

Detection and initial characterisation of an exoplanet atmosphere with small aperture telescopes

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Abstract

In the recent years atmospheres of exoplanets have been studied with space-based telescopes like the HST or large aperture ground-based telescopes like the Gran Telescopio Canarias.

But as the number of suitable exoplanets is rising, comparative studies of atmospheres with a statistically meaningful amount of targets will follow, for which the observational time with large telescopes is limited and expensive.

Our aim is to investigate whether it is possible to detect and initially characterise the atmosphere of an exoplanet with small aperture telescopes using chromatic variations in transit depths.

We collected multi-color transits in the years 2011 to 2013 using the robotic 1.2m-telescope STELLA on Tenerife as well as the Nordic Optical Telescope and the 70cm-telescope at the Leibniz Institute for Astrophysics Potsdam.

The highly inflated Hot Jupiter HAT-P-32 b was chosen as target for our pilot study for its favorable large atmospheric scale height and therefore enhanced atmospheric detectability.

Models of the atmospheric spectra of HAT-P-32 b indicate that the STELLA-data can be used to distinguish between a dusty and a cloud-free atmosphere using the gradient in transit depth of the observations in the blue band and in the visible band.

Here we want to present our project together with the first results of the transit depth analysis.