

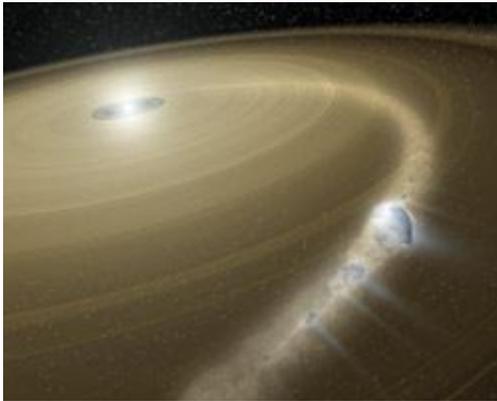


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## Peering into Planetary Graveyards

By David Tytell



A glimpse at our solar system's future? Astronomers have found the remains of a shredded comet around a distant white dwarf. NASA / JPL / Caltech / T. Pyle (Spitzer Science Center)

**February 10, 2006** | Using the infrared Spitzer Space Telescope to examine the neighborhood around a dead star, astronomers may have glimpsed our solar system's ultimate fate. The team, led by William Reach (Spitzer Science Center) and Marc Kuchner (NASA/Goddard Space Flight Center), observed the white dwarf G29-38 in Pisces, and uncovered a silicate-rich dust cloud surrounding the star. The cloud could represent part of the remains of a long-dead planetary system.

When a star like our Sun reaches its twilight years, it expands to become a red giant, then eventually sloughs off its outer gases, leaving behind a hot, dense, white dwarf. In time the dwarf cools and fades. But what remains of the planets, asteroids, and comets?

In the case of the asteroids and comets, many are scattered into interstellar space. But some would remain in the system. Those that do would have their orbits altered and many would be shredded into pieces by the massive, dense star's tidal forces. Models suggest that if a single comet were shredded into dust, it could account for the observed silicate cloud.

And shredded comets are certainly plausible — the Solar and Heliospheric Observatory has observed many dirty snowballs dissolve into debris when they slingshot too close to the Sun. One famed comet breakup occurred when Comet Shoemaker-Levy 9 passed too close to Jupiter and tidal forces crumbled the icy body into more than a dozen large fragments and which eventually plunged into Jupiter in July 1994.

If the models are correct, the single comet's worth of dust that the astronomers see can only survive a few years around the white dwarf because the dust particles absorb the white dwarf's light and reradiate it as heat (which is what Spitzer sees). As a result the particles continuously spiral inward.

Therefore, Kuchner notes, the dust needs to be replenished quickly. "We appear to be looking at the tip of an iceberg of a much larger population of comets and asteroids."

The team doesn't yet know the fate of the planets. If planetary corpses remain, they are too cold for Spitzer to detect their faint heat, and their existence remains a mystery. But by determining the fate of the comets, astronomers are one step closer to predicting the fate of our solar system. The findings appears in the December 20, 2005, *Astrophysical Journal*.

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