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Exact Enumeration of Jammed States for Confined Hard Discs[1]
S.S. ASHWIN, Department of Chemistry, Universiy of Saskatchewan, RICHARD K. BOWLES, Department of Chemistry, University of Saskatchewan — Enumeration of jammed states of particle systems interacting with hard potentials such as hard discs and hard spheres is a long- standing problem which holds the key to understanding the nature of glassy dynamics and the question of the possibility of an ideal glass transition in these systems. A simple model consisting of hard discs (of diameter σ) trapped between two hard lines separated by a distance H exhibits slow relaxation and heterogeneous dynamics characteristic of glassy systems. We map the locally jammed structures in this model to tiles and pose the problem of enumeration of jammed states for the case $H < 2\sigma$, as a tiling problem on a subset of a plane. Further on applying constraints for collective jamming on the arrangement of the tiles, we exactly enumerate the entire jamming landscape of the system and explore how this landscape is connected to the thermodynamics and dynamics of the glassy system.

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