Magnetic & optical properties of ferroic and electronic correlation materials

Strongly correlated materials present variate and fascinating properties, such as superconductivity in **copper oxides** or **iron chalcogenides**, colossal **magnetoresistance** and **multiferroicity** in **manganites**, or **thermoelectricity** in doped **Mott insulators**.
In these materials, the localization effects due to the **electron interactions** dominate the delocalization effects so that the movement of each electron is highly correlated to the others. As a result, a variety of fundamental states are created with the possibility to switch from one to another when playing with external parameters such as pressure, doping, electric or magnetic fields. Several orders of magnitude change in the resistivity of such materials can be obtain by a simple electric pulse (**resistive switching**), or their magnetic state can be modified by electric fields in multiferroic materials.
Strongly correlated materials presenting several fundamental states are needed in the development of new **miniaturized components** in **electronic** and **spintronic fields**. A better understanding of the microscopic mechanisms behind their electronic and magnetic properties is crucial in order to optimize them and to predict new candidates for targeted applications.

Our group uses several **spectroscopy methods** and **numerical simulation** to study the electrical and magnetic properties of materials.

Ongoing projects

CONTRACTSON PUBLIC FUNDING
Program "STAR" - PHC France-Coree. Exchange program for researchers (initiated by the National Research Foundation of Korea (NRF) for MSIP (Ministry of Science, ITC and Futur Planning). In France, coordinated and financed by Ministere des Affaires etrangeres et du developpement International (MAEDI) and Ministere de l'Education Nationale, de l'Enseignement superieur et de la Recherche (MENESR)) (Jan. 2015 - Jan. 2017). Financers: Campus France. Partners: School of Chemical Engineering, Sunkyunkwan University, Suwon, Korea
Program « Korea CCS 2020 »: Projet "Large-scale simulation of CO2 capture by amine based solvents: method development and application" (2014-2017). Financers: government of Korea (Ministry of Science, ICT and Future Planning). Partners: Gwangju Institute of Science and Technology.
"**Nanoscale Modeling of Transport in HMC Polyelectrolyte Membranes**" (2016-2017). Financers: Ministry of Science Coree. Partners: Hyundai Motors Co. / Gwangju Institute of Science and Technology.
"HYPERDIAMOND": The Diamond Revolution in Hyperpolarised MR Imaging - Novel platform and nanoparticule targeted probe (2016-2020). Financers: Europe- H 2020. Coordinator : Universite d'Ulm. Partners : Hebrew Univ of Jerusalem, Research Fund of the Hadassah Medical Organization, Karlsruhe Institute of technology, Austrian Institute of technology, NVision Medical Imaging, LM Van Moppes Sons SA, Arttic, GREMAN (V. Agavonov, M. Zaghrioui).

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