SO2, silicate clouds, but no CH4 detected in a warm Neptune with JWST MIRI

Résumé

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 in 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 places the emphasis on the remarkable **super-Neptune WASP-107b**, a warm close-in exoplanet (Anderson+, 2017) whose extended atmosphere constitutes a unique laboratory for atmospheric characterization through transmission spectroscopy with the **Mid-Infrared Instrument** (MIRI). In this talk, we (1) present the first mid-infrared **detection of sulphur dioxide** (SO2) and **silicate clouds** (2) report the notable and unexpected absence of methane in the upper atmosphere (3) provide evidence for **disequilibrium chemistry and photochemistry**, pointing towards a dynamically active atmosphere with a super-solar metallicity (Dyrek+, 2023).
References:

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Mots-Clés: Exoplanet, Atmosphere, Transmission spectroscopy, Mid, Infrared, JWST