Order-disorder transition in 2D conserved spin system with cooperative dynamics

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Order-disorder phase transition in classic Ising system has been intensively investigated for many years. Less attention was put on a case with conserved spin number (called conserved order parameter model). In our work we propose the use of Dynamic Lattice Liquid (DLL) model to investigate the dynamics of phase separation phenomenon in spin conserved system with all lattice sites occupied. DLL model enables non-locally correlated relaxation dynamics and allows to simulate dense systems in absence of vacancies and parallel treatment of all spins. DLL algorithm was successfully used for diffusion limited aggregation problem, polymer dynamics and reaction front evolution investigation. In our studies interactions were defined by standard Ising Hamiltonian for simple magnetic system $E = -(J/k_B T)\sum_{<i,j>} \sigma_i \sigma_j$, $i, j = -1, 1$. This approach can be regarded as a mixture of spin liquids with repulsive nearest neighbor interactions undergoing spinodal decomposition process. Simulations were performed on two dimensional triangular lattice. The special emphasis was put on thermodynamic quantities, temporal evolution of domain morphology and diffusion.