

METHOD FOR THE CALCULATION OF FREE
ENERGY IN A THREE-DIMENSIONAL
ISING-LIKE SYSTEM TAKING INTO ACCOUNT
A CORRECTION FOR THE INTERACTION
POTENTIAL AVERAGING

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S u m m a r y

The critical behavior of three-dimensional model systems has been studied theoretically. The partition function and the free energy for a one-component spin system have been calculated for a non-Gaussian distribution of order-parameter fluctuations. A specific feature of the proposed method of calculation consists in making allowance for the dependence of the Fourier transform of the interaction potential on the wave vector. Such an approach leads to a nonzero critical exponent η in the correlation function and the renormalization of the values of other critical exponents (for the correlation length, susceptibility, *etc.*). The calculation of those exponents was carried out with the use of the renormalization-group method and on the basis of obtained recurrence relations for the coefficients of fluctuation distributions in adjacent block structures.