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First results of ESA's OGS multi-band observations of extra-solar planets

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Abstract

We present first results of the analysis of multiwavelength broad-band photometry observations of planetary transits undertaken with the OGS spectrograph in autumn 2017 and spring 2018.

1. Introduction

The ESA Optical Ground Station (OGS) is a 1-m telescope located at the Teide Observatory, Tenerife. It is equipped with a spectrograph with capabilities for imaging and broad-band spectrometry by using filters, as well as dispersive spectroscopy.

Figure 1: View of the Spectrograph mounted on the OGS telescope, showing the liquid N cooling system.

Since the first commissioning run in February 2015, several observation campaigns of exoplanet transits, with a typical duration of one to two weeks, have been undertaken.

This is a follow-up of the exoplanet transit observations that have been performed in 2015-16 and where in total 20 exoplanet transits were observed.

2. Exoplanet transit observations (2017-2018 campaigns)

The main objectives of these observations were to check the feasibility and scientific capability of the spectrograph at the OGS for quasi-simultaneous multi-band photometry of planetary transits.

Photometry of planetary transits in several visible wavelength bands can provide a first view on the nature of the planetary atmosphere. It also allows to determine the planet and orbit parameters with high precision by removing the effect of the stellar activity from the transit profile. This kind of observations also complement spectroscopic observations in the infrared. In a cloudless atmosphere, visible multiwavelength observations allow for measuring the Rayleigh slope of the planet's reflected light, and therefore to derive the atmosphere mean molecular weight [1].

The data reduction and analysis is currently ongoing and results will be presented in this poster.

3. References

[1] Benneke, B, and Seager, S.: Atmospheric Retrieval for Super-Earths: Uniquely Constraining the Atmospheric Composition with Transmission Spectroscopy, ApJ 753, 100, 2012