Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Tunneling anisotropic magnetoresistance driven by resonant surface states ATHANASIOS CHANTIS, Theoretical Division, Los Alamos National Laboratory, KIRILL BELASHCHENKO, EVGENY TSYMBAL, Department of Physics and Astronomy and Nebraska Center for Materials and Nanoscience, University of Nebraska-Lincoln, MARK VAN SCHILFGAARDE, School of Materials, Arizona State University — Fully-relativistic first-principles calculations of the Fe(001) surface demonstrate that resonant surface (interface) states may produce sizeable tunneling anisotropic magnetoresistance in magnetic tunnel junctions with a single magnetic electrode. The effect is driven by the spin-orbit coupling. It shifts the resonant surface band via the Rashba effect when the magnetization direction changes. We find that spin-flip scattering at the interface is controlled not only by the strength of the spin-orbit coupling, but depends strongly on the intrinsic width of the resonant surface states.

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Date submitted: 20 Nov 2006 Electronic form version 1.4