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Quantum transport in Spin Torque Transfer Devices SAYEEF SALAHUDDIN, DEEPANJAN DATTA, PRABHAKAR SRIVASTAVA, SUPRIYO DATTA, Purdue University — We present a simulation of tunneling based Spin Torque Transfer (STT) devices using the Non Equilibrium Greens Function (NEGF) formalism in the ballistic regime. Our method is based on effective mass treatment of the magnetic contacts and tunneling oxide, including the effect of transverse modes in the transverse direction. We show that it is possible to achieve a quantitative agreement with experiments for both the tunneling magneto resistance (TMR) and the amplitude of the switching current with the same set of device parameters [1]. We shall talk about some implications of these results in the context of improving the device performance. We shall also briefly discuss how the nature of the torque may change if there is spin flip scattering. [1] S.Salahuddin, Deepanjan Datta, Prabhakar Srivastava and Supriyo Datta, proceedings of International Electron Devices Meeting (IEDM), 2007.

Sayeef Salahuddin
Purdue University

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