
A detailed view on the rotating disk surrounding the M-type AGB star L2 Puppis

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Abstract

The nearby AGB star L2 Puppis is surrounded by a circumstellar dust and gas disk. This disk was observed with ALMA at very high angular resolution (< 20 mas). Building on the first analysis by Kervella et al., we have simultaneously modelled the observed ^{12}CO and ^{13}CO emission from the disk with 3D radiative transfer, revealing the physical distributions making up the disk. The gas in the inner disk follows Keplerian dynamics, while a sub-Keplerian regime extends beyond the dust detection radius. The thermal structure of disk shows signs of complexity, with wall heating, steep gradients and buffer zones. The density decreases radially outwards following a power law with a steep slope. We have determined that the location of the tentative companion first detected by Kervella et al. coincides with the inner rim of the disk, suggesting it may contribute to the formation of the disk. Furthermore, angular momentum considerations indicate that the companion may have a mass of the order of a few Jupiter masses. The disk surrounding L2 Pup hence emerges as a prime target to investigate the relation between evolved stars, their companions, and their morphological fate.

Keywords: AGB, disk, rotation, M, type, planet

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