Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electrically detected ferromagnetic resonance studies of individual Permalloy nanowires ZHENG DUAN, CARL BOONE, ILYA KRIVOROTOV, UC Irvine, NATHALIE RECKERS, JUERGEN LINDNER, MICHAEL FARLE, University of Duisburg-Essen, ILYA KRIVOROTOV TEAM, MICHAEL FARLE TEAM — We report measurements of electrically-detected broadband ferromagnetic resonance (FMR) of individual lithographically-defined Permalloy nanowires. For these measurements, the nanowire is placed near a shorted end of a coplanar strip waveguide, and magnetization precession in the nanowire is excited by microwave power applied to the waveguide. Resistance of the nanowire is measured via four leads attached to the nanowire. The amplitude of the magnetization precession as a function of dc bias magnetic field and microwave frequency is electrically detected via two independent methods: (i) measurements of time-average resistance (photoresistance) arising from anisotropic magnetoresistance (AMR) and (ii) measurements of the rectified voltage (photovoltage) arising from AMR resistance oscillations and inductive microwave current in the nanowire. Using these complementary techniques, we make ferromagnetic resonance measurements as a function of frequency and magnetic field applied to the nanowire. We will discuss the dependence of the resonance frequency and linewidth on the nanowire width and compare our results to the results of conventional ferromagnetic resonance measurements of unpatterned Permalloy films.

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Date submitted: 18 Nov 2010 Electronic form version 1.4