ESR1:

Irradiation and impact of stellar variability on exoplanet atmospheres

Uffe Gråe Jørgensen
Niels Bohr Institute
University of Copenhagen, Denmark
uffegj@nbi.dk

Leen Decin
Institute for Astronomy
University of Leuven, Belgium
leen.decin@kuleuven.be

Project Description

Using the same atmospheric code and input for exoplanets and their host stars, allow computation of completely self-consistent systems of stellar and irradiated exoplanet physio-chemical structures and synthetic spectra. The MARCS stellar atmosphere code is thoroughly tested against observations for temperatures down to the coolest stars, and is being developed for exoplanets too. This project will develop the irradiative aspects of the MARCS code (Gustafsson et al 2008, A&A 486, 951) as it has previous successfully been applied to binary stars (Nordlund & Vaz, A&A 228, 231, 1990), and apply it self-consistently to model transit spectra of known exoplanets and analyse the effect of variability of the host stars and the effect of stellar activity on the exoplanetary composition and potential habitability.

Innovative Training Network (ITN)

This project is part of the Marie Sklodowska-Curie Innovative Training Network (ITN) *CHAMELEON* -- "*Virtual Laboratories for Exoplanets and Planet Forming Disks*" (http://chameleon.wp.st-andrews.ac.uk/). 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 relevant aspects for this complex modelling task, joining the expertise in planetary atmospheres and protoplanetary disks, including observation and interpretation. The network will consist of 15 Early Stage Researchers (PhD students) and the respective supervisors and local research groups. A description of all the 15 announced PhD fellowships of the network is listed at (http://chameleon.wp.st-andrews.ac.uk/recruitment/).

The Host Institutes

In Copenhagen, the student will be part of the active environment in the Niels Bohr Institute's section for Astrophysics and Planetary Science, which covers aspects of exoplanet research, proto-planetary disk formation, formation of our solar system, meteorites and exploration of Mars. In Belgium, the student will be part of the University of Leuven's Institute of Astronomy, which is a vibrant research group of some 70 scientists, engineers and administration staff (fys.kuleuven.be/ster), including 6 full-time and 3 part-time professors. The institute is an expertise centre in stellar physics and active in several international consortia and collaborations, involving telescopes at observatories worldwide and in space.

The position

The selected PhD student for this project will be offered a fully funded 3 years PhD study, expected to start with 2 years at the University of Copenhagen followed by 1 year of training secondment at the University of Leuven. The funding will be commensurate to the standard

scale for PhD students in according to the Marie-Curie funding rules. The successful PhD applicant for this position will have to register at, and comply with the regulations of, the University of Copenhagen and the University of Leuven, and will obtain a double degree from the two universities. The successful PhD applicants will follow a doctoral programme including personal training in management, science communication, and teaching.

Requirements
We seek an excellent student with a strong background in physics or astrophysics. Successful candidates must hold a Masters degree or equivalent by the starting date of the position. Previous research experience on aspects of exoplanet- or stellar-atmospheres, analysis of astronomical spectra, and/or astro-chemistry and astro-biology, and a track record of team work/mobility will be important criteria for the selection, as will experience in computational coding (including Fortran). Note that the general eligibility and mobility rules of Marie Sklodowska-Curie Actions apply, e.g. that applicants must not have resided or carried out their main activity (work, studies, etc.) in the country of the main host institution (in this case Denmark) for more than 12 months during the 3 years immediately before the recruitment date.

Application documents
Your application package should contain (i) a CV including publication list if applicable, (ii) a statement of interest (max. one page, including a brief description of research interests and relevant experience), (iii) copies of university grades, certificates and/or diplomas, (iv) two letters of reference to be sent by the application deadline, (v) a statement that confirms that you understood the requirements of the joint degree and the Marie Sklodowska-Curie mobility criteria as outlined at https://chameleon.wp.st-andrews.ac.uk/recruitment/.
Use the portal of the Niels Bohr Institute (https://www.nbi.ku.dk and follow the links under vacancies) at the University of Copenhagen to upload your application documents.

Application deadline: 3rd of February 2020. Applications potentially arriving after this date may be considered until the position is filled. The foreseen start is during September 2020 or soon thereafter.