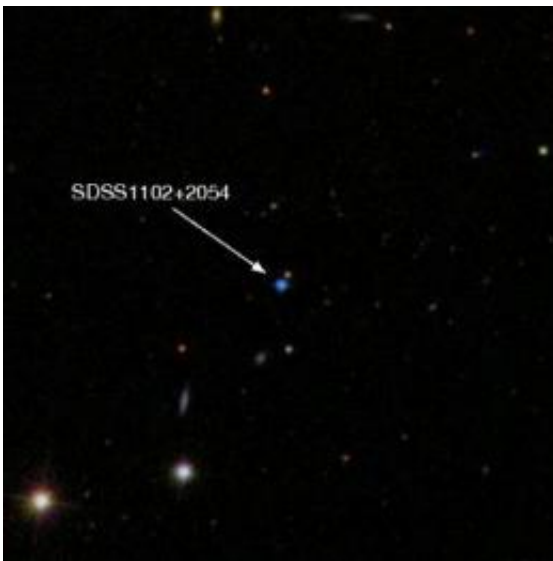


Two Earth-sized bodies with oxygen rich atmospheres found -- but they're stars not planets

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Sloan Digital Sky Survey spectroscopy of this inconspicuous blue object -- SDSS1102+2054 -- reveals it to be an extremely rare stellar remnant: a white dwarf with an oxygen-rich atmosphere Credit: The Sloan Digital Sky Survey

(PhysOrg.com) -- Astrophysicists at the University of Warwick and Kiel University have discovered two earth sized bodies with oxygen rich atmospheres - however there is a bit of a disappointing snag for anyone looking for a potential home for alien life, or even a future home for ourselves, as they are not planets but are actually two unusual white dwarf stars.

The two white dwarf stars SDSS 0922+2928 and SDSS 1102+2054 are 400 and 220 light years from Earth. They are both the remnants of massive stars that are at the end of their [stellar evolution](#) having consumed all the material they had available for [nuclear fusion](#).

[Theoretical models](#) suggest that massive stars (around 7 - 10 times the mass of our own Sun) will consume all of their [hydrogen](#), helium and carbon, and end their lives either as white dwarfs with very oxygen-rich cores, or undergo a supernova and collapse into [neutron stars](#). Finding such oxygen-rich white dwarfs would be an important confirmation of the models.

Unfortunately, almost all white dwarfs have hydrogen and/or [helium](#) envelopes that, while low in mass, are sufficiently thick to shield the core from direct view. However should such a core lose its remaining hydrogen envelope, astrophysicists could then detect an extremely oxygen-rich spectrum from the surface of the white dwarf.

Searching within an astronomical data set of the Sloan Digital Sky Survey (SDSS), the University of Warwick and Kiel University astrophysicists did indeed discover two white dwarfs with large atmospheric oxygen abundances.

Lead author on the paper, astrophysicist Dr. Boris Gänsicke from the University of Warwick, said:

"These surface abundances of oxygen imply that these are white dwarfs displaying their bare oxygen-neon cores, and that they may have descended from the most massive progenitors stars in that class."

Most stellar models producing white dwarfs with such oxygen and neon cores also predict that a sufficiently thick carbon-rich layer should surround the core and avoid upward diffusion of large amounts of

oxygen. However, calculations also show that the thickness of this layer decreases the closer the progenitor star is to upper mass limit for stars ending their lives as white dwarfs. Hence one possibility for the formation of SDSS 0922+2928 and SDSS 1102+2054 is that they descended from the most [massive stars](#) avoiding core-collapse, in which case they would be expected to be very massive themselves. However current data is insufficient to provide any unambiguous measure of the masses of these two unusual white dwarves.

More information: The full paper "Two [white dwarfs](#) with oxygen-rich atmospheres" will be published online by the journal *Science* on November 12th 2009. It is written by Dr Boris Gänsicke, Jonathan Girven, Professor Tom Marsh, and Dr Danny Steeghs.

Source: University of Warwick ([news](#) : [web](#))

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