

The Institut Laue-Langevin (ILL), situated in Grenoble, in the heart of the French Alps, is an international research centre at the leading edge of neutron science and technology. As the world's flagship centre for neutron science, the ILL makes its facilities and expertise available to visiting scientists from all over the world.

If you want to contribute to the work of our teams, **then come and join us!**

We are currently looking for a trainee for the following project:

===

Internship (Ref. SPECT_5)

Full Neutron Polarisation Analysis of Single-Crystal Inelastic Multidetector Data

Description:

We are working on a device called PASTIS3 designed for full neutron polarisation analysis on multi-detector instruments. This development is relevant for existing as well as projected ILL-instruments (IN20, Thales, IN5, PANTHER), and future instruments at the European Spallation Source. PASTIS3 will allow to distinguish neutrons that are scattered from the magnetic electron shells from those that are scattered from the atomic nucleus. With this device an intensity pattern arising from an ordered magnetic structure can be separated from the intensity pattern due to the positional arrangement of the atoms, the direction of the magnetic moments in a periodic structure can be determined, the intensity pattern as function of energy and momentum from magnetic excitations can be separated from those belonging to phonons, and the scattering from the magnetic moments (elastic or inelastic) can be obtained background-free. We propose an internship to reinforce the manpower during the commissioning and optimisation phase of PASTIS3.

Activities of the trainee:

The student shall participate in the experimental setup, the various measurements that are required to characterise the performance of PASTIS3, the final optimisation of parameters, the analysis of the performance, and the first elastic and inelastic experiments including their analysis. The experiments will have three-fold purpose: we aim to demonstrate the working principle of PASTIS3, to compare the performance of PASTIS3 to IN20's standard polarised operation mode (with a single detector), and to gain new insight into the mechanism of multiferroicity of e.g. a langasite compound, a multiferroic large-moment non-centrosymmetric insulator. PASTIS3 with FlatCone on IN20 shall allow overview-type measurements of reciprocal space maps at constant energy transfer covering phonon and magnon scattering. The full polarisation analysis permits to display phonons and magnons in separate maps, moreover, the magnetic anisotropy of the excitations can be mapped out in the same manner. Anomalies in the phonon spectrum in the vicinity of, or in overlap regions with magnetic excitations can be spotted etc.

===

Level required: 4th (possibly 3rd) year university studies in Physics

Language skills: You should be able to communicate in English or in French

Notes: These posts are internships with a maximum duration of 4 months

Benefits: You will receive a monthly allowance of between 435 € and 1050 €, depending on the duration of your internship and your profile

How to apply: Please send your application directly to the supervisor:

Ref. SPECT_5: Mechthild Enderle, e-mail: enderle@ill.eu