

MULTI-BAND CHARACTERIZATION OF HOT JUPITER USING OBSERVATÓRIO DO PICO DOS DIAS DATA

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We have carried out a campaign to characterize the hot Jupiters WASP-5b, WASP-44b and, WASP-46b using multi-band observations. We have determined the planetary physical properties and new transit ephemerides of these planets. This is the first follow-characterization of WASP-46b.

An exoplanet’s orbit oriented along the line of sight grants unmatched access to a list of both planetary astrophysical properties and orbital elements, allowing for the first time to study an accurate ensemble of parameters. The characterization of each system plays an important role for the recognition of astrophysically interesting targets for follow-up work such as transit timing variations (Holman & Murray 2005).

We started a follow-up characterization campaign to study hot Jupiters. We observed transits of the planets WASP-5b, WASP-44b, and WASP-46b (Anderson et al. 2008, 2012) on 2011 August, 2012 August, 2013 July, and 2013 August using the CCD cameras mounted on the 1.6-m and 0.6-m telescopes of the Observatório do Pico dos Dias (OPD/LNA), in Brazil. The target fields are not crowded, thus we performed standard differential aperture photometry for extracting the differential magnitudes for both the target and references.

To fit the light curves we used EXOFAST (Eastman, Gaudi, & Agol 2013). To account for systematics we decorrelated against background, airmass, and CCD positions. Since we fitted only transit data we complement our fits with spectroscopic information taken from exoplanets.org. We fixed the eccentricities to zero as the radial velocity data is consistent circular orbit. Figure 1 shows the resultant light curves of WASP-46b. The standard

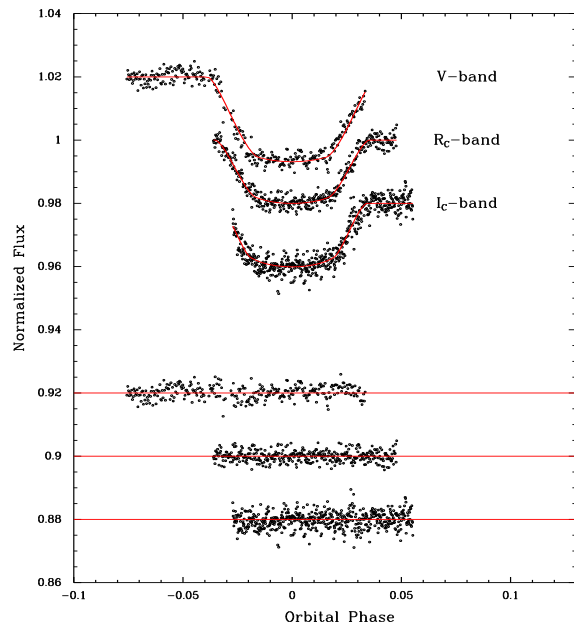


Fig. 1. Wasp-46b light curves. From top to bottom the V-, R_C , and I_C -band light curves respectively. The red curves are the best EXOFAST fits superimposed. The residual of the fitted model are displayed at the bottom.

deviation of the measurements after subtracting the fitted model was better than 0.3%.

Our results are consistent with previous literature values of the planets WASP-5b and WASP-44b. This is the first follow-up characterization campaign of WASP-46b. We improved some parameters of this system such as the inclination ($i = 82.84 \pm 0.22$). We also fitted a linear ephemerides to its mid-transit times using values from the literature and our measurements. We found deviations from this linear law, thus indicating possible additional bodies in the system. More follow-up work is needed to confirm these findings.

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