Electronic Supplementary Material (ESI) for Soft Matter. This journal is © The Royal Society of Chemistry 2022

Supplementary Information

Description of the Supplementary Videos:

Transient evolutions of the system at $\rho=1.03$, with uniformly distributed initial positions $\{\hat{\mathbf{r}}_i\}_i$ and orientations $\{\hat{\mathbf{p}}_i\}_i$. Video durations are: 25 τ .

Video 1: Gas state at $\tau^{-1} = 0.4$.

Video 2: Liquid state at $\tau^{-1} = 10$.

Video 3: Liquid state at $\tau^{-1} = 40$.

Video 4: Crystal state at $\tau^{-1} = 200$.