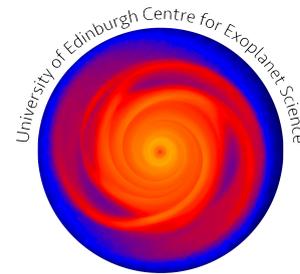


How does lightning impact the atmospheric chemical composition of an exoplanet residing in its circumstellar habitable zone?

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Project Description

The circumstellar habitable zone is determined mainly by the luminosity of the host star and the distance of the planet from the star. Understanding the chemical composition of an exoplanet atmosphere underpins a stricter criterion to determine the habitability of a planet. You will develop an existing 3-D model of atmospheric dynamics and chemistry to study how lightning disequilibrium chemistry influences spatial and temporal variations of atmospheric chemistry on exoplanets, and what that means for interpreting measurements that will eventually become available from the James Webb Space Telescope and other instruments.

There are a number of research avenues that you could pursue using the 3-D model, and you will be encouraged to choose your own curiosity-led path. Example initial questions include: how does lightning impact atmospheric chemistry in an exoplanet atmosphere and what implications does that have for being able to detect and interpret molecules that have been proposed as markers for biological activity? You will use instrument simulators to understand how 3-D model variations of atmospheric chemistry will be observed by upcoming telescopes, accounting for instrument signal to noise and spectral resolution.

Innovative Training Network (ITN): CHAMELEON

This project is part of the Marie Skłodowska-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/local research groups. For a complete list of all open PhD positions within this training network please visit the CHAMELEON ITN website: <http://chameleon.wp.st-andrews.ac.uk/>.

The Host Institute

The School of GeoSciences at the University of Edinburgh is a founding member of the [Centre for Exoplanet Science at the University of Edinburgh](#) with the School of GeoSciences Physics. It was established in recognition of the emerging interdisciplinary nature of exoplanet science. The Edinburgh centre is currently focused on computational modelling of atmospheres and planetary disks, direct-imaging and characterization of exoplanets and brown dwarfs, data retrieval methods,

extreme conditions, and astrobiology. It includes six members of staff and a vibrant group of PhD students and postdoctoral researchers.

The Position

The selected PhD student will be offered a fully funded PhD place with a training secondment for this position foreseen at the [University of Leuven](#), with additional short training at the University of St Andrews working with Dr Christiane Helling. The funding will be commensurate to the standard scale for PhD students in according to the Marie-Curie funding rules. The successful student will study for a joint degree from the University of Edinburgh and KU Leuven, and as such will need to register and comply with the regulations at both universities. The successful PhD applicants will follow a doctoral programme including personal training in management, science communication, and teaching.

Application instructions

You will be required to apply formally through the jobs@ed.ac.uk website that we anticipate will go live in mid/late November. We will revise the CHAMELEON website with details of the University of Edinburgh advert when they become available. We anticipate an application deadline of 6th January 2020 with shortlisting sometime in mid/late January 2020.

The application package will be sent as one single PDF containing:

- a curriculum vitae, with a publication list, if relevant;
- a statement of interest (max. one page, including a brief description of research interests and relevant experience);
- copies of university grades, certificates and/or diplomas;
- names and contact details of two referees who are prepared to send confidential recommendation letters should they be requested to do so.
- a statement that confirms that you understood the requirements of the joint degree and the Marie Skłodowska-Curie mobility criteria as outlined at <https://chameleon.wp.st-andrews.ac.uk/recruitment/>.

Applications that do not strictly follow these guidelines will not be considered.