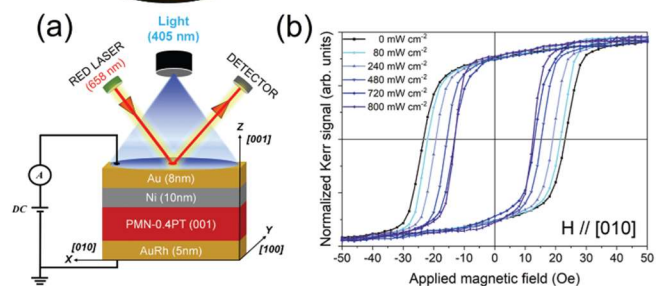


Light, voltage and temperature control of magnetic properties in multiferroic heterostructures via spectroscopic investigations



In state-of-the-art experimental research, a huge interest is rising in determining the interplay between the electronic and magnetic properties of multiferroic heterostructures, composed by a ferromagnetic layer at the interface with a ferroelectric/piezoelectric/photostrictive substrate.

The goal of the thesis is to deposit and characterize the electronic and magnetic properties of such heterostructure. The candidate will be part of APE-HE, a dynamic and young group of research part of CNR - IOM, at the Elettra synchrotron facility in Trieste.

During the thesis, the student will be involved in the full experimental study of the materials, starting from the deposition of ferromagnetic layers by electron beam evaporation sources on piezo/ferroelectric substrates, and continuing to their characterization and data analysis. A wide range of techniques will be explored due to the sensitivity to external stimuli of the heterostructure. In particular, the candidate will be fully involved in the investigation of the electronic and magnetic properties of the heterostructures under different conditions (*i.e.* temperature, voltage-controlled substrate polarization, light illumination,...). In order to do so, the candidate will perform magnetic characterizations such as magneto-optic Kerr effect (MOKE) and magneto-resistance measurements, structural characterizations such x-ray diffraction (XRD).

The candidate will have direct access to the APE-HE beamline at Elettra synchrotron, where she/he will become an expert in x-ray absorption spectroscopy (XAS) and x-ray magnetic circular dichroism (XMCD). These techniques will be crucial in the investigation of the origin of the interfacial coupling of the heterostructure under stimuli.

As part of the research group, the student will also take part to experiments with other collaborating groups and at other beamtimes at international synchrotrons. She/he will attend schools and international conferences during the cursus of the thesis.

The PhD candidate, with a background of Condensed Matter, is expected to be willing to engage in experimental development, with a curious spirit and positive interaction with the group. A background in magnetism is a plus.

We kindly invite you to write us for further information on the thesis project and for planning a visit to our laboratory.

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