Contribution ID: **86** Type: **not specified**

Transmission spectroscopy of WASP-7 b with UVES

Thursday, 16 May 2024 14:30 (2 minutes)

Context. Transmission spectroscopy is a prime technique to study the chemical composition and structure of exoplanetary atmospheres. Strong excess absorption signals have been detected in the optical Na I D1, 2 Fraunhofer lines during transits of hot Jupiters, which are attributed to the planetary atmospheres and allow us to constrain their structure. Aims. We study the atmosphere of WASP-7 b by means of high-resolution transit spectroscopy in the sodium lines. Methods. We analyzed a spectral transit time series of 89 high-resolution spectra of the hot Jupiter WASP-7 b that was observed using the Ultraviolet and Visual Echelle Spectrograph (UVES). We used the telluric lines for an accurate alignment of the spectra and carried out a telluric correction with molecfit. Stellar magnetic activity was monitored by investigating chromospheric lines such as the Ca II H and K, and hydrogen Hα lines. Finally, we obtained transmission spectra and light curves for various lines. Results. The star shows no identifiable flares and, if any, marginal changes in activity during our observing run. The sodium transmission spectra and corresponding light curves clearly show signs of the Rossiter-McLaughlin effect and the stellar center-to-limb variation that we modeled using synthetic spectra. A statistically significant, narrow absorption feature with a line contrast of 0.50 ± 0.06% (at ~8.3σ level) and a full width at half maximum of 0.13 ± 0.02 Å is detected at the location of the Na I D2 line. For the Na I D1 line signal, we derived a line contrast of 0.13 ± 0.04% (at ~3.2σ level), which we consider a tentative detection. In addition, we provide upper limits for absorption by the hydrogen Balmer lines (Hα, Hβ, and Hγ), K I λ7699 Å, Ca II H and K, and infra-red triplet lines.

Primary author: RAHMATI, Hossein (Heidelberg University)

Co-authors: CZESLA, Stefan; KHALAFINEJAD, Sara; MOLLIÈRE, Paul

Presenter: RAHMATI, Hossein (Heidelberg University)

Session Classification: Poster Presentations