

Magnetization of ^3He films in ferromagnetic regime: Cluster size effects

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The thermodynamics of low dimensional spin-1/2 Heisenberg ferromagnets in an external magnetic field is investigated within a second-order two-time Green function formalism. The proposed approach describes properly the behavior of both infinite and finite-sized systems in the whole temperature range and at arbitrary fields.

The obtained results are applied to interpret a great variety of the experimentally observed temperature dependences of the magnetization $M(T)$ for ^3He monolayers and ^3He - ^4He mixture films adsorbed on graphite. A good quantitative agreement between the theory and experiment has been obtained in the whole temperature range for different values of the external magnetic fields. The experimentally observed 'ferromagnetic anomaly' and cluster size effects in helium monolayers¹ have been interpreted.

1. E. Collin, C. Bäuerle, Yu. M. Bunkov, and H. Godfrin, Phys. Rev. B **73**, 125421 (2006).