Title: WASP-107b: A unique laboratory for atmospheric characterization

Keywords: exoplanet, atmosphere, transmission spectroscopy,

Abstract:

Our understanding of exoplanetary atmospheres is being revolutionized by the observational capabilities of the newly operating James Webb Space Telescope (JWST) [Rigby+, 2022]. More specifically, JWST-era observations provide new insights into the physical and chemical processes governing close-in exoplanetary atmospheres [Rustamkulov+, 2022; Tsai+, 2023], thus allowing the community to start constraining planetary formation and evolution theories [Turrini+, 2021]. In that context, this talk emphasizes the remarkable super-Neptune WASP-107b, a warm close-in exoplanet [Anderson+, 2017] whose extended atmosphere constitutes a unique laboratory for atmospheric characterization through near and mid-infrared transmission spectroscopy with JWST-MIRI, NIRSpec and NIRCam. In this talk, we **(1)** present the chemical composition of its atmosphere including unexpected detections of sulphur dioxide (SO_2) and silicate clouds [Dyrek+, 2024] **(2)** derive a set of constraints on planetary interior properties (intrinsic temperature and core metallicity) thanks to precise measurements of atmospheric metallicity and elemental ratios of key tracers such as C/O and refractory metals [Sing+, 2024, in prep.] **(3)** provide the first results on morning and evening terminator spectroscopy through asymmetric fitting used as a cloud diagnostic in terms of location and composition [Murphy+, 2024, in prep.].

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