

**Centre de Recherche Astrophysique de Lyon  
UMR 5574**

**Master 2 Research internship offer  
Academic year 2025 – 2026**

**Internship supervisor: Nicolas Bouché**

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**Address/Workplace:** CRAL - site Charles André : 9 avenue C. André, St Genis Laval

**Hosting research team:** Galpac

**Internship title:** Mapping the diffuse [dark] gas surrounding galaxies

**Summary of proposed work:**

Galaxies are made of billions of stars, dark matter, and hydrogen gas that serves as fuel for star formation. However, galaxies need to have their gas reservoirs constantly replenished from the intergalactic medium; otherwise, star formation would stop rapidly (galaxies would run out of fuel). Some of the major open questions for astronomers include “How do galaxies acquire their gas?” The question of gas feeding (often referred to as 'gas accretion') is currently a hot topic in astrophysics.

Our team is leading a large program (MUSE Gas Flow and Wind [MEGAFLOW]) with the MUSE instrument of the European Very Large Telescopes, dedicated to studying gas flows around galaxies. MUSE is an integral field unit spectrograph capable of obtaining spatially resolved spectra of multiple galaxies simultaneously with unprecedented precision, thanks to its extreme sensitivity.

This internship aims to study the spatial distribution of the diffuse gas (using the Mg 2796,2803 emission line) around star-forming galaxies in the survey and to compare to radiative transfer models. In other words, this project involves 3D MUSE data analysis and modelling using radiative transfer tools.

This internship involves J. Blaizot (CRAL), SJ Chang (MPA-Garching).

CRAL build the MUSE/VLT instrument and is leading or co-leading several next generations of instruments, such as BlueMUSE/VLT, Harmoni/ELT, and 4MOST.

**Prerequisite:** A keen interest in galaxy formation. Programming experience with python.

**Duration:** 4 months

**Nature of the financial support for the internship:** ANR

**Potential for a follow-up as a PhD thesis:** No