Abstract Submitted
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Transport properties of exchange biased mesoscale wires[1] JAMES DELLES, DAVID HARRISON, DAN ENDEAN, DAN DAHLBERG, University of Minnesota - Twin Cities — We used anisotropic magnetoresistance (AMR) measurements to investigate the magnetization processes and reversal mechanisms in both straight and zigzag ferromagnetic wires with an exchange bias. The wires were fabricated from a 7 nm CoFe layer coupled to a 7 nm IrMn layer with the exchange bias either perpendicular or collinear to the length of the wires. All wires were 80 nm wide with the straight wires 1.5 microns long and the individual segments of the zigzag wires 800 nm long. The four terminal resistance data were taken while sweeping a 10 kG applied field. For the straight wire segments, we show that the magnetization reversal is explained by coherent rotation in all but one of the six measured applied field, exchange bias field directions. In the sixth, the reversal includes domain wall formation and propogation. Using the AMR data from the straight wires segments, we modeled the AMR data for the zigzag wires as a superposition of two perpendicular wire segments. This superposition describes the general behavior but not in detail. Simulations that solve the Landau-Lifschitz-Gilbert equation show that the differences can be explained by domain wall nucleation in the corners of the zigzag wires for all measured applied field directions.

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