

EXOPLANETS

GRAVITY takes in planets

Astron. Astrophys. **623**, L11 (2019)

A few tens of planets have been imaged directly, but perhaps none more memorably than the four planets around HR 8799, shown to circle their host star in a series of observations with the Keck Observatory over a period of seven years. The GRAVITY instrument on the Very Large Telescope Interferometer (VLTI), which has recently been observing [the Galaxy's supermassive black hole](#) and [the stars that orbit around it](#), has now directly obtained an optical spectrum of the outermost known planet in the HR 8799 system, HR 8799e. Sylvestre Lacour et al. report astrometry and K-band spectroscopy of this larger-than-Jupiter planet, which orbits at just 390 mas (~17 au) from its host.

The spatial resolution of the VLTI and the configuration of the GRAVITY instrument have allowed the capture of the coherent flux from the star and HR 8799e separately, circumventing the contamination issues of the two current exoplanet spectroscopy methods: transit spectroscopy and thermal emission spectroscopy. The observed spectrum resembles that of an L-type brown dwarf, and allows Lacour et al. to not only infer the relative amounts of carbon monoxide to methane — revealing that the planet's atmosphere is probably subject to strong vertical winds that prevent CO from turning into CH₄ — but also to say something about the dust composition of atmospheric clouds: they contain iron and silicate particles.

This observation opens the door for GRAVITY to study more planets in this way, provided they are brighter than 19 mag in the K band, have a magnitude difference to their star of <11 mag and a separation of >100 mas.

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Published online: 26 April 2019

<https://doi.org/10.1038/s41550-019-0785-0>