Dr. Marjana Lezaicć

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Curriculum Vitae

1990-1997 Studies in physics, University of Belgrade, Yugoslavia.
1998–2001 Postgraduate studies in solid state physics, University of Athens, Greece.
2005 Ph.D. in physics, RWTH Aachen, Germany
2005-2008 Postdoctoral researcher, Forschungszentrum Jülich (FZJ), Germany
2008 Postdoctoral researcher, Materials Research Laboratory, UCSB, California, USA
2008 Principal investigator, "Computational Nanoferronics" group, FZJ, Germany

Research fields

Electronic-structure theory; Computational physics and methods; Complex materials; Complex magnetism; Half-metallic ferromagnets; Magnetism at elevated temperatures; Multiferroics; Nanoferronics

Current research interests

My research is focussed on the field of *nanoferronics.* This term stands for a branch of spintronics which deals with electronic transport through junctions of materials which can exhibit different kinds of ferroic orders (e.g ferroelectric and ferromagnetic materials). The simplest junction of this kind is the so-called Magnetic Tunnel Junction (MTJ) where a thin insulating layer is sandwiched between two magnetic metallic leads and the current through the junction depends on the mutual orientation of the magnetization in the two leads. MTJs are intensively studied as building blocks of a possible magnetic random access memory.

The choice of the materials for MTJs is not a trivial task. A high signal to noise ratio demands highly spin-polarized materials; thermal stability plays a crucial role in a possible application. We are investigating these properties computationally in order to propose a theoretically ideal junction [1,2].

Currently, I am interested in the development of multiferroic (simultaneously ferroelectric and ferromagnetic) materials, which can be used as the insulating layer in MTJs leading to many new applications, such as the attractive 8-bit memory. We obtain the material properties computationally, from the first principles.

Collaboration with experimentalists working on multiferroics materials and junctions would be very interesting for me and the Computational Nanoferronics group.

[1] *Half-metallic ferromagnets for magnetic tunnel junctions,* Ph. Mavropoulos, M. Ležaić and S.Blügel, Phys. Rev. B **72**, 174428 (2005)
[2] *First-principles prediction of high Curie temperature for ferromagnetic bcc-Co and bcc-FeCo alloys and its relevance to tunneling magnetoresistance*, M. Ležaić, Ph. Mavropoulos, S. Blügel, Appl. Phys. Lett. **90**, 082504 (2007)