

Exchange bias in dipole coupled trilayers: experimental results and theoretical interpretation

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Trilayer (AFM-PM-FM) exchange bias (EB) is studied, focusing on the switching from negative to positive EB. The same cooling field yields negative EB for thin spacers, and positive EB for thicker ones. The coupling between the FM and the AFM is attributed to long-ranged dipole coupling. The dipole field is generated in the AFM by symmetry breaking due to quantum fluctuations. The magnetic domains imprinted on the AFM, that are responsible for EB, are created during field cooling. Our model accounts quantitatively for the experimental results, but ignores the short range interfacial exchange interactions of the usual EB theories, retaining solely the long range dipole field. Novel switching capabilities emerge.