# ***INTERNSHIP PROPOSAL***

Laboratory name: Laboratoire Léon Brillouin
CNRS identification code: UMR 12
Internship director'surname: McClarty
e-mail: paul.mc-clarty@cnrs.fr Phone number: -
Web page: https://iramis.cea.fr/llb/
Internship location: CEA Saclay

Thesis possibility after internship: YES
Funding: YES If YES, which type of funding: ANR

**Title Altermagnetism and Neutron Scattering**

Summary *An M2 internship in experimental condensed matter is available to work at Laboratoire Léon Brillouin at CEA Saclay on the physics of altermagnets.*

*The field of altermagnetism is one of the most active in condensed matter physics. Altermagnets are relatives of simple antiferromagnets : both have microscopic magnetic moments that are equal and opposite so that the net magnetization is zero. But in altermagnets, the band structure of magnons and electrons are spin-split in an anisotropic manner in momentum space. This has important implications for various observable properties some of which may have important implications for spintronics applications. Currently only a handful of altermagnets have been characterized experimentally so there is great interest in exploring new materials and developing new experimental tools to find those systems most suitable for different purposes. Recently our team at LLB has pioneered new approaches to studying altermagnets using polarized neutron scattering. For example, we have used inelastic polarized neutron scattering to image the altermagnetic chirality of magnon modes in MnF2. We have also made the first measurement of the altermagnetic local multipolar order parameter in the same material using polarized elastic scattering.*

*The focus of the project will be on neutron scattering techniques (experimental work to carried out at ILL, Grenoble) and especially analysis of neutron scattering data connecting to a microscopic understanding of, for example, spin wave excitations. This project will tie in with theoretical work at LLB. Depending on circumstances and interest there may be opportunities to learn crystal growth techniques. It is anticipated that there will be a PhD position starting in 2027 connected to altermagnetism with funding from the ANR (project ALMAGEST) that will provide a thorough training in various important tools in modern condensed matter physics.*

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: YES/NO Soft Matter and Biological Physics: YES/NO
Quantum Physics: YES/NO Theoretical Physics: YES/NO