



A comprehensive study of the WASP-74 planetary system

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In this work, we present new transit observations of the hot Jupiter WASP-74 b using the high-resolution spectrograph HARPS-N and the multi-color simultaneous imager MuSCAT2. The new data allow us to refine the orbital properties of the planet, the physical parameters of the host star, and reveal some properties about the planet's atmosphere using different techniques. We measure, for the first time, the sky-projected angle between the stellar spin-axis and the planet's orbital axis, which is compatible with an orbit well-aligned with the equator of the host star. We build up an observational low-resolution transmission spectrum from the optical to the near-infrared of the planet using all the available transit photometry for this planet. Our joint reanalysis shows a slope in the transmission spectrum steeper than expected from Rayleigh scattering alone and no signs of strong optical absorbers such as TiO and/or VO, in disagreement with previous claims of the presence of these gases in the atmosphere of WASP-74 b.

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