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Earth-Like Planet Spotted in the Making

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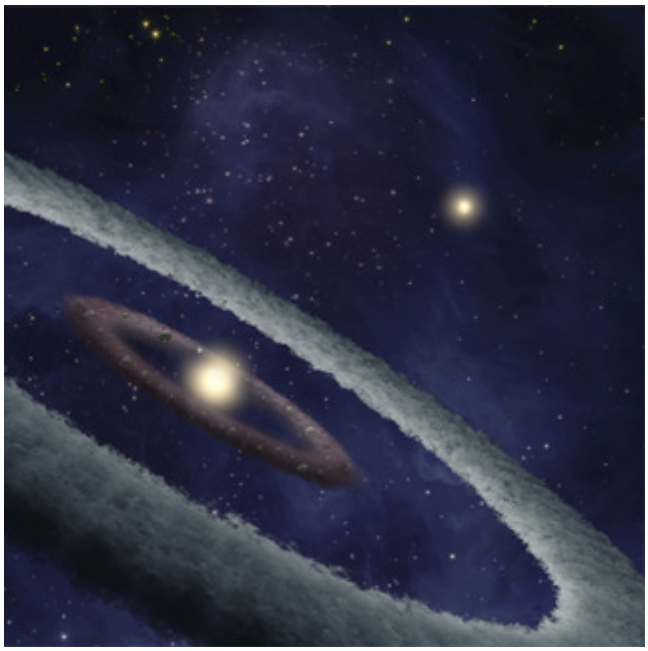
Ring of dust lies in the sweet spot for liquid water



AN EARTH IN THE MAKING? Astronomers say a warm dust belt around the star HD 113766 (seen in this artist's depiction) is in the right spot with the right ingredients to form an Earth-like planet complete with liquid water.

A huge ring of warm dust encircling a sun-size star 424 light-years away may well be molded into an Earth-like planet in the next 100 million years, astronomers reported this week. A team that examined infrared light hailing from the star HD 113766 discovered a belt of powdery dust and probably rock—the raw material for a planet—in the star's habitable zone, the sweet spot where water can stay liquid.

The composition of the dust suggests it is also just right for forming a rocky or terrestrial planet instead of a gaseous one, the group reports in a paper set to be published in *The Astrophysical Journal*. "It's sitting damn, bang-smack in the middle of the habitable zone," says astrophysicist Carey Lisse of Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Md., a co-author of the report.

"That's really cool," he says, because astronomers have never conclusively sighted a rocky planet forming in this "Goldilocks" zone.

Planets arise from the disk of material left over after a star sparks to life. Based on studies of comets, researchers believe that these young solar systems swirl with ice crystals and wispy gases that coalesce into gas giants like Saturn and Jupiter. Rocky planets come later, after the gas is gone.

In particular, the Deep Impact mission blasted a crater in the comet Tempel 1

so astronomers could study the makeup of the debris, providing a "Rosetta stone" for interpreting the composition of material around stars, says Lisse, who led the Deep Impact analysis.

Lisse and his colleagues applied their Rosetta stone to HD 113766, a star a shade bigger than the sun that is a relatively young 16 million years old. By examining infrared data taken earlier by the Spitzer Space Telescope, they discovered a swath of dust particles ranging in size from 0.1 to 20 microns (finer than a split hair) that added up to the mass of a large asteroid and, based on their warmth, were strewn about 1.8 Earth–sun distances from the star.

The infrared light revealed rock and iron compounds, but no gas or other telltale cometary material, the group reports. Nor had the rock and iron separated as they do in older asteroids or mature planets, suggesting that the system recently entered the phase in which rocky planets can form. "We're seeing the building blocks of the earth," Lisse says.

Such dust belts typically contain a spectrum of rocks of different sizes, and the distribution of dust strongly suggests at least one Mars mass worth of rocks 10 meters (30 feet) wide or smaller and up to several Earth masses of material if larger rocks are present, which Lisse says is very plausible but more speculative.

He notes that a planet would likely take 10 million to 100 million years to form from the ring. The only thing that might interrupt the process is if a gaseous planet had already formed and crossed the belt's path, sweeping up the rocky chunks before they could clump together.