Chandra Science Highlight

New Stellar Danger to Planets Identified by NASA's Chandra

Caption: *In the upper right of this artist's impression a supernova's blast wave is shown striking dense gas surrounding the exploded star. When this impact occurs it can produce a large dose of X-rays that reaches an Earth-like planet (shown in the lower left, illuminated by its host star out of view to the right) months to years after the explosion, and may last for decades. This X-ray exposure may deplete the ozone layer on the planet, exposing its surface to high amounts of ultraviolet radiation from an Earth-like planet's host star. A large amount of nitrogen dioxide may be produced, causing a brown haze in the atmosphere, and a "de-greening" of land masses because of damage to plants.*

- Astronomers have determined supernova explosions pose another threat to planets and their atmospheres.
- This result comes from analysis of X-ray observations for over 30 supernovae using NASA's Chandra X-ray Observatory and other telescopes.
- For some types of supernovae, the researchers found that a torrent of X-rays could be unleashed that last for decades.
- This type of X-ray onslaught could significantly damage atmospheres of nearby planets, impacting life as we know it.
- Earth is in a safe space in terms of potentially harmful supernova explosions but may not have been in the past.

Distance estimates: About 163 million light-years (for one supernova in the study)

Credits: : NASA/CXC/Univ. of Illinois/I. Brunton et al.; Illustration: NASA/CXC/M. Weiss

Instrument: ACIS

Reference: Brunton, I. et al. 2023, Apj.947, 42

(The photo album is at**:**
https://chandra.harvard.edu/photo/2023/4snr/

The CXC is operated for NASA by the Smithsonian Astrophysical Observatory

April 2023