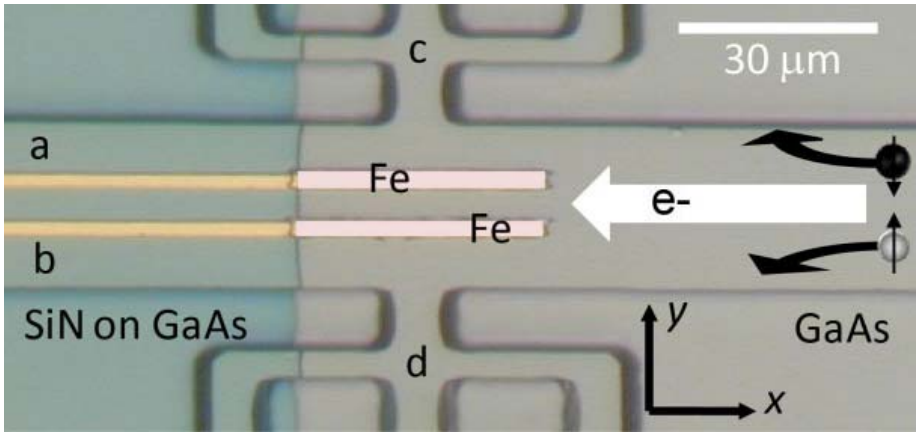
Electrical Measurement of the Spin Hall Effect in Fe/$In_xGa_{1-x}As$

E. S. Garlid[1], Q. O. Hu[2], M. K. Chan[1], C. C. Geppert[1], C. J. Palmstrøm[2], P. A. Crowell[1]

[1]School of Physics & Astronomy, University of Minnesota

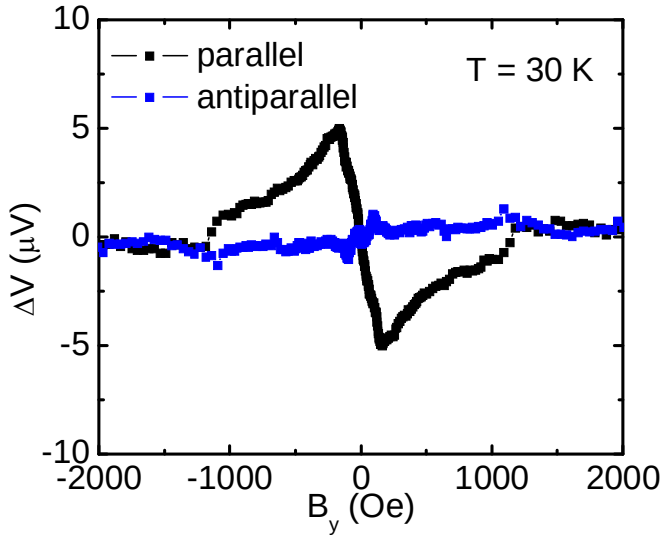
[2]Department of Electrical and Computer Engineering, University of California Santa Barbara

NNIN Facility utilized: Nanofabrication Center



- Electrons traveling down a semiconducting channel experience spin-dependent scattering off of ionized impurities.
- This gives rise to the spin Hall effect, whereby electrons accumulate at the channel boundaries with opposite spin orientations.
- Pairs of ferromagnetic contacts (a, b) are placed near the edges to detect this spin accumulation as it precesses about an applied magnetic field, B_y.

- Non-magnetic Hall arms (c, d) are used to eliminate unwanted background signals.
- The spin dependent voltage signal ($V_{ab} - V_{cd}$) is odd with respect to current direction, contact magnetization, and polarity of applied magnetic field.
- Varying the current bias while observing the sign and magnitude of the signal allows us to quantify the contributions from different spin-scattering mechanisms.



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