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Spin Lifetimes at Fe/GaAs and Fe/AlO_x/GaAs interfaces A.T. HANBICKI, C.A. AWO-AFFOUDA, O.M.J. VAN 'T ERVE, C.H. LI, G. KIOSEOGLU, M.A. HOLUB, B.T. JONKER, Naval Research Laboratory — Three terminal Hanle measurements are useful for probing the spin lifetime at magnetic contact/semiconductor interfaces. In this technique, a spin polarized charge current is injected into a transport channel and the resulting spin accumulation under the injecting contact leads to a split in the chemical potential between majority and minority spins in the semiconductor. We inject a spin polarized current from Fe into GaAs across several different tunnel barriers and use the Hanle effect to determine spin lifetimes by monitoring the voltage drop as a function of perpendicular magnetic field. The measured Hanle curves are modeled to extract the spin lifetime under the magnetic contacts. By fitting experimental data using the spin lifetime as the only fitting parameter we obtain a spin lifetime of 4 ns for spin injection from Fe into GaAs through a Schottky contact. These results will be compared with data we obtained on Fe/AlO_x/GaAs using the same measurement geometry. This work was supported by core programs at NRL.

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