

**Soutenance d'HDR de Panayotis Lavvas, le mercredi 24 janvier 2018
à 14h00, Amphi 2 de l'UFR Sciences Exactes et Naturelles.**

Titre : *Molecular Growth and Photochemical Aerosols in Planetary Atmospheres.*

Membres du Jury :

Monsieur Bruno BEZARD, Rapporteur

Monsieur François FORGET, Rapporteur

Monsieur Sébastien LEBONNOIS, Rapporteur

Madame Athena COUSTENIS, Membre

Monsieur Roger YELLE, Membre

Monsieur Georges DURRY, Membre

Resumé:

My main focus over the last years has been to improve our understanding of the in situ formation of photochemical aerosols in planetary atmospheres, as well as, investigate the mechanisms of their subsequent growth and interaction with their gaseous background. Titan's aerosol-rich atmosphere is the most representative environment in our solar system to study such processes, and observations from the Cassini-Huygens mission, which arrived in the Saturnian system in 2004, provide a unique opportunity to learn new aspects for this atmosphere and advance our knowledge of photochemical aerosols. The insights gained from the study of Titan's atmosphere, have found applications in other environments as well, such as Pluto's atmosphere and exoplanets. I will provide an overview of the current understanding on the topic, based on my studies on the atmospheric photochemistry and the energy deposition in a planetary atmosphere, and moving on to the gas-to-particle transition, the growth of the nascent aerosols by heterogeneous chemical processes on their surface, and their subsequent microphysical evolution. Applications to Titan, Pluto, and exoplanets (hot-Jupiters) demonstrate the applicability of the major mechanisms identified onto different environments, but also highlight the subtle differences among the various cases.