



Chandra Science Highlight

M82 SN2014J: X-ray Upper Limit Constrains Supernova Environment



False color Chandra image of the M82 galaxy, with the location of the supernova SN2014J indicated by the box. Low, medium, and high-energy X- rays are red, green, and blue respectively. The boxes in the bottom of the image show close-up views of the region around the supernova in data taken prior to the explosion (left), as well as data gathered on February 3, 2014, after the supernova (right).

- ❑ Astronomers first detected SN 2014J in the M82 galaxy on January 21, 2014, making it one of the closest supernovas discovered in 3 decades
- ❑ Optical and infrared observations show that SN 2014J was a Type Ia supernova, the type used to measure the expansion of the universe.
- ❑ Chandra set an upper limit on the X-ray emission $L_x < 7 \times 10^{35}$ erg/s
- ❑ The X-ray limit implies that the gas density around the star that exploded is very low, making it unlikely that the star became unstable because it accreted too much gas from a companion star.

Scale:

Image is 12.75 arcmin across
(42,000 light years)

Distance Estimate:

11 million light years

Reference: Margutti, R. et al, 2014, ApJ, 790, 52; [arXiv:1405.1488](https://arxiv.org/abs/1405.1488)

Credit: X-ray: NASA/CXC/SAO/E.Bulbul, et al.

Instrument: Chandra ACIS Observation

**CXC Operated for NASA by the
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