Abstract Submitted
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Thin Ising films with both competing surface fields and a magnetic field gradient: A Monte Carlo study LIJUN PANG, D.P. LANDAU, Center for Simulational Physics, University of Georgia, Athens, GA30602, K. BINDER, Institute of Physics, University of Mainz, Germany — Extensive Monte Carlo simulations are used to study the interesting effects resulting from a linearly varying magnetic field on a thin Ising film (equivalent to applying gravity to the corresponding lattice-gas model). Besides competing surface fields acting on two LxL free surfaces a distance D apart from each other, we also apply a magnetic field g that varies linearly between the surfaces and which competes with the surface fields. To determine the phase diagram, we look for bulk two-phase conexistence at different values of g and temperature T. In situations with only competing surface fields applied, the interface unbinding transition [1] happens at temperature $T_c(D)$. The addition of the g field produces a phase diagram in which, as g increases, the temperature bounding bulk two-phase coexistence first goes up from $T_c(D)$, and then decreases. For small g, we find a second order transition, whereas for large g, the transition appears to be first order. We will compare our simulation results with theoretical predictions [2].

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