

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 obtained 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

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