

Influence of the FM/AFM interface roughness on the exchange bias phenomenon

M. Pankratova¹ and A. Kovalev^{1,2}

¹*B. Verkin Institute for Low Temperature
Physics and Engineering of NAS of Ukraine,
47 Lenin Ave., 61103 Kharkov, Ukraine*

²*V.N. Karazin Kharkiv National University,
4 Svobodi sq., 61107 Kharkov, Ukraine*

The exchange bias phenomenon in the layered ferromagnetic (FM) and the antiferromagnetic (AFM) system with a rough interface is theoretically studied. We assume that the FM and the AFM subsystems interact through randomly distributed magnetic point contacts (MPC). The shift and the asymmetry of the hysteresis curve for the magnetization dependence on the field have been associated with the domain walls, that are oriented perpendicular to the FM/AFM interface. We show that even a small density of the MPC leads to a shift of the hysteresis loop and to the transformation of its shape. These dependencies are in accordance with the experimental data. The results obtained for the rough interface were compared with the hysteresis loops for the perfect FM/AFM interface. It was shown that the qualitative shape of the hysteresis curve for the rough and perfect interfaces may be similar. We propose a method to distinguish the cases with different character of FM/AFM interface.