Atmospheric characterization of the temperate sub-Neptunes K2-18 b and TOI-270 d from re-analysis of JWST observations

E. Salugova[1], P. Marty[1], E. Ducrot[1] & B. Charnay[1]

[1]LESIA, Observatoire de Paris, Meudon, benjamin.charnay@obspm.fr

The atmospheres of temperate sub-Neptunes (with T_{eq} < 400 K) are fantastic laboratories for understanding photochemistry, the formation of water cloud and interior-atmosphere interactions that occur on habitable planets, in particular in their early phases. They could even provide a window on the conditions of the early Earth and prebiotic chemistry. Some temperate sub-Neptunes could be habitable with a liquid water ocean. Amongst them, K2-18 b and TOI-270 d are currently the most promising targets for a detailed atmospheric characterization. JWST observations with NIRISS and NIRSpec revealed the presence of CH_4, CO_2 and potentially other molecules (.i.e. DMS and CS_2) on these planets [1,2]. We re-analyzed these publicly available JWST transit observations. During this talk, we will present the results of our data re-analysis and atmospheric retrieval concerning the chemical composition of the two planets, comparing them to previous studies [1,2,3].

References

[1] Madhusudhan et al., 2023
[2] Benneke et al. 2024
[3] Hölmber & Madhuasudan, 2024