

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Lateral diffusive spin transport in layered structures¹ HANAN DERY, LUKASZ CYWINSKI, LU J. SHAM, Department of Physics, University of California San Diego — A one dimensional theory of lateral spin-polarized transport is derived from the two dimensional flow in the vertical cross section of a stack of ferromagnetic and paramagnetic layers. This takes into account the influence of the lead on the lateral current underneath, in contrast to the conventional 1D modeling by the collinear configuration of lead/channel/lead. Our theory is convenient and appropriate for the current in plane configuration of an all-metallic spintronics structure as well as for the planar structure of a semiconductor with ferromagnetic contacts. For both systems we predict the optimal contact width for maximal magnetoresistance and propose an electrical measurement of the spin diffusion length for a wide range of materials. This work was supported by NSF DMR-0325599.

¹Preprint cond-mat/0510770

Hanan Dery
Department of Physics, University of California San Diego

Date submitted: 18 Nov 2005

Electronic form version 1.4