

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Centre de Nanosciences et de Nanotechnologies
CNRS identification code: UMR9001
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Internship location: 10 Boulevard Thomas Gobert, 91120, Palaiseau

Thesis possibility after internship: YES

Funding: YES

If YES, which type of funding: EU

Magneto-Ionic Nanodevices for Neuromorphic Computing

Scientific project: Controlling magnetic properties through voltage-driven ionic motion opens exciting opportunities for next-generation spintronic technologies, including reconfigurable multistate memories and neuromorphic hardware. By combining ionic and magnetic degrees of freedom, magneto-ionic nanodevices offer new ways to emulate the adaptive behavior of biological synapses. Our group at C2N has demonstrated large, reversible, and non-volatile voltage-induced changes in the magnetic properties of spintronic nanodevices, as well as their potential to realize bioinspired synaptic functionalities.

We are seeking a highly motivated master's student to join our team for an experimental research project at the interface of magnetism, ionics, and neuromorphic computing. The project will investigate how magneto-ionic gating can control the dynamics of magnetic domain walls driven by current pulses in nanodevices. By exploring the interplay between ionics and spintronics, the student will develop and characterize new device functionalities for artificial synapses. The ultimate ambition is to combine an ensemble of devices to evaluate its performance for given learning tasks.

The student will benefit from our team's complementary expertise in magneto-ionics, neuromorphic computing architectures, and nanofabrication, while gaining hands-on experience in state of the art experimental research.

Methods and techniques: Our technical means to carry out this project at C2N include simultaneous magneto-transport measurements and real-time magneto-optical imaging of magnetic domain wall motion. We also have all necessary nanofabrication tools in our state of the art cleanroom, one of the biggest academic nanofabrication platforms in Europe.

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