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Jamming and free energy landscapes for three caged soft disks XIN DU, ERIC WEEKS, Emory Univeristy — We study jamming in a model of three soft Brownian disks confined in a circular corral. For large corrals, the disks can freely rearrange where one particle passes in between the other two, but for small corrals rearrangements become rare. We use a Monte Carlo simulation to study the dynamics of the three disks, and calculate the Helmholtz free energy from the distribution of configurations in the system. The free-energy landscape in a one-dimensional space contains two symmetric energy minima separated by an energy barrier. Rearrangement events correspond to the system crossing over the free-energy barrier. With low temperature and/or small corral size, the energy barrier becomes larger and the system approaches glass transition. The free energy barrier has both energy and entropy components. We compare our results to a model of hard disks, for which the free energy barrier for rearrangements is entirely entropic. In particular we find that we cannot simply model the soft disks as hard disks with a temperature-dependent effective size.

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