

PhD position/Master thesis internship

Optical and spin properties of halide perovskites

A PhD position is open in the GEMaC laboratory, with a starting date in 2025. **Funding for this PhD project is already secured.** A master thesis internship is also possible in the first half of 2025.

In recent years, halide perovskites have demonstrated exceptional optoelectronic properties. This new class of semiconductor materials has proved an extraordinary potential for the production of low-cost solar cells and light-emitting devices. Perovskite solar cells have made lightning progress, and now boast efficiencies over 26%, on par with the best silicon-based solar cells. This success leads to significant research effort to understand the physical origins of their performance. Halide perovskites are also promising for spintronic applications. They present a strong spin-orbit coupling, a relatively long spin relaxation times, and optical accessibility for spin generation and deflection.

The objective of the PhD is to explore the exciton and spin properties of halide perovskites. The samples will be synthesized in collaboration with LuMIn and ISMO laboratory from University Paris-Saclay, in the context of the ANR project HAPERO. The candidate will study high quality perovskite materials, obtained by vacuum growth, and controlled in-situ with extremely sensitive characterization techniques.

The candidate will conduct experiments based on optical microscopy and spectroscopy. The experimental set-up includes a confocal microscope operating at cryogenic temperature (4K-300K), a superconducting magnet for application of magnetic field (9T).

The candidate should have a master degree with a strong background in solid-state physics and optics, and have a strong taste for experimental research. Good communication skills in English are required.

The research work will take place at GEMaC (Versailles, France). The GEMaC is a joint unit of the CNRS and the Université de Versailles Saint-Quentin-en-Yvelines, member of the Université Paris-Saclay.

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