

INTERNSHIP PROPOSAL

Laboratory name: Laboratoire de Physique des Solides (LPS)

CNRS identification code: UMR8502

Internship director's surname: Massee

e-mail: freek.massee@universite-paris-saclay.fr

Phone number:

Web page: <https://equipes.lps.u-psud.fr/ns2/>

Internship location: NS2 group, LPS Orsay

Thesis possibility after internship: YES

Funding: NO

Time resolved scanning tunnelling microscopy

Quantum matter, such as high temperature superconductivity, is generally emergent, meaning that the physics cannot be understood by the sum of the individual components. The crucial additional ingredient is the interactions between the atoms (or lattice), electrons and spins. To directly study these interactions, we are currently developing a time-resolved scanning tunnelling microscope. This instrument will provide direct access to the surface atoms and the local electronic structure, while at the same time enabling read-out and/or excitation at GHz frequencies (i.e. nanosecond timescales).

During this internship, you will be the first to test and use this new instrument. Initially, measurements will be performed at room temperature to make sure that the microscope works correctly. Then, exploration at low temperature and high frequency will follow, with the aim of uncovering previously inaccessible information about the workings of quantum matter.

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:	YES	Theoretical Physics:	NO