

**MULTIPHASE STRUCTURE OF FINITE-TEMPERATURE
PHASE DIAGRAM OF BLUME-CAPEL MODEL.
WANG-LANDAU SAMPLING METHOD.**

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We investigate the density of states (DOS) in antiferromagnetic spin-system on a square lattice described by Blume-Capel (BC) model. We use new, very efficient simulation method, proposed by Wang and Landau [1], in which we estimating very precisely DOS by sampling in the space of energy. Then we calculate the thermodynamical averages like the internal energy, the free energy, the specific heat and the entropy.

The BC model exhibits multicritical behaviour such as first- or second-order transitions and tricritical points. It is known that in the ground state of the BC model we observe two kinds of staggered antiferromagnetic phases: AF_1 (two interpenetrating lattices with $S = -1$ and $S = 1$) or AF_2 ($S = -1$ and $S = 0$ for $H < 0$; $S = 1$ and $S = 0$ for $H > 0$). We analyze the coexistence of such phases in finite temperatures and determine border lines between them. To understanding the microscopic nature of such boundaries we present also some results using standard Monte Carlo method.

[1] F. Wang and D.P. Landau, Phys. Rev. Lett. **86**, 2050 (2001).

←————— 13.4 cm —————→

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