**Ferromagnetic clusters surrounded by antiferromagnet. Effects of the interaction and randomness**

A.A. Krivchikov

The problem of how an external field affects the magnetic moments of ferromagnetic clusters that are surrounded by an antiferromagnet is studied. Clusters interact with each other by magnetodipole interaction. In case of sufficiently strong anisotropy, such a system can be described by a one-dimensional Ising model with a random exchange in the presence of an effective local field. A random effective field represents the inhomogeneity of the interface between clusters and an antiferromagnet. In field that is smaller than the saturation field, the ground state of such a model is a set of domains of different lengths. In contrast to the one-dimensional Ising model in a homogeneous field, linear dependence of the magnetization on the external field in the presence of a random effective field in the region of small fields is observed. The average of the random effective field determines the magnitude of the exchange bias, and the variance of the random effective field affects the slope of the magnetization curve. The use of such a model allows drawing conclusions about the properties of the boundary between subsystems from experimental data. A formula that gives estimation of the quality of the interface in the case of the cylindrical geometry of the sample is given.