

# Super cold brown dwarf or is it a planet?

March 23 2011, by Deborah Braconnier

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Image of the first ultra-cool brown dwarf (WISEPC J045853.90+643451.9) discovered by NASA's Wide-field Infrared Survey Explorer, or WISE. It is the green dot and is located between 18 and 30 light years away. It is one of the coolest brown dwarfs known, with a temperature of ~600K. Image: NASA/JPL-Caltech/WISE Team

(PhysOrg.com) -- In a month that has already announced the discovery of a brown dwarf 75 light-years from Earth, NASA's infrared Spitzer Space Telescope has found what could prove to be an even cooler, and closer, brown dwarf.

In a report released in *The [Astrophysical Journal](#)*, the discovery of WD 0806-661B has been reported. This possible brown dwarf was detected

63 light-years from [Earth](#) and has an approximate mass seven times that of Jupiter. The estimated temperature of this possible brown dwarf is 30 degrees Celsius (86F), or equivalent to Earth on a warm summer day. This discovery would make this the coldest brown dwarf discovered.

WD 0806-661B however, is in question of even being a brown dwarf. It has, instead, the potential of actually being a planet, as it is in orbit of a white dwarf, known as WD 0806-661. However, WD 0806-661B has an orbital distance of 2,500 AU, and it is believed that is too distant of an orbit.

This white dwarf star once burned with a mass two times that of our sun. When a star runs out of hydrogen fuel, it becomes what is known as a red giant. After the red giant phase, the star then sheds large quantities of its mass and becomes what is known as a white dwarf. Models predict that when this shedding of mass happens, [planets](#) within its orbit could be pushed into a wider orbit.

It is this possibility of a wider orbit that is in question regarding WD 0806-661B. Could it have once been a large planet orbiting a very large sun, only to be moved when the sun failed? Researchers admit this information will require further measurements.

The idea of finding planets orbiting white dwarfs [has also been discussed](#) in a recently published paper by Eric Agol from the University of Washington. Should WD 0806-661B prove to be a planet instead of a brown dwarf, this would further prove Agol's theories.

However, should WD 0806-661B prove to be a brown dwarf, it would be a candidate for a class of brown dwarfs that have only been theorized. Known as the “Y”-class family, this class would include [brown dwarfs](#) that are cool enough to have water vapor in their atmosphere capable of condensing to form clouds and water.

**More information:** DISCOVERY OF A CANDIDATE FOR THE COOLEST KNOWN BROWN DWARF, K. L. Luhman et al. 2011 *The Astrophysical Journal Letters*, 730 L9 [doi: 10.1088/2041-8205/730/1/L9](https://doi.org/10.1088/2041-8205/730/1/L9)

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