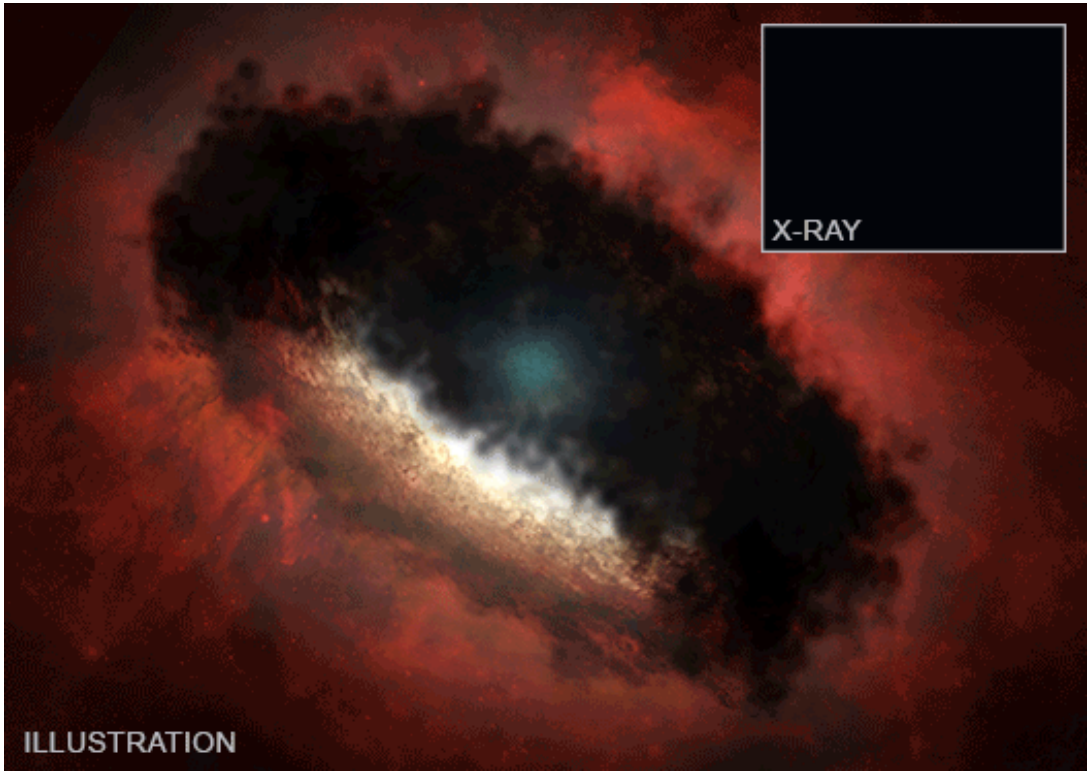
Chandra Science Highlight

Evidence for magnetic activity at starbirth: a powerful X-ray flare from the Class 0 protostar HOPS 383



Caption: This illustration shows the protostar HOPS 383 surrounded by a donut-shaped cocoon of material (dark brown) that is falling in towards the central star. Much of the light from the infant star is unable to pierce this material, but X-rays from the flare (blue) can. Infrared light is scattered off the inside of the cocoon (white and yellow). The inset shows the Chandra image of the flare, which lasted over 3 hours, taken during observations in December 2017.

- Astronomers have used Chandra to make the first detection of X-rays from a Class 0 protostar, the earliest phase of evolution of a star like our Sun.
- The X-ray flare came from the protostar HOPS 383, about 1,400 light years from Earth, during Chandra observations taken in December 2017.
- Such flares may be important for driving outflows that permit accretion onto the star, by conservation of angular momentum.
- The flares may also drive cosmic rays that collide with material in the inner disk. The resulting nuclear reactions may cause unusual abundances in meteors, like those found in the solar system.

Distance estimate: About 1,400 light years.

Scale: X-ray image is about 9 arcsec (0.06 light years) across.

Credit: X-ray; NASA/CXC/Aix-Marseille University/N. Grosso et al.; Illustration: NASA/CXC/M. Weiss

Instrument: ACIS

Reference: Grosso, N. et al, 2020 A&A, 638,L4 L4; arXiv:2006.02676

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