

PhD position in the Université de Reims Champagne Ardenne / GSMA

Titan's haze properties from Cassini/UVIS observations

Photochemical hazes are ubiquitous in planetary atmospheres where they play an important role in regulating planetary climate and atmospheric evolution. Titan is one of the best examples of a hazy atmosphere with extensive observations obtained during the Cassini mission and it is often used as a paradigm for hazes in remote planetary environments. Cassini observations show that haze formation is initiated by ion chemistry at surprisingly high altitudes, in the ionosphere. The mass flux of haze embryos that sediment from the ionosphere, however, is only 10% of the total mass flux that reaches the main haze layer. This means that further mass transfer from the neutral gas phase to the haze particles occurs at altitudes of about 500-1000 km that is poorly understood. The anticipated growth can result from heterogeneous reactions on the particles surfaces but the lack of constraints on particle radius and number density, required for the validation of haze growth models, limits our understanding of these processes. The goal of this PhD research is to obtain such constraints by analyzing observations from the Cassini UltraViolet Imaging Spectrograph (UVIS) that probe Titan's upper atmosphere, and reveal a strong scattering component attributed to the haze particles.

The project is funded by the International Research Center of the CNRS – University of Arizona collaboration, under the theme “Searching for Habitable Worlds, in the Solar System and Beyond”. The successful candidate will be based at GSMA/Reims and will work under the supervisions of Dr. HDR Panayotis Lavvas. There will be a regular interaction with collaborators in France and in the University of Arizona. The successful candidate shall be enrolled on a PhD programme of the Science du Numeric et de l'Ingénieur (SNI) doctoral school. The project starts in October 2023.

The candidate must have a degree in engineering or a Masters degree, demonstrating a strong background in physical sciences and numerical simulations. Background in astronomy / astrophysics is welcomed. The post requires a high level of communication skills, both oral and written (French and English required) to be able to interact with colleagues, present at conferences, and write articles in scientific journals. A sound knowledge of computer languages is necessary.

We are looking for a PhD fellow who will be able to become fully involved with the project, with a thirst for knowledge, a certain independence of thought and strong motivation to develop skills in data analysis and interpretation, in the field of planetary sciences. In addition, the candidate must be able to work in a team on multi-disciplinary projects.

Applications must include a detailed CV; at least two references (people who may be contacted); a cover letter of one page; a one-page résumé of the dissertation for the Masters; grades for the Masters 1 or 2, or the engineering degree.

The closing date for sending applications is 15/06/2023.

For further details, contact panayotis.lavvas@univ-reims.fr.