandra X-ray Observatory ACIS image.

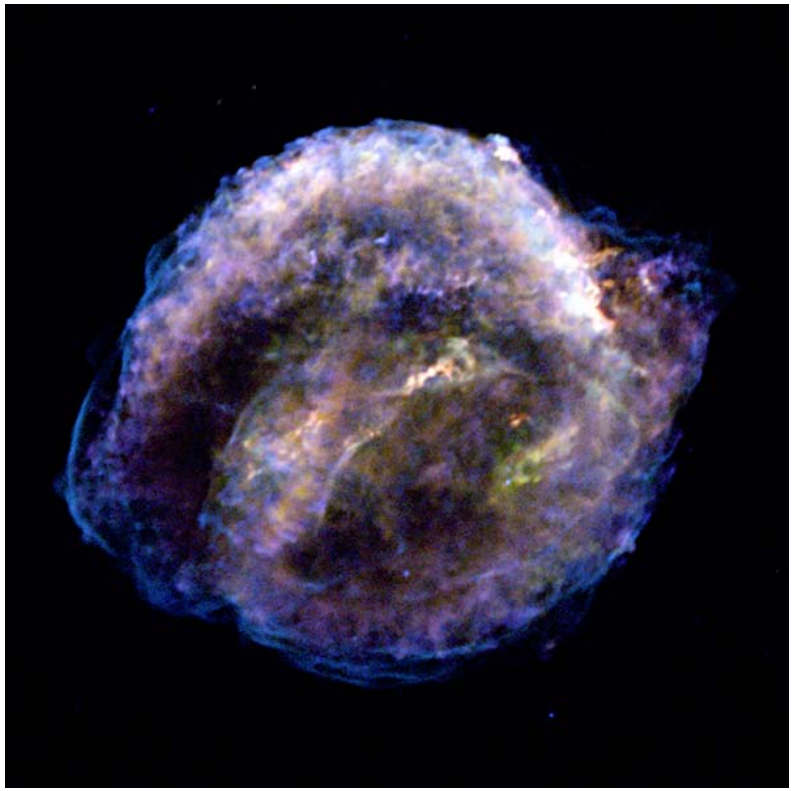

Image is 5 arcmin across.

Credit: NASA/CXC/NCSU/S.Reynolds et al.

REFERENCES: S. Reynolds et al. 2007 209th Meeting of the American Astronomical Society

This image was generated from 8.7 days of Chandra observations of the remnant of Kepler's supernova of AD 1604. In the image, red represents low-energy X-rays and shows circumstellar material that has been heated up by a shock wave from the star's explosion. The yellow color shows slightly higher energy X-rays from the iron-rich supernova ejecta, while green (medium-energy X-rays) shows other elements from the exploded star. The blue color represents the highest energy X-rays and shows the "forward" shock wave generated by the explosion.

- The strength of the iron line emission, and the absence of oxygen-rich ejecta support the longstanding claim that the Kepler supernova remnant resulted from the thermonuclear explosion of a white dwarf star that produced a high abundance of iron relative to oxygen.
- The ejecta are stratified, with silicon and sulfur extending beyond the iron emission. This chemical stratification conflicts with the predictions of well-mixed ejecta in some thermonuclear explosion models.
- High-energy X-ray continuum emission (blue), almost certainly due to synchrotron radiation from extremely high energy electrons, surrounds the remnant in thin filaments, as seen in other young remnants.
- Distance to Kepler SNR: About 13,000 light years.

CXC operated for NASA by the Smithsonian Astrophysical Observatory

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