The Relevance of Optical Data for Understanding Exoplanetary Atmospheres

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Abstract

The CoRoT and Kepler missions have taught us valuable lessons on what we may learn about exoplanetary atmospheres in the optical range of wavelengths. A major theme in the exoplanetary atmospheres community is the study of clouds, which renders interpretation of their thermal structures and chemical abundances, via infrared data, degenerate. Several HST Large Programs (Bean, Desert, Sing) have demonstrated the ubiquity of clouds in highly-irradiated exoplanetary atmospheres. Optical data provides a unique opportunity to break some of these degeneracies. In this review, I will highlight current and past optical studies of exoplanets, focusing on measurements of geometric albedos and phase curves. I will emphasize how the information from optical data compliments infrared data when performing atmospheric retrieval (inverse modeling of their atmospheres). Finally, I will describe how future data from the CHEOPS and TESS missions will advance the state of the art in understanding exoplanetary atmospheres. [Collaborators: CHEOPS team, Exoplanets & Exoclimes Group, Brice-Olivier Demory]

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