

White Dwarf Stars Consume Rocky Bodies

August 16 2011, by Tammy Plotner



This artist's concept shows a star encircled by a disk of gas and dust, the raw materials from which rocky planets such as Earth are thought to form. Image credit: NASA/JPL-Caltech

"I love rocky road... So won't you buy another gallon, baby..." Yeah. We all love rocky road ice cream, but what do stars like to snack on? In the case of the white dwarf star it would appear that a rocky body – similar to Earth – could be a preferred blend. At one time astronomers thought the dense, elderly stars were just gathering dust... but apparently it's the "bones" left-over from a planetary knosh.

Using the Keck I telescope on Mauna Kea in Hawaii, astronomer and study coauthor Ben Zuckerman of UCLA and his team have been studying two helium-dominated white dwarfs – stars PG1225-079 and HS2253+8023. About the size of Earth, but as massive as the Sun, these



stars have a zone of "pollution" around them that's around equal in mass to asteroid Ceres.

"This means that planet-like rocky material is forming at Earth-like distances or temperatures from these stars," says Zuckerman. He also notes that it's still unclear whether the material is from a planet, planetlike bodies or an asteroid, but it is clear that there's a lot of it.

Because looking at a white dwarf star for evidence of solar systems wasn't really a high priority consideration, these new findings could lend researchers some new clues. It's not just dust – it's dust with a signature. Because the white dwarf has a "clean" atmosphere of hydrogen or helium, finding other components in its spectra could point to a one-time presence of Earth-like planets. Zuckerman says that between 25 and 30 percent of <u>white dwarfs</u> have orbital systems that contain both large planets and smaller rocky bodies. After the dwarf forms, larger, Jupitermass planets can perturb the orbits of smaller bodies and bounce them toward the star.

"This is the first hint that despite all the oddball planetary systems we see, some of them must be more like our own," says astronomer John Debes of NASA's Goddard Space Flight Center in Greenbelt, Md., who was not involved in the study. "We think that most of these systems that show pollution must in some way approximate ours."

How do they know if they have a candidate? Star PG1225-079 has a mix of elements, including magnesium, iron and nickel (along with others). These were found in ratios very similar in overall content of Earth. Star HS2253+8023 contains more than 85 percent oxygen, magnesium, silicon and iron. Not only are these assessments also similar to our planet, but found in the correct range where this type of rocky body should have formed.



"I've never seen so much detail in spectra," says astronomer Jay Holberg of the University of Arizona in Tucson, who was not involved in the study. "People have seen iron and calcium and other things in these <u>stars</u>, but [this group has] gone off and found a whole slew of other elements."

Pass the spoon... Before it melts.

Source: Universe Today

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