The Hebrew University of Jerusalem , Colloquium

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"Fate of the Kinetic Ising and Potts Model"

What happens when the Ising model initially at infinite temperature is suddenly cooled to zero temperature and subsequently evolves by single spin-flip dynamics? In two dimensions, the ground state is reached only about 2/3 of the time, and the evolution is characterized by two distinct time scales, the longer of which arises from topological defects. There is also an intriguing and deep connection between domain topologies and continuum percolation. In three dimensions, the ground state is never reached and (i) domains at long times are topologically complex, with average genus growing algebraically with system size; (ii) "blinker" spins always arise that can flip ad infinitum with no energy cost; (iii) the relaxation time grows exponentially with system size. The zero-temperature coarsening of the q-state Potts model is richer still. In two dimensions, macroscopic avalanches may occur at long times that drive apparently frozen systems to the ground state.