Retrieving the transmission spectrum of HD 209458b using CHOCOLATE: a new Chromatic Doppler Tomography technique

Emma Esparza-Borges\textsuperscript{1,2}, Mahmoud Oshagh\textsuperscript{1,2}, Nuria Casasayas-Barris\textsuperscript{3}, and Enric Pallé\textsuperscript{1,2}

\textsuperscript{1}Instituto de Astrofísica de Canarias (IAC), 38205 La Laguna, Tenerife, Spain
\textsuperscript{2}Departamento de Astrofísica, Universidad de La Laguna (ULL), 38206, La Laguna, Tenerife, Spain
\textsuperscript{3}Leiden Observatory, Leiden University, Postbus 9513, 2300 RA Leiden, The Netherlands

Multi-band photometric transit observations or low resolution spectroscopy (spectro-photometry) are normally used to retrieve the broadband transmission spectra of transiting exoplanets in order to assess the chemical composition of their atmospheres. In this work, we present an alternative approach for recovering the broadband transmission spectra using chromatic Doppler Tomography. To validate the method and examine its performance, we used new observational data obtained with the ESPRESSO instruments to retrieve the transmission spectra of the archetypal hot Jupiter HD209458b. Our findings indicate that the recovered transmission spectrum is in good agreement with the results presented in previous studies, which used different methodologies to extract the spectrum.