

INTERNSHIP PROPOSAL

Laboratory name: Matériaux et Phénomènes Quantiques

CNRS identification code: 7162

Internship director's surname: Vincent Repain

e-mail: vincent.repain@u-paris.fr

Phone number: 0678279050

Web page: <https://mpq.u-paris.fr/stm/>

Internship location: Bâtiment Condorcet, 10 rue Alice Domon et Léonie Duquet, 75013 Paris

Thesis possibility after internship: YES

Funding: YES If YES, which type of funding: Doctoral school, Labex SEAM

Growth and spintronics of low symmetry magnetic layers

The goal of this internship is to realize ultrathin films of metallic and magnetic layers on insulating substrates of very low symmetry (cf. figure). A theoretical part will be devoted to the crystallographic description and symmetry analysis of such unusual substrates. The samples will be made in the clean room of the Matériaux et Phénomènes Quantiques lab in Paris and characterized by x-ray diffraction, surface science tools like scanning tunneling microscopy and vibrating sample magnetometry or magneto-optical effects for their magnetic properties. The second part of the internship/PhD will be to achieve lithography and electronic transport measurements on those samples for magnetic memory applications [1,2]. This part will be done in part in Singapore, in collaboration with Pr. Yang's group, at the Computer and Electrical Engineering department of the National University of Singapore.

The internship/PhD will take part in the STM team of the Matériaux et Phénomènes Quantiques lab, which is dedicated to fundamental research on frontier materials for further applications in quantum electronics and photonics. A trip to Singapore is possible during the internship/PhD, depending on the advancement of the project.

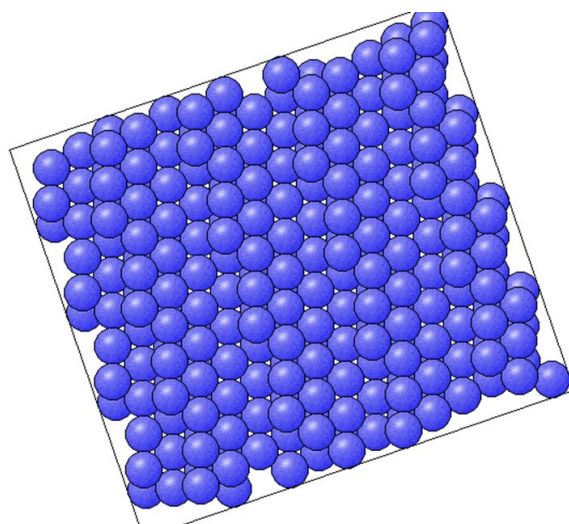


Figure: top view of a (643) surface. This kinked surface shows no mirror symmetry and can therefore be called chiral. The impact of such a low-symmetry on magnetic and spintronic properties is unexplored.

[1] A. Manchon et al. Rev. Mod. Phys. 91, 035004 (2019)

[2] L. Liu et al. Nat. Nano. 16, 277 (2021)

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

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