Machine learning for inferring physical and chemical parameters from exoplanet observations

Project description

Atmospheres of exoplanets are complex physical and chemical systems. Simulating the properties of these atmospheres is a computationally demanding task. Therefore, the analysis of observational data is usually performed using highly oversimplified models. In this project we aim to develop a machine learning framework trained on a set of complex atmospheric models. The machine learning framework should learn the features of these complex models such that it can be used to interpret observational datasets from e.g. the JWST telescope in a manner that exceeds the simplistic model interpretation currently done. The PhD student will gain expertise on atmospheric processes and machine learning techniques.

Innovative Training Network (ITN)

This project is part of the Marie Sklodowska-Curie Innovative Training Network (ITN) CHAMELEON (link to YYY): Virtual Laboratories for Exoplanets and planet forming Disks. The ITN combines the expertise of eight European research institutes (Universities of St Andrews, Groningen, Copenhagen, Edinburgh, Leuven and Antwerp, the Max-Planck Institute in Heidelberg and the Netherlands Institute for Space Research) to cover all the relevant aspects of this complex modelling task, including observation and interpretation. All students will obtain double degrees and training secondments are next to the university nodes foreseen at LUCA School of Arts, Copenhagen Game Lab and the Scottish Parliament Information Center). The network consists of 15 Early Stage Researchers (PhD students) and the respective supervisors/local research groups. See also LINK TO ZZZ for a list of all open PhD positions within the network. The main supervisor for this project is dr. Michiel Min (SRON, Utrecht), secondary supervisors are prof.dr. Inga Kamp (University of Groningen) and prof.dr. Paul Palmer (University of Edinburgh).

Requirements

We seek an excellent student with a strong background in physical sciences and/or astrophysics. A successful candidate must hold a Masters degree or equivalent by the starting date of the position. Excellent computer programming skills are a requirement. Previous research experience on planet forming disks, exoplanets, and/or astrochemistry and a track record of team work/mobility will be important criteria for the selection. Note that the general eligibility and mobility rules of Marie Sklodowka-Curie Actions apply, i.e. they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting partner for more than 12 months in the 3 years immediately before the recruitment date.