Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Spin accumulation in Ge at room temperature A.T. HANBICKI, S.-F. CHENG, R. GOSWAMI, O.M.J. VAN 'T ERVE, B.T. JONKER, Naval Research Laboratory — We have investigated spin injection into n-type Ge(001) from Fe through a sputter-deposited MgO tunnel barrier using 3-terminal Hanle measurements[1]. Unlike Si, spin research in Ge is hampered by Fermi level pinning at the Ge interface, which makes it difficult to efficiently inject carriers. We observe here precessional dephasing of the spin accumulation in an applied B-field (Hanle effect) in Fe/MgO/Ge for both forward and reverse bias. At room temperature, spin lifetimes range from τ_s = 50 ps to 123 ps as the carrier concentration is reduced from n=8x10^{17}cm^{-3} to 2x10^{16}cm^{-3}. The measured spin resistance-area product is in good agreement with values predicted by theory for samples with carrier densities below the metal-insulator transition (MIT), but 100x larger for samples above the MIT. These data demonstrate that measured spin accumulation occurs in the Ge, although dopant-derived interface or band states may enhance the measured spin voltage above the MIT. The observed room temperature injection of spins shows that despite persistent Fermi level pinning, spin accumulation is possible in the surface region of Ge. This work was supported by core programs at NRL.
[1] A.T. Hanbicki, et al., *SolidStateComm.* **152**, 244 (2012).

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Date submitted: 08 Nov 2012 Electronic form version 1.4