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research highlights

EVOLVED STARS

A vision of the future

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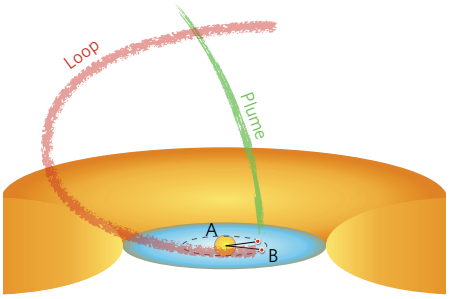

EDPS

A nearby red giant star potentially hosts a planet with a mass of up to 12 times that of Jupiter. L_2 Puppis, a solar analogue five billion years more evolved than the Sun, could give a hint to the future of the Solar System's planets.

Using ALMA, Pierre Kervella has observed L_2 Puppis in molecular lines and continuum emission, finding a secondary source that is roughly 2 AU away from the primary. This secondary source could be a giant planet or, alternatively, a brown dwarf as massive as 28 Jupiter masses. Further observations in ALMA bands 9 or 10 ($\lambda \approx 0.3$–0.5 mm) can help to constrain the companion's mass. If confirmed as a planet, it would be the first planet around an asymptotic giant branch star.

L_2 Puppis (A in the figure) is encircled by an edge-on circumstellar dust disk (inner disk shown in blue; surrounding dust in orange), which raises the question of whether the companion body is pre-existing, or if it has formed recently due to accretion processes within the disk. If pre-existing, the putative planet would have had an orbit similar in extent to that of Mars. Evolutionary models show that eventually this planet will be pulled inside the convective envelope of L_2 Puppis by tidal forces.

The companion's interaction with the star's circumstellar disk has invoked pronounced features above the disk: an extended loop of warm dusty material, and a visible plume, potentially launched by accretion onto a disk of material around the planet itself (B in the figure).

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