

# Horizontal shift of the hysteresis loop for ultrathin Fe film on MgO(001) substrate

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Recently, Fan et al. [1] reported on a new exchange bias phenomenon that is manifested only in the Fe/MgO interface spins, and not in the bulk. In the present contribution we show that when the thickness of the epitaxial Fe film on MgO(001) is reduced to about 1 nm, the VSM hysteresis loop shows at low temperature a shift that is typical for the exchange bias systems composed of a ferromagnet and antiferromagnet. Narrow hysteresis loops at the room temperature were gradually broadened with lowering temperature and eventually, below 15 K, became shifted, even when cooled *without* external magnetic field. The maximum bias field of more than 100 Oe was observed at the film thickness of 0.9 nm. Our preliminary interpretation is that the interface Fe layer is antiferromagnetically coupled to the film interior due to existence of Fe-O-Fe bonds.

## References:

[1] Y. Fan, *et al.*, Nature Nanotechnology 8, 438 (2013).