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MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April - September 2017

**Laboratory : Laboratory of multifunctional thin films and complex structures
Institution: Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)
City, Country : Bellaterra, Spain**

Title of the master thesis: Photo-writing in ferroelectric green memory devices

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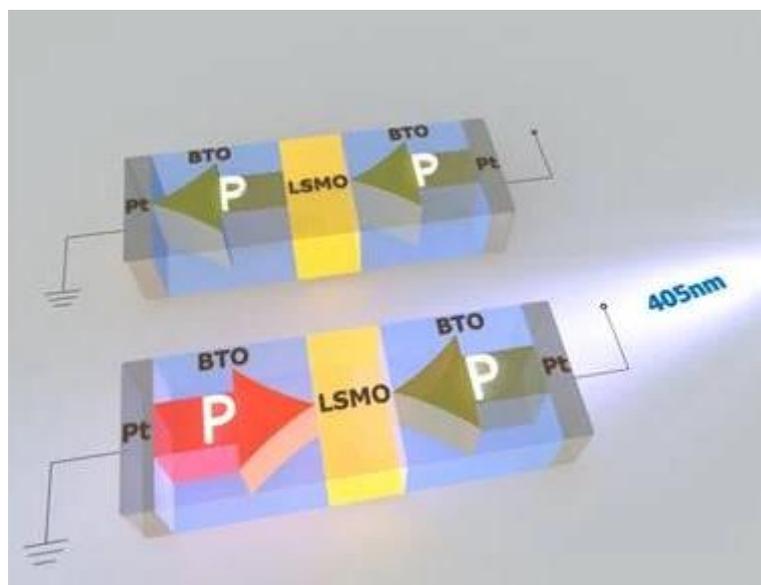
Summary of the subject (maximum 1 page) :

Optic fibers are at the core of communications technology because they allow fast data transfer. Before the data is shown in our screens, it should be converted into electric or magnetic “0” and “1”s, and optoelectronic transducers are required. It is well-known that ferroelectric materials can do the mentioned conversion without requiring any intermediate device. The physical mechanism behind this effect is that ferroelectric materials can store the charge generated during the illumination, even after switching off the optic stimulus. Integrating this well-known phenomenon to ultrathin ferroelectric tunnel junctions, which are a promising candidate for faster and less power consumption green memory devices, would allow the simplification of the data storing process. However, to achieve this chimeric objective, a deep understanding of the effects of light in ultrathin ferroelectric devices is needed. If successful, the project outcome will allow to improve data communication in the framework of IoT devices, while contributing to reduce the energy footprint on the way towards more sustainable future electronic devices.

The proposed Master thesis will carefully analyze the photoelectric response of ferroelectric tunnel junction under different conditions using state-of-the-art characterization devices. Therefore, the Master student will acquire knowledge on material growth and basic characterization. The Master student will get wide experience on photoelectric characterization, not only required for technological perspectives like the one proposed for his/her Master thesis, also required for emerging technological areas such as solar cells.

The student will be integrated in research synergies with groups across Europe (UK, France, Czech Rep., and Germany) and USA (California). He will be required to attend and participate at international conferences, and trigger by himself dissemination and outreach activities. Therefore, good communication skills are mandatory.

The Master student will be integrated to the MULFOX group at ICMAB (<http://www.icmab.es>) under supervision of Ignasi Fina (<https://sites.google.com/site/ifinawebsite>).



Keywords : Energy harvesting, optoelectronics, ferroelectrics

