

Atmospheric signatures of sub-Neptunian extrasolar planets with different origins

Mareike Godolt (1), Franz Schreier (2), Luisa M. Lara (3), Manuel Lampón (3), Philipp Baumeister (1), Fabian Wunderlich (1), Jasmine MacKenzie (1), Nicola Tosi (1,4)

(1) Zentrum für Astronomie und Astrophysik, Technische Universität Berlin (godolt@tu-berlin.de), (2) Institut für Methodik der Fernerkundung, Deutsches Zentrum für Luft- und Raumfahrt, (3) Instituto de Astrofísica de Andalucía – CSIC, (4) Institut für Planetenforschung, Deutsches Zentrum für Luft- und Raumfahrt

Abstract

The number of detected small extrasolar planets is steadily increasing. For planets with masses and radii below that of Neptune - sub-Neptunes - mass and radius measurements alone often do not allow for a unique classification as mini gas planets, rocky or icy worlds. Observations and analysis of atmospheric signatures have been discussed to break the degeneracy in potential bulk compositions. We explore the potential atmospheric signatures of sub-Neptunian planets of different origins accounting for mass-radius relations, different initial atmospheric compositions, mass and atmospheric temperatures. We calculate transmission spectra for these atmospheres and explore features that may allow to distinguish between different bulk compositions. Furthermore we estimate the detectability of these potential features by JWST.

Acknowledgements

This research was supported by DFG projects RA-714/7-1, GO 2610/1-1 and SCHR 1125/3-1. We acknowledge the support of the DFG priority programme SPP 1992 “Exploring the Diversity of Extrasolar Planets (GO 2610/2-1, TO 704/3-1)”