

Supplementary Materials

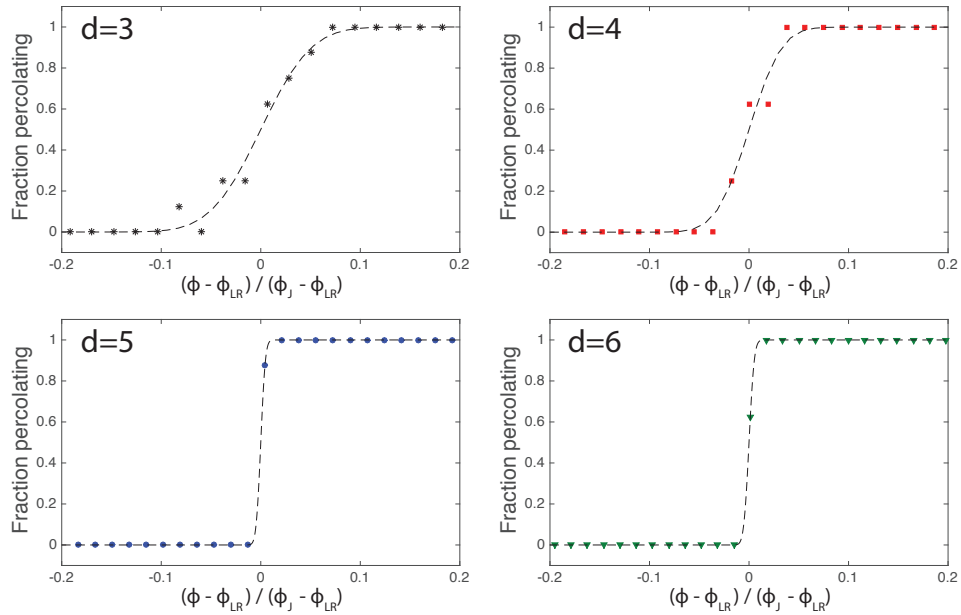


FIG. S1. The fraction of locally rigid particles as a function of scaled packing fraction (symbols) along with the error function fits (dashed lines) in $d = 3-6$. The fits are used to determine both ϕ_{LR} and its error. Each is averaged over 8 systems with 16384 particles.

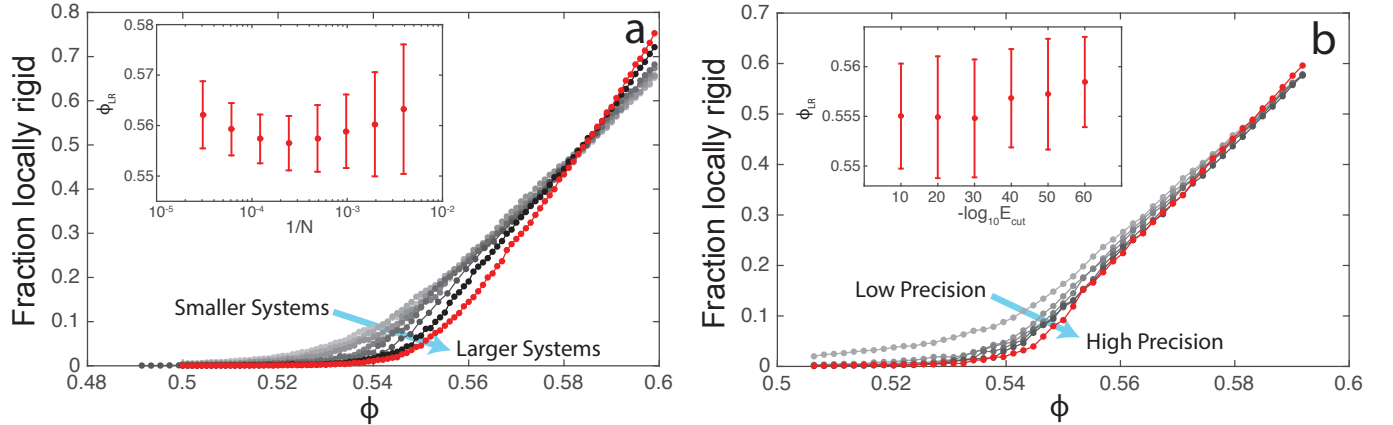


FIG. S2. a) Finite size effects in $d = 3$ seen for system sizes ranging from $N=256$ (light gray) to 16384 (black) in powers of 2 and the largest system 32768 in red. We average over 256 systems at $N=256$, 128 at $N=512$, 64 at $N=1024$, 32 at $N=2048$, 16 at $N=4096$, 16 at $N=8192$, 16 at $N=16384$, and 16 at $N=32768$. The inset shows the change of ϕ_{LR} as a function of system size. b) Differences in precision in $d = 3$ as measured by $-\log_{10} E_{cut} = 10, 20, 30, 40, 50$ (light gray to black) and the highest precision of 60 in red. This data is averaged over 16 systems of $N=8192$ particles. The inset shows how ϕ_{LR} changes with precision. The non-monotonicity of ϕ_{LR} with system size, the lack of energy cut dependence, and the lack of collapse onto the higher dimensional curves in Figure 2a are the reasons we chose to focus on systems with $d > 3$