

# Feuding helium dwarfs exposed by eclipse

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Researchers at the University of Warwick have found a unique feuding double white dwarf star system where each star appears to have been stripped down to just its helium.

We know of just over 50 close double [white dwarfs](#) but this was only the second ever eclipsing close white dwarf pair to be found. The University of Warwick astronomers Steven Parsons and Professor Tom Marsh were able to use the fact that the stars eclipse each other when seen from Earth to make particularly detailed observations of the system.

Those observations revealed that uniquely both the white dwarf stars in this pairing are composed largely of [helium](#). Most white dwarfs tend to have largely inert cores of carbon and oxygen that have formed over the star's long life when it has used up most of its hydrogen and helium. Helium white dwarfs are a sure sign that the star has undergone some extreme mass loss at some point. To find two such helium white dwarfs stars is a clear sign to astronomers that both stars have had an exotic and mutually destructive past.

What was originally the most massive star of the pair had once actually began to expand to become a red giant but its outer hydrogen envelope was ripped off by its companion. This meant the star never got an opportunity to start fusing its helium and it was left as a helium white dwarf. When the [companion star](#) then began expanded it also had its expanding layer torn off by the first star - but as the first star was already reduced to a white dwarf it could not use that new material. That hydrogen was therefore simply lost to the [star system](#) leaving behind

helium white dwarfs.

In just over 1 billion years, the two stars feud will end as they will spiral together and merge, finally igniting each other's helium to become an object known as a hot subdwarf which should last for 100 million years

The University of Warwick researchers found this star system CSS 41177 (which is over 351 parsecs , or 1140 [light years](#), away - in the [constellation Leo](#)) using a combination of data from the robotic 2m Liverpool Telescope in the Canary Islands and the 8m Gemini Telescope on Hawaii.

**More information:** The full paper has been accepted for publication in the *Astrophysical Journal* and is entitled A deeply eclipsing detached double helium white dwarf binary.

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Provided by University of Warwick

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