# Multicriticality of the magnetic bilayer described by the Blume-Emery-Griffiths model

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The Blume-Emery-Griffiths (BEG) model with its relatively simple spin-1 Ising Hamiltonian has attracted physicists dealing with a vast variety of systems. The rich phase diagrams it exhibits has been the testing ground for both analytic calculation methods and computer simulations.

This paper presents the comparison of some phase diagrams for a magnetic bilayer ($z = 5$) described by the BEG model obtained within the mean-field approximation (MFA), the Gaussian fluctuations approximation (GFA) and Monte Carlo simulation methods (MC). The main differences of these results are discussed and the attention is focused on the phase transitions which are found not only for the stable branches of the order parameters but for the metastable and unstable as well.

9.7 cm

13.4 cm

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