Dark matter could provide heat for starless planets

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(PhysOrg.com) -- In a recent paper posted at arXiv.org and submitted to *Astrophysical Journal*, Dan Hooper and Jason Steffen, physicists at Fermilab in Illinois, present the theory that cold and dark planets, not heated by a star, could be heated by dark matter. In theory, this dark matter could produce habitable planets outside of what is known as a habitable zone.

While no one knows exactly what dark matter is, it is believed to make up about 83 percent of the universe. The most accepted theory is this dark matter is made up of what are called WIMPs, or weakly interacting massive particles.

These WIMPs interact with regular matter by a weak nuclear force and gravity, but they are also antiparticles. When two WIMPs come together, they work to annihilate each other and cause a burst of energy.

Hooper and Steffen suggest that should this dark matter be trapped within a planet's gravity, the bursts of energy could produce enough to warm the planet. When it comes to Earth, the energy that could be produced is low, but in areas of space where there are high densities of black matter; Hooper and Steffen believe there is the possibility of finding planets that could be warmed in this way.

Within the innermost regions of the Milky Way, density of dark matter is estimated to be hundreds or thousands of times that in our solar system, and it is in these areas that Hooper and Steffen believe finding a planet heated by dark matter would be most plausible.

Traditional planets, heated by stars like our sun, are dependent on the life of that star. This theory would make these dark matter planets have a large advantage over those tied to a star, as the dark matter could provide heat for trillions of years.

Hooper and Steffen admit that they currently do not see a way of detecting any of these possible dark matter planets in the near future, but that in theory, it is possible.

More information: Dark Matter And The Habitability of Planets, Dan Hooper, Jason H. Steffen, arXiv:1103.5086v1 [astro-ph.EP] arxiv.org/abs/1103.5086