Abstract Submitted
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Detecting interfacial defects at magnetic/non-magnetic junctions[1] NICHOLAS HARMON, MICHAEL FLATTÉ, University of Iowa — Recent three terminal (3T) measurements in Co/LaAlO3/SrTiO3 show that spin-dependent transport through an interfacial defect is occurring instead of Hanle dephasing [1]. We propose extending 3T measurements into a coherent regime where single defects are detected by their local fields. The setup involves defects being situated between biased non-magnetic (NM) and ferromagnetic (FM) contacts. Spin torque on the FM drives an AC magnetization. Due to the large exchange interaction, the ability for charge to enter the FM depends on its spin and FM's relative orientation. As the FM precesses, the spin is dynamically filtered and a precessing spin accumulation remains at the defect. Local fields also precess the defect spin and interfere with the dynamic spin filtering. If the AC and local field are resonant, the spin accumulation is locked anti-parallel to the FM and leads to a dip in current. By adjusting the AC frequency, information on the local field is ascertained which, for hyperfine local fields, tells which nuclei are present at the defect and aids in identifying the defect. In the DC limit, defect spin accumulation leads to modifications in Hanle signals. [1] H. Inoue, A.G. Swartz, N.J. Harmon, M.E. Flatté, T. Tachikawa, Y. Hikita, and H.Y. Hwang. In press at Phys. Rev. X.

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