

## Ph.D Project EIPHI GS COSMIC

Job title	Doctoral research position in molecular physics
Job type (PhD, Post-doc, Engineer)	PhD
Contract duration (months)	36
Qualifications (Master, Ph.D ...)	Master
Employer	UBFC Université Bourgogne Franche-Comté
Financing Institutions	Région Bourgogne Franche-Comté & Graduate School EIPHI
Host Laboratory	Laboratoire ICB, UMR 6303 CNRS/UBFC Laboratoire UTINAM, UMR 6213 CNRS/UBFC
URL Host Laboratory	<a href="https://icb.u-bourgogne.fr">https://icb.u-bourgogne.fr</a> <a href="https://www.utinam.cnrs.fr">https://www.utinam.cnrs.fr</a>
Address Host Laboratory	ICB, 9 Av. A. Savary, BP 47870, F-21078 Dijon cedex UTINAM, 41 bis Av. de l'Observatoire, BP 1615, F-25010 Besançon cedex
Job description	<p>The chemical composition of comets is an important tool for a good understanding of solar system formation. Thanks to the Rosetta spacecraft and its in situ observations by mass spectroscopy of the comet 67P/Churyumov-Gerasimenko new chemical species in comets have been detected. The objective of this PhD is to use these results to provide the molecular data necessary for detect some of these species in other comets with ground-based facilities. Such molecular data will permit a good modeling of the infrared spectrum of these species and, consequently, will open the possibility of detecting them with the present and future generations of near-infrared spectrometers (such as CRIRES+ at the 8-m Very Large Telescope or futures instruments on the 39-m Extremely Large Telescope).</p> <p>The PhD student will develop algorithms and codes adapted for large amplitude motions (for internal rotators such as -CH<sub>3</sub>, -NH<sub>2</sub>, -OH, -SH). Some computations in quantum chemistry will permit to predict the wavelengths as well as intensities in absorption and emission necessary to the detection of these species. This work will be performed in collaboration with experimentalists (AILES line of Synchrotron SOLEIL).</p> <p>If it appears that some species could be observed the student will also participate to some analysis of archive data available with 8-m class telescopes or proposals for instruments like CRIRES+.</p>
Supervisor(s)	Vincent BOUDON (ICB), Philippe ROUSSELOT (UTINAM)

Candidate profile	<p>The candidate should have a Master degree, or equivalent, in molecular physics. He/she should have a good background in molecular spectroscopy and be familiar with computing tools (such as programming languages like Python). Some knowledge in astrophysics are not mandatory but would be appreciated.</p>
Keywords	Spectroscopy, Infrared, Comets, Modelling
Application deadline	June 1, 2022
Application Depending on the type of position	<p>Please send the following documents (all in one PDF file) by e-mail to <a href="mailto:phil@obs-besancon.fr">phil@obs-besancon.fr</a> :</p> <ol style="list-style-type: none"> <li>1) For EU candidates: Copy of your national ID card or of your passport page where your photo is printed. For non-EU candidates: Copy of your passport page where your photo is printed.</li> <li>2) Curriculum Vitae (may include hyperlinks to your ResearchID, Research Gate, Google Scholar accounts).</li> <li>3) Detailed list of publications (may include hyperlinks to DOI of publications).</li> <li>4) Letter of motivation relatively to the position (Cover Letter) (maximum 1 page)</li> <li>5) Copy of your PhD degree if already available.</li> <li>6) Coordinates of reference persons (maximum 3): Title, Name, organization, e-mail.</li> </ol> <p>If you have questions regarding the application, you can contact the supervisor.</p>