Spintec laboratory is opening a up-to two years postdoctoral position within the framework of the ANR project **TOPMEMO** (topological memories)**.**

Context:

Join our team for a postdoctoral position focused on advancing Spin-Orbit Torque (SOT) based Magnetic Tunnel Junctions (MTJ) for embedded non-volatile memory applications. SOT-MTJs offer compelling advantages similar to SRAM, including ultra-fast dynamics (sub-ns), exceptional endurance (>10^{14} cycles), and low power operation (sub-pJ). A critical challenge in SOT-MRAM technology is reducing the write current, which is intrinsically linked to the charge-to-spin current conversion ratio (ξ), a key parameter defining the efficiency of SOT materials.

The **TopMemo** project aims to leverage recently discovered topological insulators (TIs), which exhibit significantly larger SOT compared to conventional metals like Pt, Ta, or W. By replacing heavy metals with TIs in these structures, we seek to substantially reduce the writing current. This project will utilize the expertise of **LAAS-CNRS** in growing TIs via Molecular Beam Epitaxy (MBE) on industrial substrates, and of **CEA-Spintec** in the characterization and fabrication of spintronic devices.

In this role, you will investigate how various spacer layers can maintain the integrity of the TI and the ferromagnetic storage layer during annealing. Additionally, you will explore the potential of orbital physics to introduce an extra degree of freedom for material engineering in TI/FM stacks. The most promising solutions will be integrated into scaled SOT-MTJ devices.

What you will do:

- Develop materials solutions to improve SOT-MTJ write performance and conduct magnetic characterization to meet concept and application specification targets.
- Nanofabricate Hall bars for transport characterization and scaled single-cell SOT-MTJ devices in our academic clean room facilities (PTA).
- Perform electrical characterization of produced devices using harmonic Hall voltage setups and a prober dedicated to the study of SOT-MTJ cells.

The position:

We are offering **up-to 24 months** postodoctral position in the Spintec MRAM team, with an start date as soon as possible. As part of the MRAM team, you will collaborate with the Materials and the Nanofabrication.

This ANR project is conducted in collaboration with **S. Plissard** from LAAS institute (MPN laboratory).

We are looking for candidates with preferably experience in nanofabrication and topological material characterization, and if possible with background knowledge in magnetism and spintronics.

Candidates should send a CV and a letter of motivation to kevin.garello@cea.fr
Further information about Spintec laboratory www.spintec.fr

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