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Electrically Detected Broadband Ferromagnetic Resonance in Individually Defined Permalloy Nanowires ZHENG DUAN, CARL BOONE, ILYA KRIVOROTOV , UC Irvine, NATHALIE RECKERS, SVEN STIENEN, JUERGEN LINDNER , University of Duisburg-Essen, UC IRVINE TEAM, UNIVERSITY OF DUISBURG-ESSEN TEAM — We report measurements of electrically detected broadband ferromagnetic resonance (FMR) in lithographically defined Permalloy nanowires. For these measurements, the Permalloy nanowire is placed in close proximity to the short of a gold coplanar strip waveguide. The microwave power applied to the waveguide drives the magnetization precession in the wire and the four-point resistance of the wire is measured as a function of DC external magnetic field. The time-averaged resistance of the wire depends on the amplitude of the magnetization precession via anisotropic magnetoresistance (AMR), and thus peaks and dips with resistance dependence on the bias magnetic field arise from resonant excitation of spin wave modes in the wire. Using this electrically detected FMR technique, we measure the frequency and linewidth of the quasi-uniform mode of magnetization precession as well as bulk modes and edge modes that exist for the magnetic field applied in the plane of the sample perpendicular to the wire. We will present measurements of the resonance frequency and linewidth of various modes for several values of the wire width and compare our results to theoretical predictions of the field dependence of the mode frequency.

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