Astronomers discover Earth-size ‘diamond’ in space

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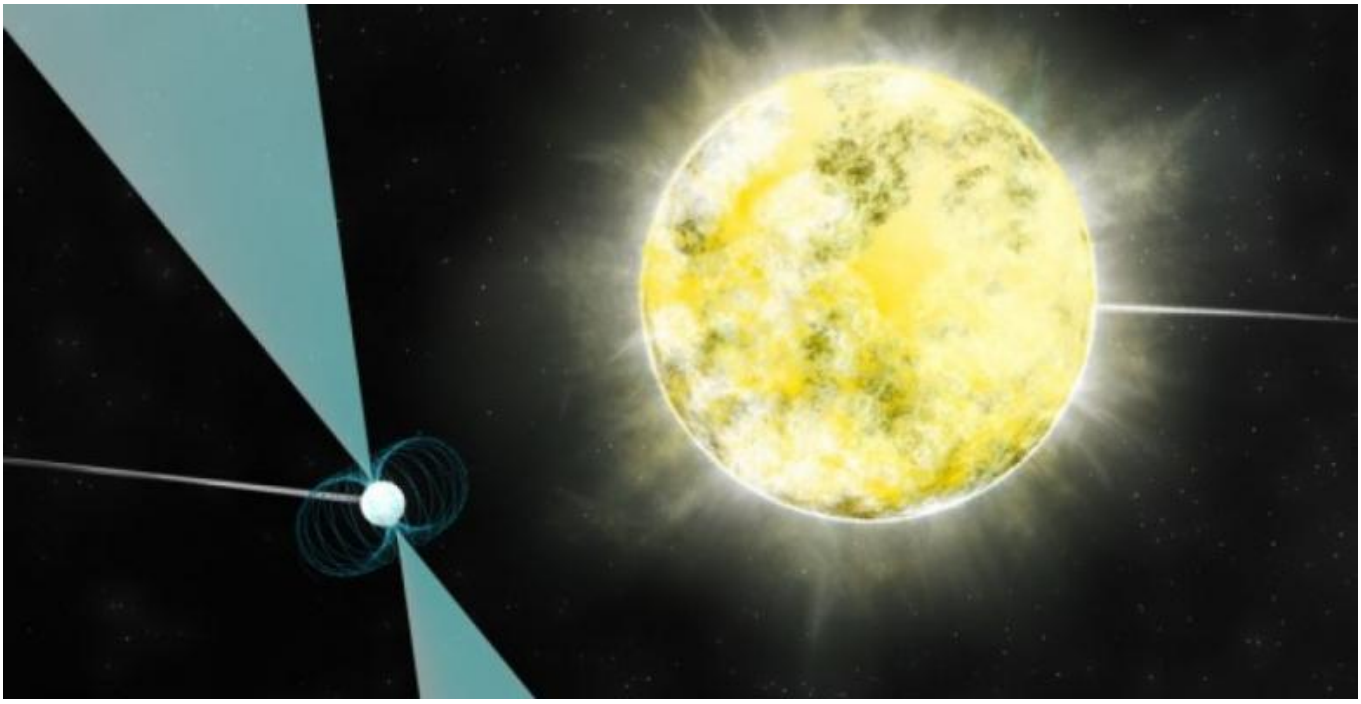

“It’s a really remarkable object,” noted David Kaplan, a professor at the University of Wisconsin-Milwaukee, in a statement. “These things should be out there, but because they are so dim they are very hard to find.”

Astronomers identified this white dwarf utilizing the NRAO’s Green Bank Telescope and Very Long Baseline Array, in addition to other observatories.

The pulsar companion to this white dwarf, called PSR J2222-0137, was the first object in this system to be discovered. It was located utilizing the GBT.

The first data on PSR J2222-0137 showed that the pulsar was gravitationally bound to a companion star, which was initially identified as either another neutron star or an extremely cool white dwarf.

Observations from the VLBA helped astronomers nail down its location and distance from the Earth — about 900 light-years away in the direction of the constellation Aquarius.

The astronomers investigated how the gravity of the companion warped space, leading to delays in the radio signal as the pulsar moved behind it. These delayed travel times allowed the researchers to identify the orientation of their orbit and the individual masses of the two stars.

The data suggested that the companion was much more likely to be a cool white dwarf, because the orbits were too orderly for a second supernova to have occurred.

Given the information they had at hand, the astronomers thought they should have been able to spot it in optical and infrared light.

“Our final image should show us a companion 100 times fainter than any other white dwarf orbiting a neutron star and about 10 times fainter than any known white dwarf, but we don’t see a thing,” explained Bart Dunlap, a graduate student at the University of North Carolina at Chapel Hill and one of the team members. “If there’s a white dwarf there, and there almost certainly is, it must be extremely cold.”

Believed to be 3,000 degrees Kelvin, astronomers contend that such a cool, collapsed star would be primarily crystallized carbon, not unlike a diamond.

The findings are described in greater detail in the *Astrophysical Journal*.