Simulation of an ensemble with varying magnetic field: A numerical determination of the order-order interface tension in the $D=2$ Ising model

B. A. Berg and U. Hansmann

Department of Physics, The Florida State University, Tallahassee, Florida 32306
and Supercomputer Computations Research Institute Tallahassee, The Florida State University, Tallahassee, Florida 32306

T. Neuhaus

Fakultät für Physik, Universität Bielefeld, D-4800 Bielefeld, Federal Republic of Germany

In analogy with a recently proposed multicanonical ensemble we introduce an ensemble where the partition function is simulated with a term in the action containing a varying magnetic field. Using this ensemble we demonstrate on lattices with periodic boundary conditions that it is possible to enhance the appearance of order-order interfaces by many orders of magnitude. To perform a stringent test of the method we consider the $D=2$ Ising model at $\beta=0.5$ and simulate square lattices up to size 100×100. By a finite-size scaling analysis, the order-order interface tension per unit area is obtained. Our best infinite-volume extrapolation is in excellent agreement with Onsager's exact result.