

## **Exo-Planetary high-Temperature Hydrocarbons by Emission and Absorption Spectroscopy (e-PYTHEAS project)**

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e-PYTHEAS is a multidisciplinary project which combines theoretical and experimental work with exoplanet modelling applications. It sits on the frontier between molecular physics, theoretical chemistry and astrophysics. It aims at enhancing our understanding of the radiative properties of hot gaseous media to allow for improved analysis and interpretation of the large mass of data available on the thousands of exoplanets and exoplanetary systems known to date. Our approach is to use theoretical research validated by laboratory experiments and to then inject it into models of the atmospheres of the giant gaseous planets in the solar system and other planetary systems. This will help to analyse data and address essential questions on the formation and evolution of planetary systems, such as retrieved by ESA's M4 space mission ARIEL.

Our consortium of 5 French laboratories and associated partners proposes to improve the existing high-temperature spectroscopy data for several molecular species detected in exoplanets. The provision of infrared (IR) laboratory data of methane, acetylene, ethylene and ethane, between 500 and 2500 K will help to refine thermal profiles and provide information on the gaseous composition, the hazes and their temporal variability.

See: <http://e-pytheas.cnrs.fr>

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