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**Monte Carlo Simulations of Metastable Decay in the Ising Model on the Hyperbolic Plane**[1] HOWARD L. RICHARDS, Physics, Marshall University, MALLORY A. PRICE, Math, Marshall University, JULIE E. LANG, Physics, Morehead State University — Consider a regular network of Ising spins with short-ranged, ferromagnetic interactions and a weak, negative magnetic field. The system evolves under single-spin-flip Metropolis dynamics from an initial state of all spins "up" ($s_i = +1$, $\forall i$). For Euclidean networks in less than 6 dimensions, decay from the "metastable" state occurs in a finite time (measured in Monte Carlo steps per spin) through the nucleation and growth of one or more finite critical droplets. For networks on the hyperbolic plane, however, we show that the size of a critical droplet diverges at a nonzero magnetic field – the spinodal field. We then use Monte Carlo simulations on the $\{5, 4\}$ grid to demonstrate the divergence of the lifetime of the metastable state at nonzero spinodal fields.

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