

Subject: Santamaria, 11a, 3/9, 212, A-157
From: Janice Coble <coble@msd.anl.gov>
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SPEAKER: JACOBO SANTAMARIA
Universidad Complutense de Madrid
Spain

TITLE: Giant Magnetoresistance at Oxide Ferro-
magnet/Superconductor Interfaces

DATE: Thursday, March 9, 2006

TIME: 11:00 a.m.

PLACE: Building 212, ROOM A-157

HOST: Axel Hoffmann

Refreshments will be served at 10:45 a.m.

Abstract: Interfaces between complex oxides are attracting great interest due to their exciting and unexpected properties and also due to the possibility of tailoring novel behaviors and phenomena for specific applications. The growth of oxides based heterostructures is a new strategy for the design of novel artificial multifunctional materials with interesting behaviors ruled by the interface. In particular with the (re)discovery of colossal magnetoresistance (CMR) materials, there has been renewed interest in heterostructures combining high T_c superconductors and CMR ferromagnets where ferromagnetism (F) and superconductivity (S) compete within nanometric distances from the interface. In this talk I will focus in F/S/F structures made of $\text{YBa}_2\text{Cu}_3\text{O}_7$ (YBCO) and $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ (LCMO). The high degree of spin polarization of the LCMO conduction band, together with the d-wave superconductivity of the YBCO make this F/S system an adequate candidate for the search of novel spin dependent effects in transport. I will discuss that the critical temperature of the superconductor depends on the relative orientation of the magnetization of the F layers, giving rise to a novel giant magnetoresistance effect which might be of interest for spintronic applications.

Work done in collaboration with V. Peña¹, Z. Sefrioui¹, J. Garcia-Barriocanal¹, C. Visani¹, D. Arias¹, C. Leon¹, N. Nemes², M. Garcia Hernandez², S. G. E. te Velthuis³, A. Hoffmann³, M. Varela⁴, S. J. Pennycook⁴

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