

Abstract Submitted  
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**Umbrella Sampling in the Long Range Ising Model** RANJIT CHACKO, HARVEY GOULD, Clark University, WILLIAM KLEIN — Umbrella sampling with the largest cluster size as the local order parameter has been used to study liquid to solid nucleation. In the absence of a rigorous definition of a solid-like cluster, an ad hoc definition of the clusters must be adopted. As a result it is not clear if the vanishing of the free energy barrier found by umbrella sampling should be interpreted in terms of a spinodal and how well the cluster found at the free energy maximum corresponds to the true nucleating droplet. To better understand umbrella sampling with a local order parameter we study nucleation in the long-range Ising model for which the cluster definition is given rigorously by a percolation mapping. We determine the free energy of the long-range Ising model as a function of the largest cluster size and the quench depth, and study the properties of the nucleating clusters as the spinodal is approached.

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