Electronic Supplementary Material (ESI) for Soft Matter.

Supplementary Information for 'Hierarchical glass transition of hard hemidisks with local assemblies'

Wei Zheng,[1,2,*] Qun-Li Lei,[2,*] Yuqiang Ma,[1,†] and Ran Ni[2,‡]

[1] *National Laboratory of Solid State Microstructures and Department of Physics, Collaborative Innovation Center of Advanced Microstructures, Nanjing 210093, China*

[2] *School of Chemical and Biomedical Engineering, Nanyang Technological University, 62 Nanyang Drive, 637459, Singapore*

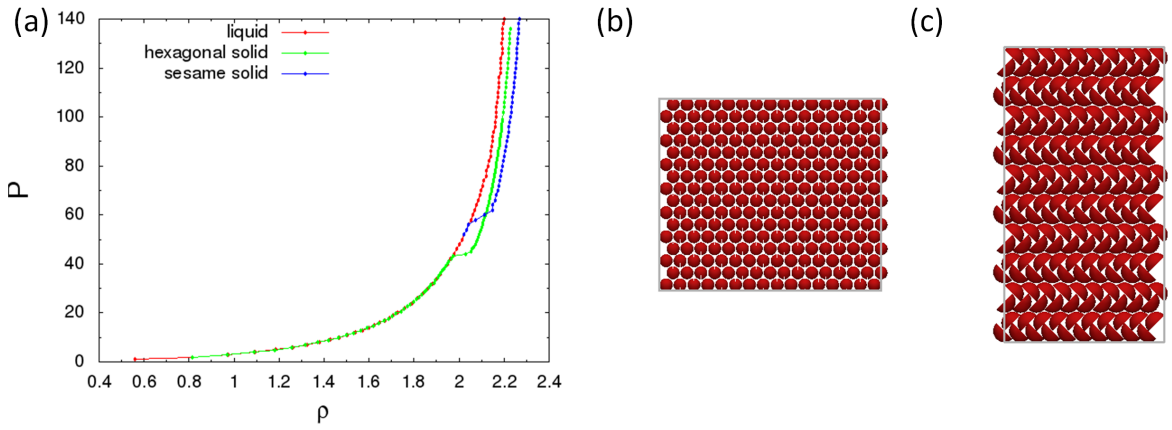

Fig. S1: (a) Equation of state of different phases for the hemi-disk systems. (b) hexagonal crystal phase. (c) closest-packed sesame crystal phase. The highest packing fraction of the closest-packed sesame crystal phase found in our simulation is 0.9331.

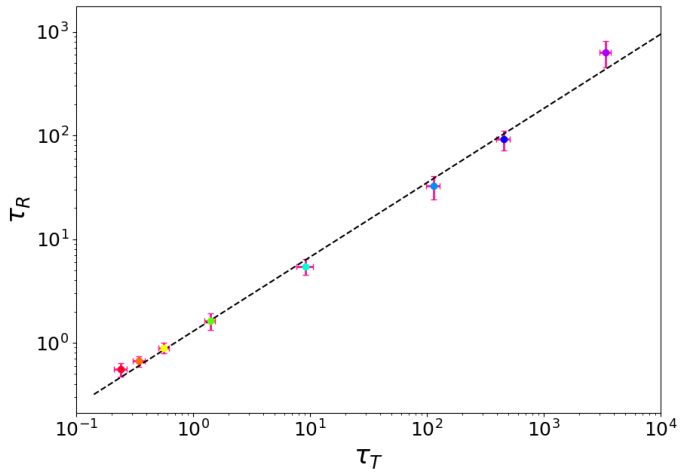

Fig. S2: Cross plot of τ_t and τ_t for translational and rotational freedom degree respectively using the same data points from Fig. 2 in the main text. Different color represent different density. From red to blue, the density increases.

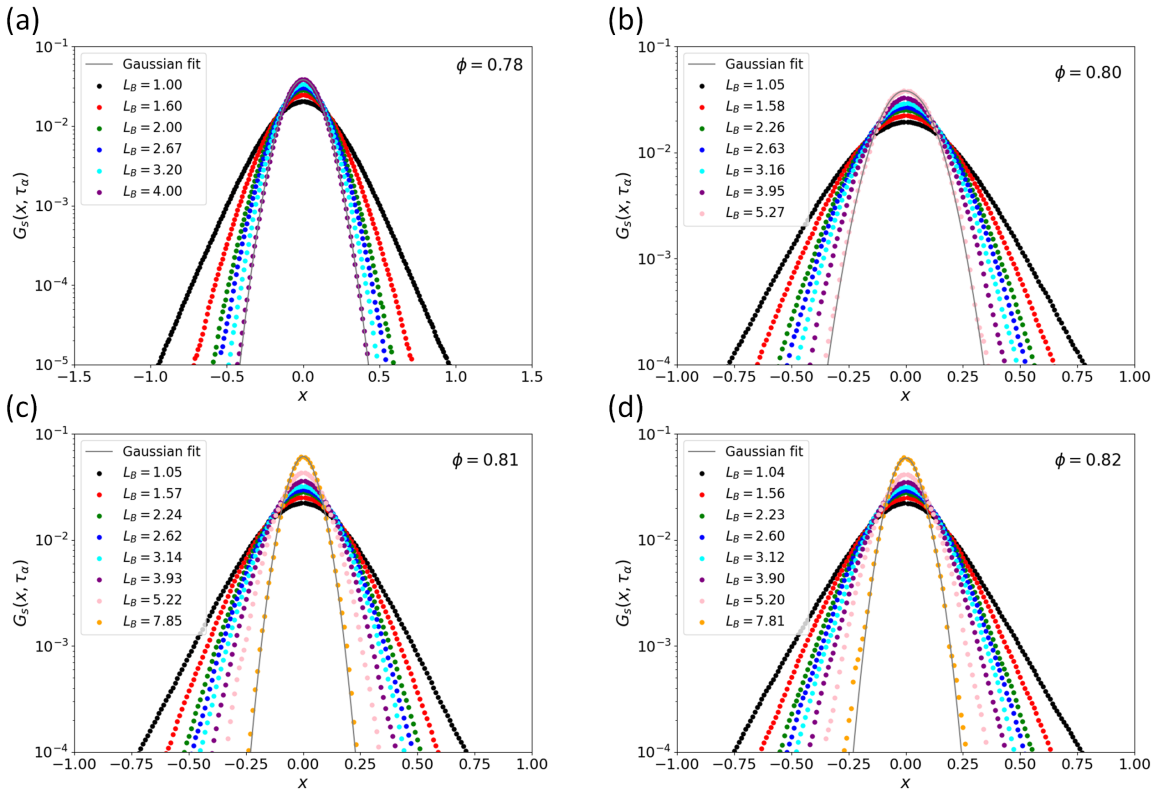

Fig. S3: (a-d) Coarse-graining van Hove function of translational displacement using different block lengths. Here x represents the sum of particles displacements in the block for both x, y directions for systems with different densities.

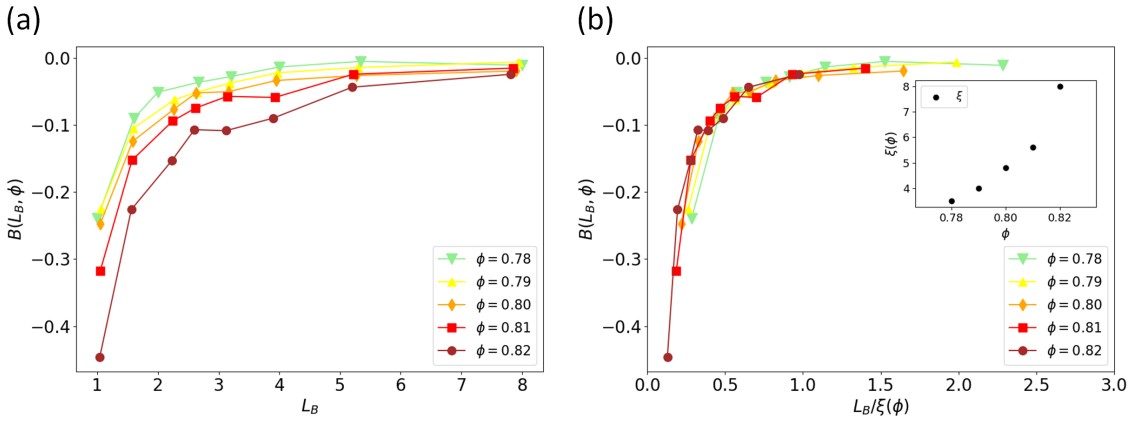

Fig. S4: (a) Binder cumulant of the distribution in Fig. S3 as a function of block lengths for systems with different densities. (b) Collapsing of Binder cumulant by introducing the parameter ξ (heterogeneity length scale). The inset shows the obtained values of ξ.

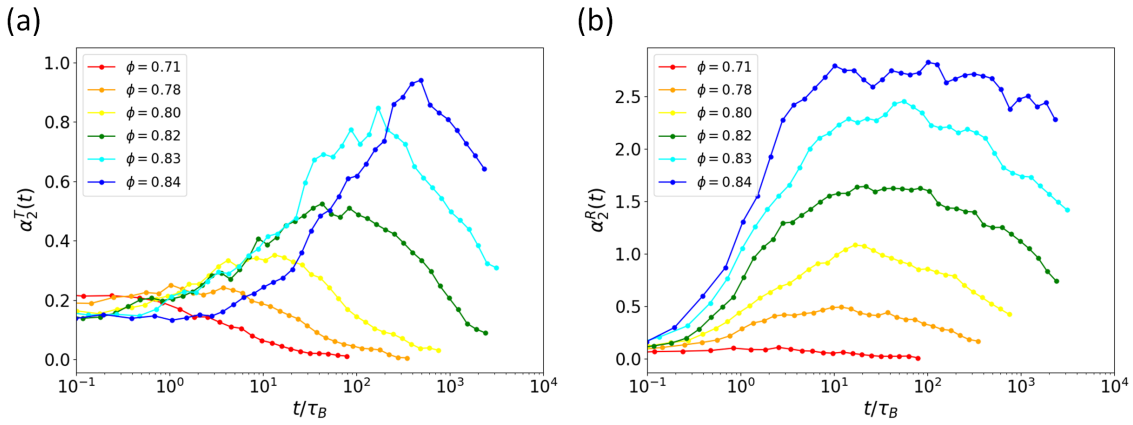

Fig. S5: (a-b) Non-Gaussian Parameter (NGP) for the translational freedom degree (a) and rotational freedom degree (b) for systems at different densities.

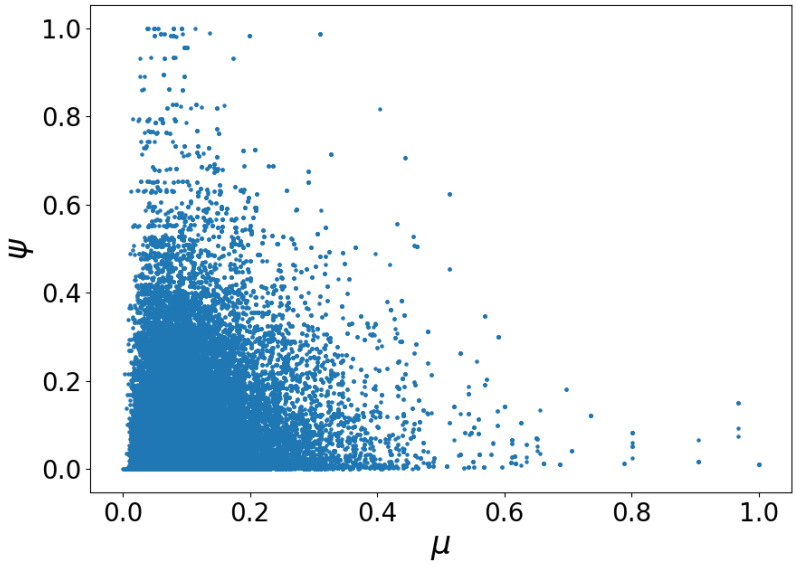

Fig. S6: Scattering plot of the distribution for the mobilities in translation freedom degree (μ) and rotational freedom degree (ψ) for all particles in the system.