

Habitable planets and white dwarfs

March 22 2011, by Deborah Braconnier

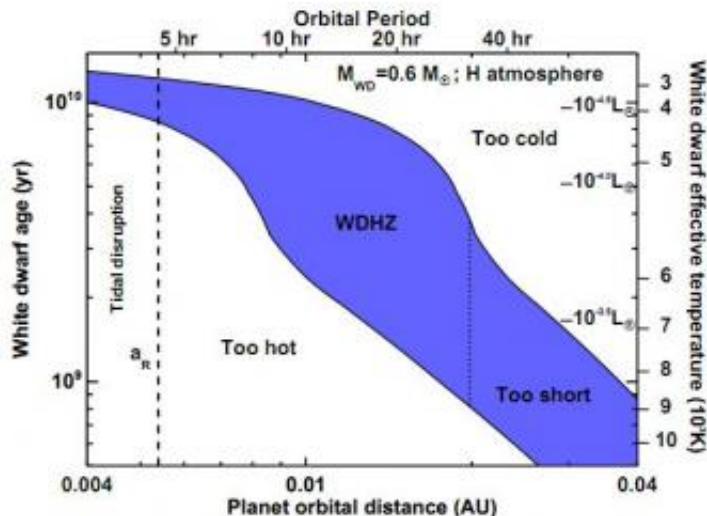


Image credit: Eric Agol, arXiv:1103.2791v1 [astro-ph.EP]

(PhysOrg.com) -- The search for habitable planets similar to Earth has routinely focused around active nuclear burning stars. However, in a recently published paper by Eric Agol from the University of Washington, the idea to expand the search to white dwarfs shows promise.

A white dwarf star is similar to the size of Earth and is believed to be in the final stages of a stars evolutionary process. It is no longer supporting nuclear reactions and is essentially only a glowing core. Unlike our sun, a white dwarf is no longer producing reactions, and is in a cooling process. Although cooling, a [white dwarfs](#) surface temperature is around 5000K.

According to Agol, the surface temperature of an average white dwarf would be able to provide a habitable zone for planets within an orbit no closer than 0.01 AU. Agol has created a chart illustrating a white dwarf habitable zone, and he defines a continuously [habitable zone](#) as one with a range of orbital distances habitable for a minimum duration. This minimum duration could last in excess of 3 billion years.

The one problem with these habitable planets is that they would have a permanent day side and a permanent night side, similar to our moon. This would be caused by the short orbit and the probability of tidal locking.

About five percent of all stars are white dwarfs, and there are at least 15,000 within 300 light-years of earth. Agol proposes that these possible planets could completely eclipse their white dwarf, making it possible to locate them using ground based telescopes. He also proposes that the use of the Large Synoptic Survey Telescope (LSST), currently under construction in Chile, could provide even better options for locating white dwarf habitable planets.

Agol believes that by utilizing a network of ground-based telescopes over a two year period, over half a dozen [habitable planets](#) could be located orbiting a white dwarf.

More information: Transit surveys for Earths in the habitable zones of white dwarfs, by Eric Agol, arXiv:1103.2791v1 [astro-ph.EP] arxiv.org/abs/1103.2791
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