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Exchange bias measurement methodologies and the role of hysteresis loop asymmetry ONDREJ HOVORKA, Electrical Engr. Dept., Drexel University, Philadelphia, USA, ANDREAS BERGER, San Jose Research Center, Hitachi Global Storage Technologies, San Jose, USA, GARY FRIEDMAN, Electrical Engr. Dept., Drexel University — The phenomenon of exchange bias refers to the observation of a hysteresis loop field shift in ferromagnetic-antiferromagnetic (AFM) compound structures [1] and in all-ferromagnetic bilayer systems [2]. The exchange bias effect is typically quantified by determining the sum of the coercive fields from a hysteresis loop. Such a two-point (TP) measurement is, however, unambiguous only for time reversal symmetric hysteresis loops [3]. To account for the loop asymmetry, frequently observed in experiments, we recently proposed an alternative characterization scheme, called the center of mass method (CM) [3]. In the present study, we correlate the differences between TP and CM methods and the hysteresis loop asymmetry, using measurement data obtained from the all-ferromagnetic bilayer system, which are supported by model calculation results. We find the loop asymmetry to be a reliable indicator for the ambiguity of the conventional TP method. We will also discuss the applicability of the CM method to conventional AFM structures. [1] A. Berkowitz, K. Takano, J. Magn. Magn. Mater. 200, 552 (1999). [2] A. Berger et. al., Appl. Phys. Lett. 85, 1571 (2004). [3] O. Hovorka et. al., Appl. Phys. Lett. 89, 142513 (2006).

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