

INFLUENCE OF AN EXTERNAL
FIELD ON THE SECOND ORDER PHASE
TRANSITION: METHOD FOR DESCRIPTION
OF THE CRITICAL BEHAVIOR OF 3D SYSTEMS

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S u m m a r y

The review of modern researches of the behavior of systems near the second-order phase transition point is given. The methods and the theoretical description of their critical behavior are presented. For instance, the mean-field method, the Landau theory, the renormalization group method, *etc.* are considered. The main part of the work is devoted to the presentation of an analytic method describing the critical behavior of the 3D Ising model in the external field. It is the continuation of the phase transition theory proposed by I.R. Yukhnovs'kyi and uses the collective variables method. The generalization concerns with the external field influence on the behavior of such characteristics as the order parameter, susceptibility, heat capacity, *etc.* Within the frame of a simple model, the critical exponents and critical amplitudes for various physical quantities are evaluated. The general scaling form for the free energy near the phase transition point is suggested. The crossover equation of state is obtained. It represents the explicit dependence of the order parameter on the reduced temperature and the external field.