Planet Nine could spell doom for solar system

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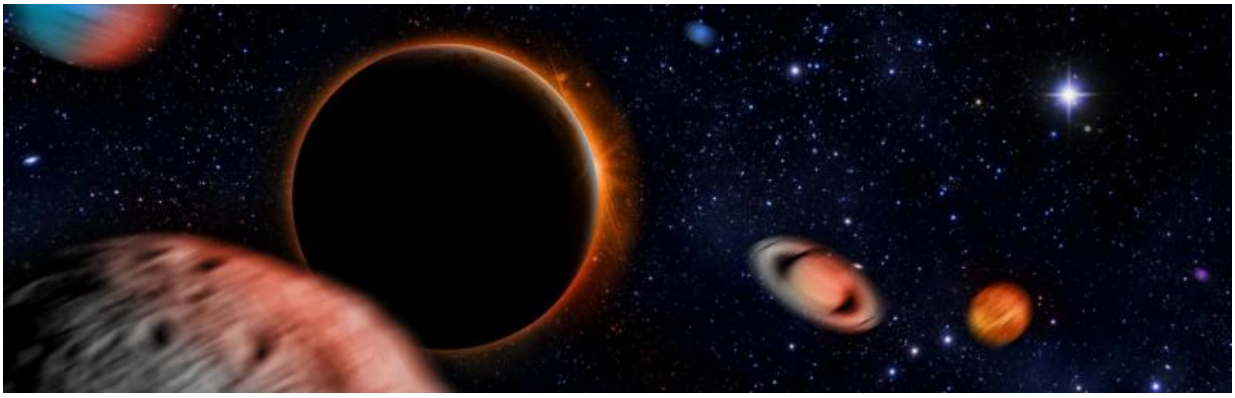

Credit: University of Warwick

The solar system could be thrown into disaster when the sun dies if the mysterious 'Planet Nine' exists, according to research from the University of Warwick.

Dr Dimitri Veras in the Department of Physics has discovered that the presence of Planet Nine – the hypothetical planet which may exist in the outer Solar System - could cause the elimination of at least one of the giant planets after the sun dies, hurling them out into interstellar space through a sort of 'pinball' effect.

When the sun starts to die in around seven billion years, it will blow away half of its own mass and inflate itself—swallowing the Earth—before fading into an ember known as a white dwarf. This mass

ejection will push Jupiter, Saturn, Uranus and Neptune out to what was assumed a safe distance.

However, Dr. Veras has discovered that the existence of Planet Nine could rewrite this happy ending. He found that Planet Nine might not be pushed out in the same way, and in fact might instead be thrust inward into a death dance with the solar system's four known giant planets—most notably Uranus and Neptune. The most likely result is ejection from the solar system, forever.

Using a unique code that can simulate the death of planetary systems, Dr. Veras has mapped numerous different positions where a 'Planet Nine' could change the fate of the solar system. The further away and the more massive the planet is, the higher the chance that the solar system will experience a violent future.

This discovery could shed light on planetary architectures in different solar systems. Almost half of existing white dwarfs contain rock, a potential signature of the debris generated from a similarly calamitous fate in other systems with distant "Planet Nines" of their own.

In effect, the future death of our sun could explain the evolution of other planetary systems.

Dr. Veras explains the danger that Planet Nine could create: "The existence of a distant massive planet could fundamentally change the fate of the solar system. Uranus and Neptune in particular may no longer be safe from the death throes of the Sun. The fate of the solar system would depend on the mass and orbital properties of Planet Nine, if it exists."

"The future of the Sun may be foreshadowed by white dwarfs that are 'polluted' by rocky debris. Planet Nine could act as a catalyst for the

pollution. The Sun's future identity as a white dwarf that could be 'polluted' by rocky debris may reflect current observations of other white dwarfs throughout the Milky Way," Dr Veras adds.

More information: Dimitri Veras. The fates of Solar system analogues with one additional distant planet, *Monthly Notices of the Royal Astronomical Society* (2016). DOI: 10.1093/mnras/stw2170

Provided by University of Warwick

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