Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Spin torque and spin current in magnetic tunnel junctions[1] MAIRBEK CHSHIEV, WILLIAM H. BUTLER, Center for Materials for Information Technology, The University of Alabama, Tuscaloosa, AL, ALAN KALITSOV, NICK KIOUSSIS, Department of Physics, California State University, Northridge, CA — In recent years, current-induced spin torque [1] has attracted strong interest both because it may advance our understanding of fundamental physics and because it may have useful applications. We present a study of non-equilibrium spin currents and the corresponding spin torques in magnetic tunnel junctions with non-collinear moments. Calculations are based on the Keldysh formalism in which the non-equilibrium Green functions are calculated within a tight-binding model using the technique of Caroli et al. [2]. The properties of spin torque and spin currents are studied as a function of applied bias, barrier thickness and lattice structure type. In addition, the exchange coupling between ferromagnetic layers in magnetic tunnel junctions is investigated via its relation to the current induced spin torque. [1] J. C. Slonczewski, J. Magn. Magn. Mat. 159, L1 (1996); L. Berger, Phys. Rev. B 54, 9353 (1996); E. Myers, D. Ralph, J. Katine, R. Louie, R. Buhrman, Science, 285, 867 (1999). [2] C. Caroli, R. Combescot, P. Nozieres, D. Saint-James, J. Phys. C: Solid St. Phys., 4, 916 (1971).

[1]This work was supported by MRSEC NSF-DMR 0213985 and INSIC EHDR Program

Mairbek Chshiev
Center for Materials for Information Technology, The University of Alabama, Tuscaloosa, AL

Date submitted: 30 Nov 2005 Electronic form version 1.4