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 experi-
mental 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 ex-
oplanets 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 sys-
tems. 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 the project’s website: http://e-pytheas.cnrs.fr