A Statistical Ensemble for Soft Granular Matter SILKE
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CHAKRABORTY, Brandeis University — Work on packings of soft spheres (PRE
68, 011306 (2003)) has shown the existence of a Jamming transition and has high-
lighted the need for a general statistical framework to describe granular packings.
This work presents an extension of the formalism proposed by Edwards (Physica A
157, 1080 (1989)) to packings of soft particles. We base our analysis on a height
formalism developed in two dimensions (PRL **88**, 115505 (2002)) to extract a topo-
logical invariant Γ, the trace of the global stress tensor, which is conserved under
internal rearrangements of the system. Upon assuming a flat measure in Γ-space, we
can derive a canonical distribution of the local Γ-values in a grain packing. We then
check the predictions of this ensemble against distributions of mechanically stable
packings of frictionless disks obtained from computer simulations. Work supported
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