The GTC exoplanet transit spectroscopy survey

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Abstract

Our group is presently conducting an observational campaign, using the 10-meter Gran Telescopio Canarias (GTC), to obtain the transmission spectrum of several exoplanets during a transit event. The GTC instrument OSIRIS is used in its long-slit spectroscopic mode, covering the spectral range of 520-1040 nm, and observations are taken using a set of custom-built slits of various, broad, widths. We integrate the stellar flux of both stars in different wavelength regions producing several light curves and fit transit models in order to obtain the star-to-planet radius ratio, Rp/Rs, across wavelength. A Markov Chain Monte Carlo (MCMC) Bayesian approach is used for the transit fitting. With our instrumental setup, OSIRIS has been able to reach precisions down to 250 ppm (WASP-48b, V=11.06 mag) for each color light curve 10 nm wide, in a single transit. Central transit timing accuracies have been measured down to 6 seconds. Here we shown some examples to discuss the capabilities and limitations of GTC with current and future instrumentation, and the role of GTC as tool for the follow up of faint Kepler targets. In particular, we show the GTC observations of the intriguing evaporating planet KIC 12557548b, for which we performed simultaneous color light curves, and a search for alkali elements in its planetary tail.

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