PhD Position – Call for Applications

Strain modulation of altermagnets

Context

Altermagnetism represents a newly-discovered magnetic order which lays halfway between antiferromagnetism and ferromagnetism, combining antiparallel spin configuration and zero net magnetisation of the former, and the presence of magnetic signatures (such as the anomalous Hall effect) of the latter. This combination of properties makes altermagnets promising for spintronics application by combining the advantages of both orders. Altermagnetism existence was experimentally observed in MnTe [1], CrSb [2], and FeS [3].

Since the origin of altermagnetism lies in lattice symmetry [4], it is expected that altermagnets will be strongly influenced by its alterations, as it was observed in CrSb [5]. Therefore, symmetry alteration by an external parameter is expected to affect the altermagnetic properties. Among external parameters, strain is a powerful tool, able to modify the electronic band structure or the magnetic anisotropy, with direct impact on the magnetic properties and the spin configuration. Recently, a strain-induced transition between antiferromagnet to altermagnet was indirectly observed in FeS [6]. This makes strain an ideal "knob" to control future altermagnetic devices.

[1] Krempaský et al, Nature **626**, 517 (2024) ; **[2]** Yang et al, Nat. Comm. **16**, 1442 (2025) ; **[3]** Takagi et al, Nat. Mater. **24**, 63 (2024) ; **[4]** Šmejkal et al, Phys. Rev. X **12**, 031042 (2022) ; **[5]** Zhou et al, Nature **638**, 645 (2025) ; **[6]** Yao et al, ArXiv:2602.14790 (2026).

PhD Objectives.

The PhD student will perform crystal growth, strain-dependent x-ray diffraction and Raman spectroscopy to calibrate the applied strain, static magneto-optics Kerr effect measurements to probe the Néel vector, and ultrafast pump-probe spectroscopy to track phonon and magnetic dynamics under controlled deformation. This approach allows to measure the dynamics of magnetic properties, which is essential to assess the potential of these materials in high-speed, field-free spintronics architectures.

Candidate Profile

The candidate should have a strong background in condensed matter physics or materials science. Experience in crystal growth, characterization techniques, or spectroscopy is desirable but not mandatory. The student should be motivated, rigorous, and able to work collaboratively in an interdisciplinary environment. Interest in quantum materials, advanced spectroscopy and functional properties is highly recommended.

Supervision and Hosting Lab

Maurizio MONTI (INSP) - maurizio.monti@sorbonne-universite.fr
Yannick KLEIN (IMPMC) - yannick.klein@sorbonne-universite.fr

Application Procedure

Required documents: CV, motivation letter and transcripts of master courses.
Application deadline: April 10th 2026.