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In-plane current induced spin orbit effects in nanometer scale Hall bar of β-W/Ta/CoFeB/MgO/Ta multilayers[1] AVYAYA J. NARASIMHAM, State University of New York, Albany, YU-MING HUNG, Department of Physics, New York University, MENG ZHU, SUNY Polytechnic Institute, Albany , ANDREW D. KENT, Department of Physics, New York University, VINCENT P.LABELLA, SUNY Polytechnic Institute, Albany — The giant spin Hall effect (GSHE) is caused by spin orbit interactions in a semiconductor or metal that result in a spin current that is transverse to the charge current. Recent spin Hall effect studies in the beta phase metals Ta and W show that transverse spin currents are strong enough to switch an adjacent magnetic layer. Films with perpendicular magnetic anisotropy (PMA) can exhibit uniform magnetizations and higher thermal stability. Inserting a 1 nm Ta insert-layer between the CoFeB and W induces PMA which is confirmed by vibrating sample magnetometer and anomalous Hall voltage measurements. β-W(5)/Ta(1) channel and the adjacent CoFeB/MgO/Ta layers are patterned into a 100 nm wide Hall bar structures. Effect of in-plane current induced change in coercivity while sweeping in-plane magnetic field are studied. An empirical model to quantitatively understand the switching will be presented.

[1]SRC-NRI-INDEX -Spin Logic

AVYAYA jayanthi narasimham
State University of New York, Albany

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