

Physical properties of the planetary systems WASP-45 and WASP-46 from simultaneous multiband photometry

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Abstract

Accurate measurements of the physical characteristics of a large number of exoplanets are useful to strongly constrain theoretical models of planet formation and evolution, which lead to the large variety of exoplanets and planetary-system configurations that have been observed. We present a study of the planetary systems WASP-45 and WASP-46, both composed of a main-sequence star and a close-in hot Jupiter, based on 29 new high-quality light curves of transits events. In particular, one transit of WASP-45 b and four of WASP-46 b were simultaneously observed in four optical filters, while one transit of WASP-46 b was observed with the NTT obtaining a precision of 0.30 mmag with a cadence of roughly 3 min. We also obtained five new spectra of WASP-45 with the FEROS spectrograph. We improved by a factor of 4 the measurement of the radius of the planet WASP-45 b, and found that WASP-46 b is slightly less massive and smaller than previously reported. Both planets now have a more accurate measurement of the density ($0.959 \pm 0.077 \rho_{\text{Jup}}$ instead of $0.64 \pm 0.30 \rho_{\text{Jup}}$ for WASP-45 b, and $1.103 \pm 0.052 \rho_{\text{Jup}}$ instead of $0.94 \pm 0.11 \rho_{\text{Jup}}$ for WASP-46 b). We tentatively detected radius variations with wavelength for both planets, in particular in the case of WASP-45 b we found a slightly larger absorption in the redder bands than in the bluer ones. No hints for the presence of an additional planetary companion in the two systems were found either from the photometric or radial velocity measurements..

Keywords

Planets and satellites: fundamental parameters, Stars: fundamental parameters, Stars: individual: WASP-45, Stars: individual: WASP-46.