

Abstract Submitted
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Generalized Bond Order Parameters to Characterize Transient Crystals MASAHARU ISOBE, Nagoya Institute of Technology, BERNI ALDER, Lawrence Livermore National Laboratory — Higher order parameters in the hard disk fluid are computed to investigate the number, the life time and size of transient crystal nuclei in the pre-freezing phase. The methodology introduces further neighbor shells bond orientational order parameters and coarse-grains the correlation functions needed for the evaluation of the stress autocorrelation function for the viscosity. We successfully reproduce results by the previous collision method for the pair orientational correlation function, but some two orders of magnitude faster. This speed-up allows calculating the time dependent four body orientational correlation between two different pairs of particles as a function of their separation, needed to characterize the size of the transient crystals. The result is that the slow decay of the stress autocorrelation function near freezing is due to a large number of rather small crystal nuclei lasting long enough to lead to the molasses tail.

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