

Pulverized planet dust might lie around double stars

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This artist's concept illustrates an imminent planetary collision around a pair of double stars. NASA's Spitzer Space Telescope found evidence that such collisions could be common around a certain type of tight double, or binary, star system, referred to as RS Canum Venaticorum or RS CVns for short. The stars are similar to the sun in age and mass, but they orbit tightly around each other. With time, they are thought to get closer and closer, until their gravitational influences change, throwing the orbits of planetary bodies circling around them out of whack and leading to collisions. Spitzer's infrared vision spotted dusty evidence for such collisions around three tight star pairs. Credit: NASA/JPL-Caltech

(PhysOrg.com) -- Tight double-star systems might not be the best places for life to spring up, according to a new study using data from NASA's Spitzer Space Telescope. The infrared observatory spotted a surprisingly

large amount of dust around three mature, close-orbiting star pairs. Where did the dust come from? Astronomers say it might be the aftermath of tremendous planetary collisions.

"This is real-life science fiction," said Jeremy Drake of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass. "Our data tell us that planets in these systems might not be so lucky -- collisions could be common. It's theoretically possible that habitable planets could exist around these types of [stars](#), so if there happened to be any life there, it could be doomed."

Drake is the principal investigator of the research, published in the Aug. 19 issue of the [Astrophysical Journal Letters](#).

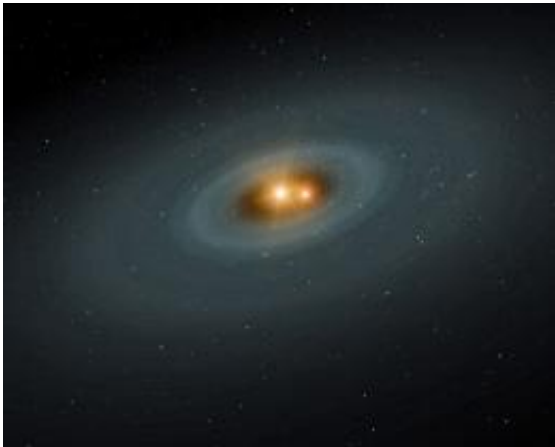
The particular class of binary, or double, stars in the study are about as snug as stars get. Named RS Canum Venaticorum, or RS CVns for short, they are separated by only about two million miles (3.2 million kilometers), or one-fiftieth the distance between Earth and our sun. The stellar pairs orbit around each other every few days, with one face on each star perpetually locked and pointed toward the other.

The close-knit stars are similar to the sun in size and are probably about a billion to a few billion years old. But these stars spin much faster, and, as a result, have powerful magnetic fields and giant, dark spots. The [magnetic activity](#) drives strong [stellar winds](#) -- gale-force versions of the [solar wind](#) -- that slow the stars down, pulling the twirling duos closer over time. And this is where the planetary chaos might begin.

As the stars cozy up to each other, their gravitational influences change, and this could cause disturbances to planetary bodies orbiting around both stars. Comets and any planets that might exist in the systems would start jostling about and banging into each other, sometimes in powerful collisions. This includes planets that could theoretically be circling in the

double stars' habitable zone -- a region where temperatures would allow liquid water to exist. Though no [habitable planets](#) have been discovered around any stars beyond our sun at this point in time, tight double-star systems are known to host planets; for example, one system not in the study, called HW Vir, has two gas-giant planets.

"These kinds of systems paint a picture of the late stages in the lives of planetary systems," said Marc Kuchner, a co-author from NASA Goddard Space Flight Center in Greenbelt, Md. "And it's a future that's messy and violent."



This artist's concept illustrates a tight pair of stars and a surrounding disk of dust -- most likely the shattered remains of planetary smashups. Using NASA's Spitzer Space Telescope, the scientists found dusty evidence for such collisions around three sets of stellar twins (a class of stars called RS Canum Venaticorum or RS CVns for short). The stars, which are similar to our sun in mass and age, orbit very closely around each other. They are separated by just one-fiftieth of the Earth-sun distance. As time goes by, the stars get closer and closer, and this causes the gravitational harmony in the systems to go out of whack. Comets and any planets orbiting around the stars could jostle about and collide. Credit: NASA/JPL-Caltech

Spitzer spotted the infrared glow of hot dusty disks, about the temperature of molten lava, around three such tight binary systems. One of the systems was originally flagged as having a suspicious excess of infrared light in 1983 by the Infrared Astronomical Satellite. In addition, researchers using Spitzer recently found a warm disk of debris around another star that turned out to be a tight binary system.

The team says that dust normally would have dissipated and blown away from the stars by this mature stage in their lives. They conclude that something -- most likely planetary collisions -- must therefore be kicking up the fresh dust. In addition, because dusty disks now have been found around four, older binary systems, the scientists know that the observations are not a fluke. Something chaotic is very likely going on.

If any life forms did exist in these star systems, and they could look up at the sky, they would have quite a view. Marco Matraga, first author of the paper, from the Harvard-Smithsonian Center for Astrophysics and now a visiting astronomer at the Palermo Astronomical Observatory in Sicily, said, "The skies there would have two huge suns, like the ones above the planet Tatooine in 'Star Wars.'"

Other authors include V.L. Kashyap of the Harvard-Smithsonian Center for Astrophysics; and Massimo Marengo of Iowa State University, Ames.

The Spitzer observations were made before it ran out of its liquid coolant in May 2009, officially beginning its warm mission.

Provided by JPL/NASA

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