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Transmission Spectroscopy of HD189733b with UVES

During an exoplanetary transit, the spectral signatures of the exoplanet atmosphere can be measured using a technique called transmission spectroscopy. Our aim is to re-investigate the transmission spectrum of sodium in the atmosphere of HD189733b, which orbits a bright active K-type star. We use high-resolution optical spectra taken by the UVES instrument mounted at the VLT. Our observations cover a single transit of HD1897433b. To probe the transmission spectrum for planetary absorption features we obtain the excess depth of the transit light curve (e.g. Snellen et al. 2008) by integrating over a passband of 1.5 \AA inside the sodium D-line (centred at 5889.95 \AA). The star exhibits strong flaring activity during the transit. Thus, to quantify the effect of stellar activity we use the temporal changes of the Ca K line, known to be one of the standard activity indicators. In addition we evaluated the planetary imprint related to stellar limb-darkening by obtaining the difference curve (Charbonneau et al. 2002, Czesla et al. 2015). Our result, similar to Albrecht (2008) shows that the around the center of the transit, the planetary sodium absorption is less deep compared to the rest of the transit. This effect could be caused by the change in radial velocity of the planet with respect to the star. By modeling this effect we are able to estimate the shape of planetary sodium absorption feature which was represented by a Gaussian with a given depth and broadening. From these parameters we will be able to infer important physical properties of the exoatmosphere (Heng et al. 2015).