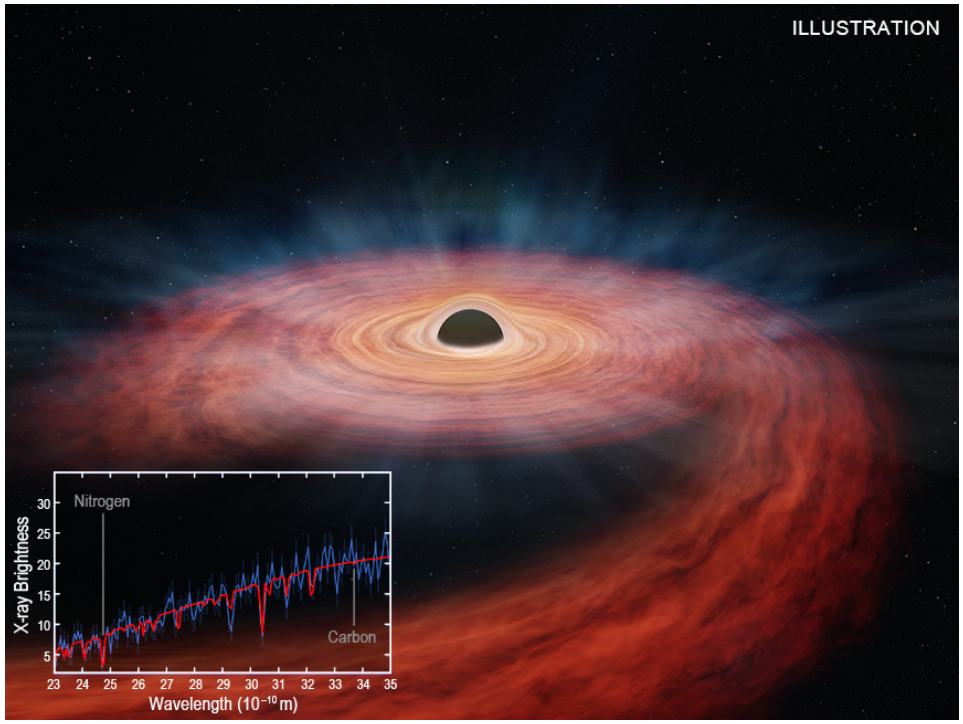
Chandra Science Highlight '

A Giant Black Hole Destroys a Massive Star



***Caption**: This artist's illustration depicts the aftermath of a star that approached too close to a supermassive black hole and was then torn apart by tidal forces. Some of its gas (red) was left orbiting around and falling into the black hole and some was driven away in a wind (blue). The inset shows an X-ray spectrum — a plot of X-ray brightness versus wavelength — from Chandra used to probe the elements contained in this wind. The Chandra data is colored blue and a model of the spectrum is given in red, highlighting the detection of nitrogen from the dip in the spectrum, and the non-detection of carbon from the lack of a dip.*

- A giant black hole 290 million light-years away destroyed a large star and threw its pieces into space.
- NASA's Chandra X-ray Observatory and ESA's XMM-Newton scoured the wake of this event for information.
- The X-ray data reveals the relative amount of nitrogen compared to carbon in wind from this stellar debris field.
- Comparison with models shows that a star with three times the mass of the Sun was destroyed, making it one of the largest known to undergo a tidal disruption.

Distance estimate: 290 million light-years

Credits: NASA/CXC/Univ of Michigan/J. Miller et al.; Illustration: NASA/CXC/M.Weiss

Instrument: HRC

Reference: Miller, J.M., et al., 2023, ApJL, 53, 2
https://iopscience.iop.org/article/10.3847/2041-8213/ace03c

For more details see the Chandra Feature:
https://chandra.si.edu/photo/2023/tde/

The CXC is operated for NASA by the Smithsonian Astrophysical Observatory

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