



Postdoctoral research position at CEA Paris-Saclay, France

Generic Tight-binding platform for spin-orbitronics applications.

A 12-month postdoctoral position is open in the laboratory of Physics of the Condensed State (SPEC: Service de Physique de l'Etat Condensé) in CEA Paris-Saclay.

Subject description:

Spin-orbitronics is a major field of applied and fundamental physics, encompassing different classes of materials, magnetic systems and devices. Unfortunately, simulation tools that combine the joint transport of spin charge and orbit currents at the microscopic scale are still in their infancy and are not capable yet of effectively predicting the key properties of new devices.

The aim of this project is to develop a tight-binding modelling platform ([TBKOSTER](#): Tight-Binding Kernel of Objects for Spin-orbitronics Enhanced Research) for analyzing and post-processing joint charge/spin/orbit properties, and for integrating various transport and time-dependent dynamics codes developed in the laboratory. Our successful tight-binding model is based either on parametrization or on Wannier functions expansion, and is well adapted to the computation of physical properties via response function formalism or transport properties via non-equilibrium Green's function formalism.

TBKOSTER will make it possible to simulate realistic materials, analyze the phenomena at play on a microscopic scale and highlight fundamental physical concepts related on spin-orbital currents in solids. This modelling platform is intended also to support the experimental teams in interpreting experiments, as well as proposing new materials or devices with optimized properties.

The successful candidate is expected to extend the generic tight-binding modelling platform.

The salary is around 2500€ per month. The position is available before May 2025.

Skill requirements:

Applicants should hold a Ph.D degree in Solid State Physics or Materials Science or a closely related discipline, with expertise/experience in simulations of magnetic systems and good skills in programming (e.g. FORTRAN, C, etc.). An experience in Tight binding/Wannier modelling is considered a plus. Established authorship and innovation record, such as peer-reviewed scholarly articles, patents, or technical books is desirable. Track record of successful execution of research-and-development projects, including project planning, defining milestones, and delivering results on time is expected. Excellent written and verbal communication skills are mandatory. Applicants should provide a detailed **CV**, a **list of publications** and at least two **reference letters**.

Contacts:

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