

Tenured Position at CNRS – to Join the Spintronic and Nanomagnetism group at IJL

Growth of Model Heterostructures for the next generation of Spintronic devices

The CNRS (French research agency) offers permanent research positions (*Chargé de Recherche*) through a competitive examination, with no pre-assignment to an Institute or a University (<https://carrieres.cnrs.fr/en/external-competitions>).

The SPIN team @ IJL (<https://spin.ijl.cnrs.fr>) will help you in the application and be very happy to welcome you in the group.

Description of the activity:

The new researcher will be responsible for developing the growth of thin films and heterostructures in the framework of the cutting-edge activities developed in the Spintronics and Nanomagnetism team.

One can for example underline the emergence of:

- (i) Systems based on magnetic oxides for studies related to surface/interface electronic transport, Spin Orbit Torque effects, ultra-fast magnetization dynamics or for the development of new functionalities (ferroelectricity, multiferroicity, etc.).
- (ii) Heterostructures combining the fields of superconductivity, spintronics and ultra-fast dynamics and for which the ultimate control of the superconductor/magnetic metal interfaces is required.
- (iii) High quality metallic architectures for specific electronic and magnetic properties. These could be model antiferromagnetic systems, stacks allowing the coupling of complementary properties, topological insulators to be inserted into SOT devices, complex alloys with semi-metallic properties (Heusler), High Entropy Alloys...

The researcher will work mainly within the Davm Competence Center, a platform made up of more than 30 interconnected ultra-high vacuum systems, combining in-situ growth (Molecular Beam Epitaxy, Sputtering, Pulsed Laser Deposition, Atomic Layer Deposition) and characterization (Near field microscopy (STM, AFM), Auger, XPS, ARPES, in-situ Kerr and Faraday) of nanomaterials. He/She will become the scientific manager of one or several growth chambers connected to this Davm instrument.

Description of the host Group:

Observing, manipulating and functionalizing the magnetism of matter at nanometric scales is at the core of the Spintronics and Nanomagnetism group's research.

The objectives are to understand and control the structural, electronic, magnetic and transport properties of magnetic nanostructures of different dimensions (2D: thin films, interfaces, superlattices;

1D: thread, tracks and 0D: pillars, aggregates) and at different time scale, from seconds to femto-seconds. Furthermore, their evolution under the influence of different stimuli (magnetic fields, electric fields, temperature, electric currents, stress, laser pulses) is considered.

The fundamental research activity of the group is mainly experimental, widely recognized for its very high level, and developed via numerous fruitful collaborations with the best spintronic and nanomagnetism laboratories in the world.

The group has the means and know-how to develop model systems, and the group members are particularly involved in various expertise centers beyond the group's perimeter:

- The Davm center, unique in the world:

<https://ijl.univ-lorraine.fr/en/research/competence-centers/deposit-and-analysis-of-nanomaterials-under-ultra-high-vacuum-daum/>

- The Minalor center for micro and nanofabrication (UV, e-beam lithography and patterning)

<https://ijl.univ-lorraine.fr/centres-de-competences/centre-de-competences-micro-et-nanotechnologies-cc-minalor>

- The Magnetism center:

<https://ijl.univ-lorraine.fr/en/research/competence-centers/magnetism/>

Education, Experience, Knowledge and Competences required:

Education: PhD in Physics, Material Science or Engineering. A Post-doc experience will be highly valued.

Knowledge: Condensed Matter Physics, Nanomagnetism and Spintronics. Experience in Ultra-High Vacuum technics for sample growth such as MBE, PVD, ALD, PLD and in-situ characterization as STM, AFM, XPS and ARPES are expected.

An established track record of successful research project management is mandatory.

The applicant must show strong motivation for experimental research, interest for teamwork, excellent disposition towards challenging problems, a good level of English to interact in an international environment.

How to apply:

All applicants should contact Stéphane Mangin, Head of the SPIN team (stephane.mangin@univ-lorraine.fr) and send a full CV including contact details.

Interviews will be organized by the group to select the candidates who will be supported in their application to the CNRS researcher position.