

OPTICALLY CONTROLLED FERROELECTRIC MEMRISTORS

VENUE

ICMAB-CSIC Conference Room
C/ Til·lers s/n
Campus de la UAB
E-08193 Bellaterra

CHAired BY

Prof. Josep Fontcuberta & Dr. Ignasi Fina

All-optically controlled resistive switching could offer advantages, in terms of energy dissipation and speed, for logic and data storage functions in solid-state devices. Ferroelectrics may constitute a building block of this emerging technology, when integrated in nanometric tunnel devices. The functioning of these devices, from photon absorption to their resistance switching involve a subtle interplay between electronic and optical properties, polarization effects and materials issues.

This school aims at introducing the scientific knowledge, in a tutorial style, required to follow and contribute to this emerging field. The school is targeting an audience of PhD fellows and researchers initiating their activity on photoresponse in oxides, with interest on polar materials (ferroelectric), with applications spanning from photovoltaics to resistive switching.

Topics to be covered

- 1 Photoresponse in semiconductors.** Electronic band structure, Schottky barriers, photon absorption and charge recombination. Charge extraction
- 2 Band alignment in heterojunctions**
Experimental determination and guides for material's selection
- 3 Conduction mechanisms**
Ferroelectric capacitors and tunnel junctions
- 4 Photoresponse**
Ferroelectric capacitors and optically modulated electroresistance
 - A.** Optically modulated Schottky barriers and electroresistance
 - B.** Optically modulated ferroelectric polarization and electroresistance
- 5 Bulk photovoltaic effect**
Polar materials
- 6 Optically accesible memristors**

LECTURERS

Prof. Juan Bisquert, Director of the Institute of Advanced Material. Universitat Jaume I de Castelló, Spain.
Prof. Andreas Klein, Electronic Structure of Materials Department. Technische Universität Darmstadt, Germany
Prof. Marin Alexe, Department of Physics, University of Warwick, UK.
Prof. Alexei Gruverman, Department of Physics and Astronomy, University of Nebraska–Lincoln, USA.
Prof. Andrew Rappe, Department of Chemistry, University of Pennsylvania, USA.
Prof. Junling Wang, School of Materials Science and Engineering Nanyang Technological University, Singapore.
Dr. Giuliana Di Martino, Department of Materials Science & Metallurgy University of Cambridge, UK

The school will last for 1+1/2 days, including lectures of 1.5 hours each in slots of 2 hours.
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC). Campus UAB. Bellaterra, Catalonia, Spain
Register by 11 October 2020 via web site (free cost) : <https://optofem2020.icmab.es>
E-mail: optofem2020@icmab.es