

The formation and long-term evolution of circumbinary planetary systems across the H-R diagram

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Formation of second-generation exoplanets around double white dwarfs

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The evolution of binaries that become double white dwarfs (DWDs) can cause the ejection of high amounts of dust and gas. This material can give rise to circumbinary discs and become the cradle of new planets, yet no studies to date have focused on the formation of circumbinary planets around DWDs. DWDs will be the main sources of gravitational waves detectable by the Laser Interferometer Space Antenna (LISA) mission, opening the possibility to detect circumbinary planets around short-period DWDs via the modulation of their GW signal. My contribution will present multiple planet formation tracks showing how the planetary formation processes typical of pre-main sequence discs are affected by the disc environments surrounding DWDs, accounting for accretion rate onto the central binary and the disc photoevaporation rate caused by stellar irradiation. The simulations show that planetary formation should be common in circumbinary discs around DWDs, but the formation of gas giants in particular can be hindered by the temperatures of the disc and the rapid disc depletion. In particular, the metallicity and accretion rate of the disc, and the timing of planet formation represent the key parameters discriminating between the different nature of the final planets.

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