

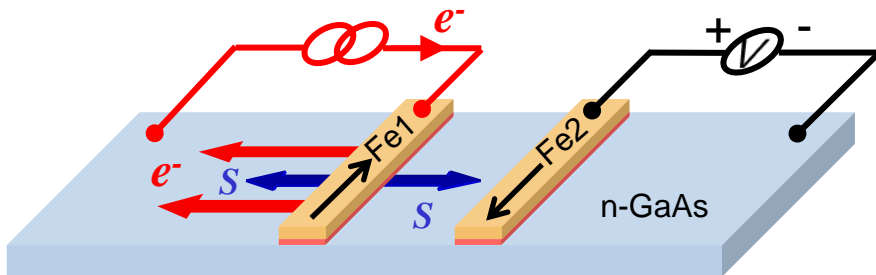
Spin Transport in Ferromagnet-Semiconductor Structures

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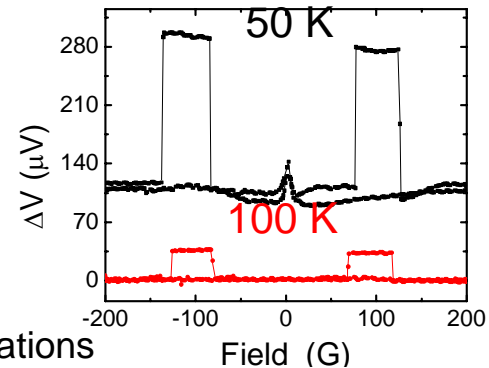
NNIN Facility utilized: Nanofabrication Center

- Non-local spin detection geometry and experimental setup (as shown in the cartoon)

- ◆ Lateral Fe-GaAs devices are fabricated using photolithography, wet/dry etching, PECVD, e-beam evaporation, and liftoff
- ◆ Non-local spin detection enables the separation of spin and charge current
- ◆ Spin polarization injected from Fe1 is detected by Fe2



- Bias dependence of electrical spin injection and detection in Fe-GaAs devices
 - ◆ Bias dependence of spin accumulation shows only a small region of linear response
 - ◆ Electrical measurements agree with direct measurements of spin polarization using optical Kerr effect
 - ◆ Detector sensitivity can also be modulated with bias



● Publications

- ◆ X. Lou, C. Adelman, S. A. Crooker, E. S. Garlid, J. Zhang, K. S. Madhukar Reddy, S. D. Flexner, C. J. Palmstrøm, and P. A. Crowell, *Nature Physics* **3**, 197 (2007).
- ◆ M. Furis, D. L. Smith, S. Kos, E. S. Garlid, K. S. M. Reddy, C. J. Palmstrøm, P. A. Crowell, and S. A. Crooker, *New Journal of Physics* **9**, 347 (2007).
- ◆ S. A. Crooker, M. Furis, X. Lou, P. A. Crowell, D. L. Smith, C. Adelman, and C. J. Palmstrøm, "Optical and Electrical Spin Injection and Spin Transport in Hybrid Fe/GaAs Devices," *J. Appl. Phys.* **101**, 081716 (2007).