Alignment-Sensitive Reversal Mechanisms of Epitaxial-FeF$_2$/Polycrystalline-Ni Exchange Biased Thin Films* JUSTIN OLAMIT, KAI LIU, UC Davis Physics Department, ZHI-PAN LI, IVAN K. SCHULLER, UC San Diego Physics Department — Magnetization reversal mechanisms of epitaxial-FeF$_2$/polycrystalline-Ni exchange biased thin films were investigated with vector magnetometry and a First Order Reversal Curve (FORC) technique [1]. The FORCs were measured without remounting the sample after the vector magnetometry measurements, ensuring consistency between the two methods. Samples were exchange biased by field cooling along the FeF$_2$ spin axis. When the applied field is aligned with the spin axis, the transverse hysteresis loop is flat and FORC analysis shows that the magnetization switching is highly irreversible (∼80%), indicating that domain nucleation and motion is the reversal mechanism. With a misalignment of 5˚, the transverse hysteresis loop shows that the reversal is predominantly by rotation [2] and FORC analysis shows that the majority of the magnetic switching is by a reversible mechanism (only ∼40% irreversible). These results demonstrate that the magnetization reversal mechanisms are extremely sensitive to the alignment of the applied field with the antiferromagnet spin axis and the exchange bias direction [3]. 1. J. E. Davies, et al., Phys. Rev. B 70, 224434 (2004); Phys. Rev. B 72, 134419 (2005). 2. J. Olamit, et al., Phys. Rev. B 72, 012408 (2005). 3. A. Tillmans et al, cond-mat/0509419. *Work supported by ACS-PRF, Alfred P. Sloan Foundation, and DOE.