Abstract Submitted
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Scanning Kerr Rotation Microscopy of Lateral Spin Transport Devices M. FURIS, D.L. SMITH, S.A. CROOKER, Los Alamos National Laboratory, New Mexico, X. LOU, C. ADELMANN, C.J. PALMSTRøM, P.A. CROWELL, University of Minnesota, Minneapolis — Scanning Kerr-rotation microscopy is employed to image electrical spin injection and accumulation in the GaAs channel of lateral spin transport devices having ferromagnetic Fe/GaAs Schottky barrier source and drain contacts [1]. Because electrically-injected spins are initially oriented in the xy sample plane ($S_0 \parallel \hat{x}$), we measure the Kerr rotation ($\theta_K \propto S_z$) as a function of small in- plane magnetic field (B_y). We specifically investigate how these "Hanle curves" vary across a series of devices with systematically increasing electron density n_e in the n-type GaAs channel (2×10^{16} cm$^{-3} < n_e < 3 \times 10^{17}$ cm^{-3}). The width of the Hanle curves near the source contact increases with n_e, reflecting the decreasing electron spin lifetime. The amplitude of the Hanle curves (a measure of the spin polarization) decays on a lengthscale related to the n_e-dependent spin diffusion constant, lifetime, and mobility. [1] S.A. Crooker, M. Furis, X. Lou, C. Adelmann, D.L. Smith, C.J. Palmstrøm, P.A. Crowell, Science **309**, 2191 (2005).

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