

Magnetic Properties of Heisenberg Thin Films in an External Field

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Abstract: The magnetic properties of Heisenberg ferromagnetic films in an external magnetic field are investigated by means of the variational cumulant expansion (VCE). The magnetization can be in principle calculated analytically as the function of the temperature and the number of atomic layers in the film to an arbitrary order of accuracy in the VCE. We calculate the spontaneous magnetization and coercivity to the third order for spin-1/2 Heisenberg films with simple cubic lattices by using a graphic technique.

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Key words: thin film, Heisenberg ferromagnet, variational-cumulant expansion

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