**372b Order Parameter Density of States Monte Carlo Simulations**

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We present a new method for obtaining phase transitions in ordered systems characterized by specific order parameters. The proposed method relies on a density of states approach to Monte Carlo simulations. By driving the system along a distinct order parameter, it is possible to determine the relative free energies of different ordered phases. The validity and usefulness of the method are illustrated in the context of two examples. In the first, we examine the crystallization of a simple system of soft spheres. In the second, we examine the stability of various phases of phospholipids membranes; including their melting.