New satellite data like an ultrasound for baby stars

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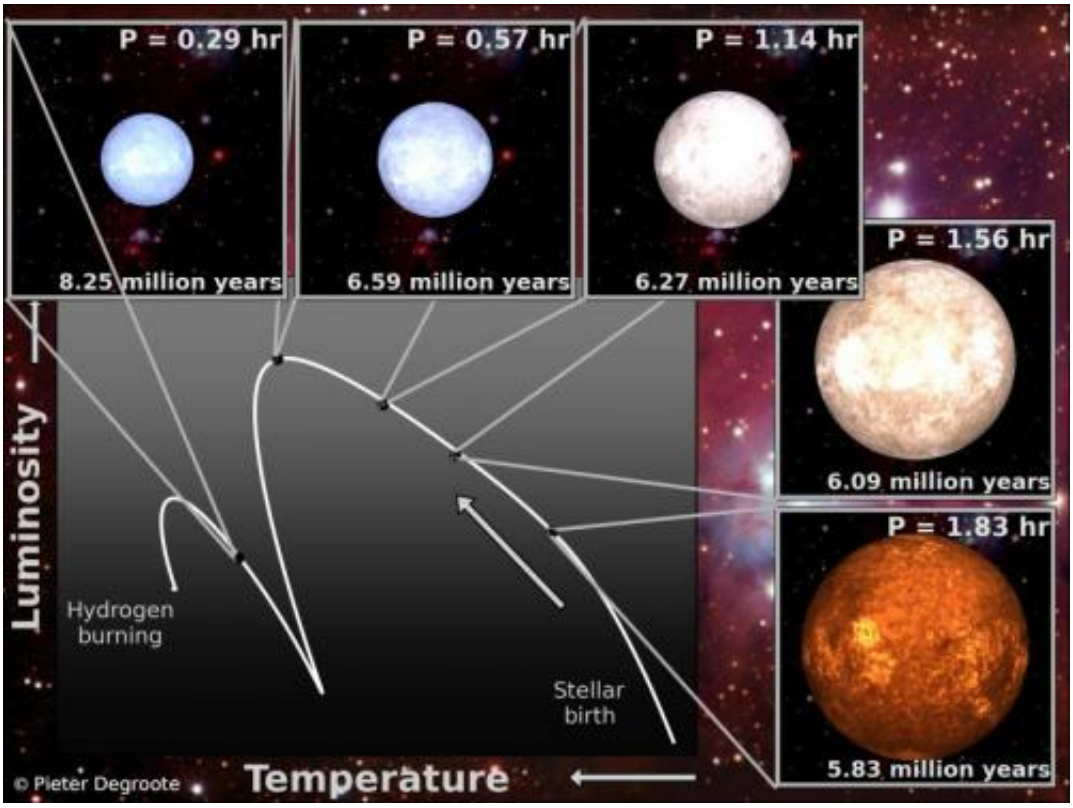

A composite still image of the animation (see below). Credit: University of British Columbia

An international team of researchers have been monitoring the "heartbeats" of baby stars to test theories of how the Sun was born 4.5 billion years ago.

In a paper published in *Science* magazine today, the team of 20 scientists describes how data from two space telescopes – the Canadian Space Agency's MOST satellite and the French CoRoT mission – have unveiled the internal structures and ages of young stars before they've even emerged as full-fledged stars.

"Think of it as ultrasound of stellar embryos," explains University of British Professor Jaymie Matthews, MOST Mission Scientist and a co-author of the study. "Stars can vibrate due to sound waves bouncing inside. We detect the sound vibrations across the vacuum of space by the subtle changes in stellar brightness. Then we translate the frequencies of those vibrations into models of the structures of those stars' hidden interiors."

Dr. Konstanze Zwintz, from the KU Leuven Institute of Astronomy in Belgium and lead author of the study, calls this technique of probing protostars with sound waves "echography." Astronomers are using measurements of this 'heartbeat' as a virtual time machine to explore the life stages of a star.

The study found that when an emerging star is closer to the initial stage of its formation (as in the first trimester of a human pregnancy), it pulsates slowly. When it gets closer to igniting thermonuclear fusion in its core to become a true star (like the moment of human birth), it pulsates ever faster. And when the hydrogen fuel at the core of a star is exhausted, it enters the last stages of its life.

Watching soon-to-be-stars in young clusters like NGC 2264, the focus of the study, is like watching our Sun during its birth, says Matthews.

MOST (Microvariability & Oscillations of STars) is a Canadian Space Agency (CSA) mission launched in 2003 to perform asteroseismology and study planets beyond the Solar System. The telescope was designed

and largely built at UBC and is operated there under the supervision of Prof. Matthews.

More information: Echography of young stars reveals their evolution," by K. Zwintz et al. *Science*, www.sciencemag.org/lookup/doi/… 1126/science.1253645

Provided by University of British Columbia