

PhD in Ultrafast Dynamics in Magnetic Materials

We are looking for a curious and ambitious PhD candidate to join Universitat Jaume I in Castellón, Spain, and explore magnetization dynamics phenomenon to develop cutting-edge devices. The proposed research project will be at the edge between material science, physics, and engineering, combining high frequency dynamics with new computing paradigms such as Ising Machines. The PhD candidate's work will focus on the ultrafast dynamics of magnetic materials at the nano- and picosecond time scales using a state-of-the-art optical pump-probe system, combined with electrical characterization techniques based on spintronic effects. In particular, the project aims to study high-frequency spin-wave modes at THz frequencies in antiferromagnets such as hematite (α -Fe₂O₃), IrMn₃ and PtMn₃, and to develop spin-Hall-driven nano-oscillators able to generate THz waves electrically. The fundamental results obtained during the PhD will be used to design high frequency devices with cutting-edge properties (from microwaves to terahertz) and computing applications, such as Ising Machines.

The position is for a duration of 3 years +1 year, and the salary is commensurate with PhD level. The ideal candidate profile would be a student with a degree and master's in physics or Materials Science, , with special attention to candidates with a background in Magnetic Materials, Optics and/or Spintronics. Candidates with other degrees and good qualifications will also be considered. The tasks and skills the candidate will develop during the PhD are:

- Material deposition by physical vapor deposition techniques, e.g. sputtering, e-beam and thermal evaporation.
- Electrical characterization using probe stations, both DC and AC up to 300 GHz.
- Microwave device characterization: VNA and spectrum analyzer.
- Material characterization: TEM, SEM, X-ray diffraction, and Raman spectroscopy.
- Magnetic measurement techniques: MOKE, VSM, SQUID.
- Ultrafast magneto-optical spectroscopy: time-resolved MOKE and optical pump-probe.
- High-frequency magnetization dynamics: ferromagnetic and antiferromagnetic resonance (FMR/AFMR) and THz spectroscopy.
- Programming: C, C++, MATLAB, Mathematica, Python.

The Universitat Jaume I offers an excellent research environment located in a modern and dynamic campus near the Mediterranean Sea. The Spintronics for Advanced Devices Lab and the Optics Group are young research teams within UJI, whose aim is to implement and develop the future devices that will form part of the new electronic circuits and computing systems. You can find more information about us at: <http://www.inam.uji.es/research-groups/rg12-spintronics-advanced-devices-lab> and <https://sites.google.com/view/spinadlab/home?authuser=0> .

If you are interested in our group, please send your application material, including a motivation letter, CV, and one or two recommendation letters to victor.lopez@uji.es and dtorrent@uji.es, in addition to register your application at: <https://www.uji.es/seu/info-adm/tao/convocatoriesRH?pConv=3539&pCategoria=14> before September 30th.