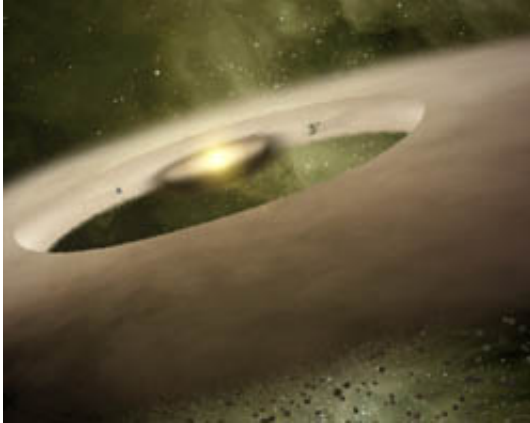


Youngest solar systems detected

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An artist's rendition of the 1-million-year-old star system UX Tau A, located approximately 450 light-years away. Observations from NASA's Spitzer Space Telescope showed a gap in the dusty disk swirling around the system's central star. Astronomers suspect that the formation of one or multiple planets carved the space in this disk. Credit: University of Michigan

Astronomers at the University of Michigan have found what are believed to be some of the youngest solar systems yet detected.

The systems are around the young stars UX Tau A and LkCa 15, located in the Taurus star formation region just 450 light years away. Using a telescope that measures levels of infrared radiation, the researchers noticed gaps in the protoplanetary disks of gas and dust surrounding these stars. They say those gaps are most likely caused by infant planets sweeping those areas clear of debris.

A paper on the findings by astronomy doctoral student Catherine Espaillat, professor Nuria Calvet, and their colleagues is published in the Dec. 1 issue of *Astrophysical Journal Letters*.

"Previously, astronomers were seeing holes at the centers of protoplanetary disks and one of the theories was that the star could be photoevaporating that material," said Espaillat, first author of the paper.

Photoevaporation refers to the process of heating up the dust and gas in the surrounding cloud until it evaporates and dissipates.

"We found that in some stars, including these two, instead of a hole, there's a gap," Espaillat said. "It's more like a lane has been cleared within the disk. That is not consistent with photoevaporation. The existence of planets is the most probable theory that can explain this structure."

The researchers used NASA's Spitzer Space Telescope for this study. The infrared orbiting telescope observes energy at wavelengths invisible to optical telescopes. That allowed astronomers to study these "pre-main sequence stars" in a deeper way.

A main sequence star is an average adult star, like the sun, which burns by converting hydrogen into helium. Pre-main sequence stars like UX Tau A and LkCa 15 haven't yet established this conversion process. They derive energy from gravitational contraction. UX Tau A and LkCa 15 are both about 1 million years old.

"They're baby stars," Calvet said. The sun, for comparison, is a middle-aged star at 4.5 billion years old.

Calvet said this research adds new insights to the study of solar systems.

"We are looking for our history," Calvet said. "We are looking for the history of solar systems, trying to understand how they form."

The paper is called "On the Diversity of the Taurus Transitional Disks: UX Tau A & LkCa 15."

Source: University of Michigan

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