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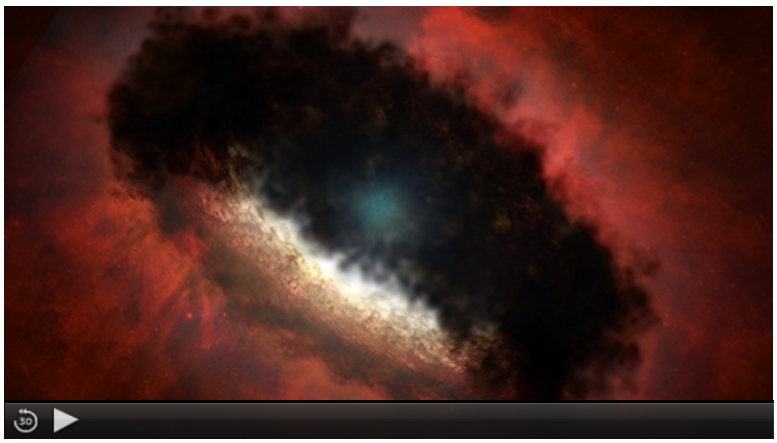
Animations: X-rays From a Newborn Star Hint at Our Sun's Earliest Days



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A Tour of X-rays From a Newborn Star Hint at Our Sun's Earliest Days
(Credit: NASA/CXC/A. Hobart)
[Runtime: 02:45]

With closed-captions (at YouTube)

Astronomers have reported the first detection of X-rays from the earliest phase of evolution of a star like our Sun. This discovery, made using NASA's Chandra X-ray Observatory, may help answer some questions about the Sun and the Solar System as they are today.

The X-rays came from a flare emitted by an object called HOPS 383, located about 1,400 light years from Earth in the star-forming region of the Orion Molecular Cloud Complex. Astronomers refer to HOPS 383 as a young "protostar" because it is in the earliest phase of stellar evolution that occurs right after a large cloud of gas and dust has started to collapse. Once it has matured HOPS 383 will have a mass about half that of the Sun.

This result is significant because it resets the timeline for when astronomers think Sun-like stars start blasting X-rays into space. While scientists know that young stars are much more active in X-rays than older ones, they have debated just when X-ray emission begins.

Chandra observations in December 2017 revealed the X-ray flare in HOPS 383, which lasted for about 3 hours and 20 minutes. Astronomers didn't see any other X-rays from HOPS 383 during this observing time, meaning that the flare at its maximum was at least ten times brighter than the usual X-ray output from the protostar.

This kind of information helps astronomers determine what effects X-rays from a very young star like our Sun might on the objects that form around it. For example, such high-energy outbursts in our infant Sun may explain the unusual chemical composition that scientists have found in some meteorites.

Astronomers will need longer X-ray observations to learn more about flares during this very early phase of development for stars like our Sun. They will use Chandra and other telescopes to examine just how common are X-ray flares from the youngest protostars and how much of an influence they have on the development of solar systems here and beyond.

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A Quick Look at X-rays From a Newborn Star Hint at Our Sun's Earliest Days
(Credit: NASA/CXC/A. Hobart)
[Runtime: 1:12]

Astronomers have announced the first detection of X-rays from the earliest phase of evolution of a star like our Sun.

The X-ray flare was seen from the "protostar" called HOPS 383, which is located about 1,400 light years from Earth.

Scientists discovered the flare in data of HOPS 383 captured by NASA's Chandra X-ray Observatory in December 2017.

The flare was 2,000 times brighter in X-rays than what we currently see from our middle-aged Sun.

This result may reset the timeline for when astronomers think Sun-like stars start blasting X-rays into space.

It may also help explain the unusual chemical composition of certain meteorites and other mysteries involving the present-day Sun and Solar System.

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Download this video (GIF)

HOPS 383 Timelapse
(Credit: NASA/CXC/Aix-Marseille University/N. Grosso et al.)
[Runtime: 0:10]

Astronomers have reported the first detection of X-rays from the earliest phase of evolution of a star like our Sun. This discovery from NASA's Chandra X-ray Observatory may help answer questions about the Sun and Solar System as they are today. The X-ray flare came from the young "protostar" HOPS 383, about 1,400 light years from Earth, during Chandra observations taken in December 2017, as shown in this timelapse video.

Return to: X-rays From a Newborn Star Hint at Our Sun's Earliest Days (June 18, 2020)

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