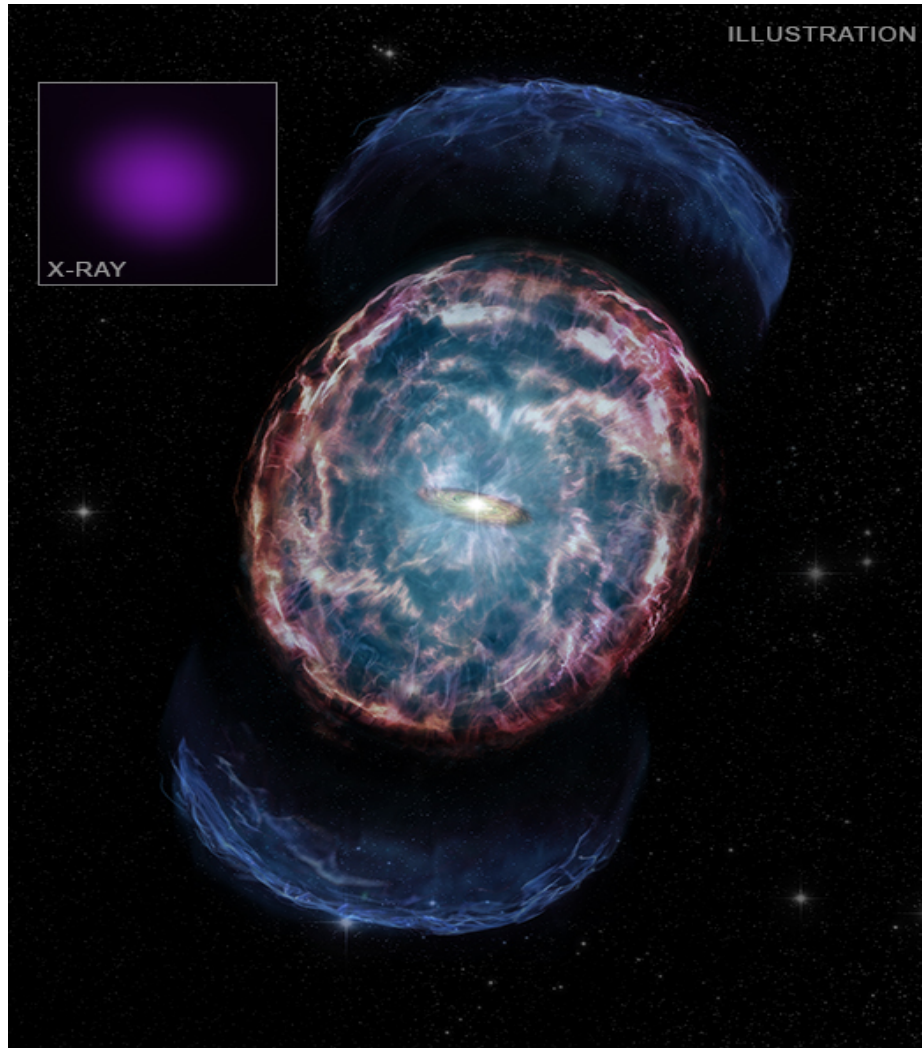




# Chandra Science Highlight

## The Unfolding Story of a Kilonova Told in X-rays



- NASA's Chandra X-ray Observatory continues to study GW170817, a neutron star merger that produced gravitational waves.
- Many telescopes saw different kinds of light after the discovery in August 2017, but only Chandra is still making a detection.
- A new study presents evidence that X-rays seen with Chandra come from the merger's debris colliding with surrounding gas.
- An alternative explanation is that the X-rays come from material falling towards a black hole that formed after the neutron stars merged.

**Distance estimate:** About 130 million light-years

**Credits:** X-ray: NASA/CXC/Northwestern Univ./A. Hajela et al.;  
Illustration: NASA/CXC/M.Weiss

**Instrument:** ACIS

**Reference:** Hajela, A. et al., 2022, ApJL, in press; [arXiv:2104.02070](https://arxiv.org/abs/2104.02070)

*Caption: An artist's conception illustrates GW170817, the aftermath of a merger between two neutron stars. One possible explanation for X-rays from GW170817 seen 3.5 years after the merger is that when the merger's debris collides with surrounding gas, it is heated and glows in X-rays. The illustration shows the merger debris in blue surrounded by the colliding gas in orange and red. An alternative explanation is that the X-rays come from material falling towards a black hole that formed after the neutron stars merged. This material is shown by a small disk in the center of the illustration. The two blue glowing arcs above and below the kilonova show where now-faded jets have struck surrounding material. The X-ray source is shown in the upper left. <https://chandra.si.edu/photo/2022/gw170817/>*

The CXC is operated for NASA by the Smithsonian  
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