Binary white dwarf stars

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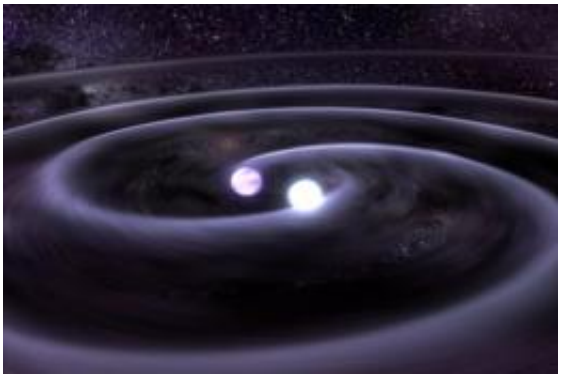

An artist's conception of two orbiting white dwarf stars, showing schematically that they radiate gravitational waves as they orbit each other. Scientists have found a newly discovered white dwarf pair that will merge in about 37 million years to be reborn again as a normal star. Credit: Tod Strohmayer (GSFC), CXC, NASA, Illustration: Dana Berry (CXC)

(PhysOrg.com) -- When a star like our sun gets to be very old, after another seven billion years or so, it will no longer be able to sustain burning its nuclear fuel.

With only about half of the its mass remaining, it will shrink to a fraction of its radius and become a white dwarf star. White dwarfs are common, the most famous one being the companion to the brightest star in the sky, Sirius.

But although they are common, and although they represent the final stage of our own sun, astronomers still do not understand their full range

of character, or the parameters that determine what they ultimately become.

One reason is that many white dwarfs are, like the companion of Sirius, located in binary systems in which the companion stars influence the details of how they age.

CfA astronomers Mukremin Kilic, Warren Brown, and Scott Kenyon, with six colleagues, used the MMT to discover that the companion of a previously known white dwarf is actually another white dwarf star.

The two orbit each other in only 39.1 minutes, separated by a distance that is only 32% of the radius of the sun. Perhaps the most remarkable feature of this particular binary is its fate.

White dwarf binary stars in general are extreme systems that radiate gravitational waves as they orbit each other.

To balance the loss of this energy, the stars gradually come closer together until eventually they merge. Many white dwarf binaries will explode as supernovae when they merge, but this newly discovered one is too small to trigger such an explosion.

Instead, it will probably start fusing its helium atoms, and when it does - in about 37 million years - it will shine like a normal star again.

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