

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electrically controllable spin filtering and switching in multiferroic tunnel junctions¹ SHENG JU, Department of Physics, National Taiwan University, Taiwan, TIAN-YI CAI, Institute of Physics, Chinese Academy of Sciences, Beijing 100080, China, GUANG-YU GUO, Department of Physics, National Taiwan University, Taiwan, ZHEN-YA LI, Department of Physics, Suzhou University, China — We propose an electrically controllable spin filter based on multiferroic tunnel junction. This novel spin filter combines the exchange splitting of ferromagnets and asymmetry in energy potential due to the screening of ferroelectric polarization charges at electrodes. Transfer matrix calculations show an enhanced spin filtering efficiency, depending on the magnitude and orientation of ferroelectric polarization. A transition from a positive tunneling magnetoresistance to a negative one is also found. Furthermore, an electric controllable switching between multiple resistive states via magnetoelectric coupling is also described, which will open a new logic programming in the future spintronics.

¹The authors gratefully acknowledge supports from the National Science Council of Taiwan and National Center for Theoretical Sciences of Taiwan.

Sheng Ju
Department of Physics, National Taiwan University

Date submitted: 16 Nov 2006

Electronic form version 1.4