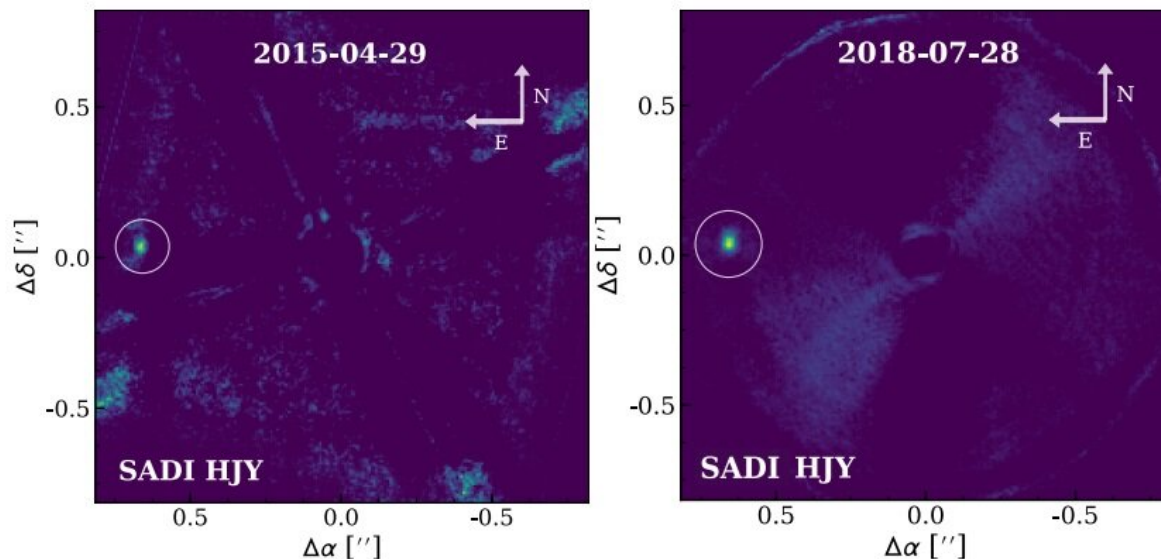


VLT observations detect a low-mass companion of the young massive star MWC 297

February 12 2020, by Tomasz Nowakowski



MWC 297 B detected with SADI in 2015 (left) and 2018 (right) combining all wavelengths. Credit: Ubeira-Gabellini et al., 2020.

Using ESO's Very Large Telescope (VLT) in Chile, astronomers have discovered a low-mass stellar companion embedded in the disk of the young pre-main-sequence (PMS) massive star designated MWC 297. The finding is detailed in a paper published February 5 on the arXiv pre-

print server.

MWC 297 is classified as a PMS Herbig Be star of spectral type B1.5, with an [effective temperature](#) of around 23,700 K. The star, estimated to be less than 1 million years old, has a radius of about 9.17 solar radii and is almost 17 times more massive than our sun.

Previous observations of MWC 297 have revealed that it has a compact two-component circumstellar [disk](#). The disk's inner part is located from 7.5 to 43.5 AU from the star, while its outer part extends from 300 to 450 AU. One of the scenarios that could explain the presence of such huge gap between the two parts of the disk is the presence of a companion object that may be lurking somewhere between 43.5 and 300 AU from the [host star](#).

New observations of MWC 297 conducted by a group of astronomers led by Maria Giulia Ubeira-Gabellini of the University of Milan, Italy, seem to confirm the companion object theory. Using the Spectro-Polarimetric High-contrast Exoplanet REsearch (SPHERE) instrument on VLT, the scientists found a [low-mass star](#) in the gap between the disk's two components.

"In this letter, we report the discovery of a low-mass companion in the disk around Herbig Be star MWC 297 using high-contrast observations with VLT/SPHERE-IFS," the astronomers wrote in the paper.

The newly discovered object, designated MWC 297 B, was found at a projected separation of 244.7 AU and a position angle of 176.4 degrees. According to the researchers, such large separation suggests that it formed via gravitational instability.

The astronomers assume that MWC 297 B is most likely a young M-dwarf, early embedded in the disk. The spectral characterization shows

that the companion is less than 1 million years old, has a mass of around 0.25 solar masses, and high excitation of about 11.9 mag. Therefore, the mass ratio of the MWC 297 binary (MWC 297 B/MWC 297 A) was calculated to be about 0.01.

The authors of the study added that MWC 297 B turns out to be one of only few stellar companions discovered around young host [stars](#). To date, most companions with ages below 10 million years found with direct imaging are yet to be confirmed.

Although the basic parameters of MWC 297 B have been derived, follow-up observations at longer wavelengths are required to better refine the characteristics of this object. Furthermore, the astronomers suppose that the companion may host a hot circumsecondary disk, so further investigation of the MWC 297 system would verify this assumption.

More information: Discovery of a low-mass companion embedded in the disk of the young massive star MWC 297 with VLT/SPHERE, arXiv:2002.01946 [astro-ph.SR] arxiv.org/abs/2002.01946

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