

Julia Victoria Seidel



Title

Hotter than Hell: Understanding highly-irradiated worlds through transmission spectroscopy

Abstract

One of the most intriguing outcomes of the young field of exoplanet research is the emergence of highly-irradiated planets, located much closer to their host star than any of the Solar System planets. These planets, which give us a glimpse into the future of our Solar System once the Sun reaches its final life stages, have been studied in-depth, allowing us to learn more about their temperature profiles and present molecules and atoms. However, the characterisation of atmospheric dynamics, a crucial part to truly understand an atmosphere, has severely lagged behind.

Until recently, our only glimpse into the winds on exoplanets was restricted to global circulation models (e.g. Showman et al. 2009, Parmentier et al. 2018), probing only the lowest layers of the atmosphere, and atmospheric escape models, which describe the mass outflow far out in the exosphere (e.g. Lecavelier des Etangs et al. 2010, Bourrier et al. 2017). Thanks to these techniques, we know that the lower atmosphere is dominated by zonal winds, while the exosphere expands into space. But what happens in the vast area between these regimes?

This pressing question has been answered in my PhD work, where I, for the first time, utilise resolved spectral lines which probe the missing layers of the atmosphere to understand their atmospheric dynamics (Seidel et al. 2019, 2020a, 2020d submitted). During my talk, I will present a consolidated view of highly-irradiated exoplanet atmosphere dynamics, focussing on the connection between the different atmospheric layers.

Julia Victoria Seidel

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Research Interests

Exoplanet atmospheres, high-resolution transmission spectroscopy, atmospheric dynamics

Current Position

PhD researcher at the **Observatory of Geneva, University of Geneva, Switzerland**

In the group of Prof. David Ehrenreich, defence date: May 2021

Past Positions

Technical Student, CERN, Geneva, Switzerland

Summer Student, CERN, Geneva, Switzerland

Education

Doctorat ès Science, Mention Astronomy and Astrophysics,
Observatory of Geneva, University of Geneva, Switzerland

Defence date: May 2021

Master of Science in Physics with Extended Research (2017), *Imperial College London + Universidad de los Andes, Bogotá D.C., Colombia*

Bachelor of Science in Physics (2015), *Technische Universität Darmstadt, Darmstadt, Germany + Ecole Normale Supérieure, Paris, France*

Accepted Observing Projects

PI: 106.20ZN, ESO Period P106 (1.5 nights), ESPRESSO instrument

+ 22 nights as Col with ESPRESSO, HARPS, CARMENES and NIRSPEC

Publications

1st author: 4 publications

Co-author: 13 publications

Talks

Invited talks: 2

Contributed talks: 6

Seminars: 8

Teaching

Co-supervisor Master thesis, 5 semester Lab projects, teaching assistant