

## **Micromagnetic Simulation of High-Frequency Modes in Clusters of Ferromagnetic Nanoparticles**

### **Topic**

Microcomposites consisting of ferromagnetic nanoparticles embedded in an insulator matrix are key materials for a broad panel of applications, including high-density data storage, spintronics and microwave devices. The design of such applications requires an in-depth understanding of both the static and dynamic properties of composite materials. Micromagnetic simulation studies can greatly help designing such materials, as modern numerical studies allow to determine the intrinsic high-frequency spin oscillations and the collective modes in such clusters of nanoparticles.

### **Tasks**

The goal of this project is to establish a thorough understanding of the high-frequency properties of magnetic microcomposites by means of numerical modeling. The studies involve large-scale simulations of interacting magnetic clusters and a precise analysis of data. The simulations will be performed with our custom-developed finite-element micromagnetic software which uses advanced numerical methods and massively parallel GPU computations. The results of the numerical studies will be compared to experimental ones performed in another group at the institute.

### **What we offer**

The successful applicant will find an interdisciplinary and innovative scientific environment at the IPCMS Strasbourg. This PhD project will provide the opportunity to directly connect fundamental and applied research, owing to a close collaboration between the IPCMS and Dassault Aviation, a major industrial player in France. The three-year PhD project is financed by the LabEx NIE excellence program and will be conducted at the IPCMS Strasbourg, starting October 1<sup>st</sup> 2018.

### **How to apply**

We seek an excellent PhD candidate with a Master degree in physics, materials science, or a related subject. Knowledge of micromagnetism or computational physics would be advantageous. Interested candidates should send their application including a CV, a transcript of the grades, and a letter of motivation to [riccardo.hertel@ipcms.unistra.fr](mailto:riccardo.hertel@ipcms.unistra.fr). Please use the same address to request further information.

Riccardo Hertel

Directeur de Recherche

CNRS and Université de Strasbourg

Institut de Physique et Chimie des Matériaux de Strasbourg (IPCMS)