

Searching the Gardner transition in physical systems

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The last few years have witnessed a considerable advance in the microscopic description of glasses: finally a full mean-field theory has been obtained [1]. In the predicted phase diagram, the jamming transition is located inside the glass phase and corresponds to a transition from entropic rigidity to mechanical rigidity. Unexpectedly, the theory predicts the existence of a new phase transition between both, a Gardner transition. Remarkably, the criticality of the new phase brings an universal explanation for the anomalies observed in amorphous solids if compared with crystalline ones, and sets the path towards the development of a theory for amorphous solids.

In this talk, I will present direct numerical evidences for the relevance of this Gardner transition in physical systems [2, 3, 4, 5]. I will discuss different approaches and protocols to detect it via computer simulations of hard spheres and vapor-deposited soft disks, some of which have already been successfully repeated in real experiments [6].

References

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