

Abstract Submitted
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Analysis of Configurational Entropy in Jammed Granular Matter

CHRISTOPHER BRISCOE, CCNY - Levich Institute, PING WANG, CHAOMING SONG, HERNAN MAKSE — Energy fluctuations in jammed granular matter are negligible and cannot control the statistical mechanics. It is of interest to explore volume fluctuations in an effort to describe the statistical mechanics of jammed matter, originally proposed by Edwards. Current studies have introduced the concept of a theoretical phase diagram for jammed matter, providing plausible statistical explanations for the RCP and RLP states, along with intermediate jammed states, as a function of coordination number, z , friction coefficient μ , and volume fraction, ϕ . Entropy can be derived from this theoretical framework by means of a Hamiltonian, with energy and temperature replaced by volume, W , and compactivity, X , where X is an analogue of temperature. Our present efforts are to calculate the Shannon entropy of jammed granular packings along various paths of the phase diagram, resulting in an extensive entropy density, and X , as a function of ϕ , providing a new equation of state for jammed granular matter.

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