

Contrats doctoraux 2026

Titre du projet de thèse : Spectroscopic characterization of gas mixtures of key molecules for the Earth and planetary atmospheres

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Résumé du projet de thèse (en 20 lignes maximum) :

The Earth's atmosphere is the site of complex physico-chemical processes involving key molecules that play a decisive role in climate dynamics. Among these molecules, organic compounds play a central role, particularly in aerosol formation mechanisms. However, these processes remain largely unknown, generating significant uncertainties in climate modelling and the study of planetary atmospheres.

To improve this understanding, in-depth spectroscopic characterisation of these molecules, including their weakly bound aggregates and unstable intermediates in the gas phase, is crucial. Using rotational spectroscopy, this project will study these organic compounds, their degradation products and the non-covalent interactions that stabilise molecular clusters, a crucial step in the formation of aerosols.

The approach combines supersonic jet experiments, aimed at stabilising complex molecular aggregates and reactive species, with quantum chemistry calculations to interpret and attribute the spectra obtained. By combining these tools, the project will provide essential data for understanding, on a molecular scale, the mechanisms of chemical evolution in a gaseous environment. Already applied to terrestrial atmospheric studies, this methodology will be extended to the analysis of planetary atmospheres and interstellar environments.

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Remarques/commentaires supplémentaires :