

## Fluctuation nanoclusters in liquid-like magnetics

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Problem of finite-size magnetic nanoclusters formation in an infinite system near phase transition point is formulated on the base of the Ising-like Hamiltonian and the lattice-gas model [1,2]. The only short-range interparticle interactions within the cluster and with the external environment are taken into account. The effective formula for number for nearest neighbours in surface layer of spherical nanocluster is derived. The Grand thermodynamic potential of the investigated system is calculated in the self-consistent field approximation.

The set of differential equations for parameters: concentration, magnetization, radius of the nanocluster are solved exactly. It was shown the appearance of certain point (below and upper of global ferroelectric phase transition temperature) at which a different types of nanoclusters arise. Normal law for size distribution of nanoclusters takes into account a chaotic character of order parameter fluctuations in the infinite system. The nanocluster mean size, their magnetic moment and the conditions of stability with changes in temperature are discussed.

1. N.A. Korynevskii, V.B. Solovyan. Statistical theory of metal nanoparticles formation. Lattice-gas model approximation. *Physica B*, 436, 111–116, 2014.
2. N.A. Korynevskii, V.B. Solovyan. Fluctuation Nanoclusters in a Liquid-Like Ferroelectrics. Programme and Abstracts of the V Ukrainian-Polish-Lithuanian Meeting on Ferroelectric Physics, p. 17, Uzhgorod, Ukraine, 2018.