

Webinar

Vibrational and Mechanical Properties of Model Amorphous Solids

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Amorphous materials exhibit a wide range of as-yet unexplained thermodynamic properties. We utilise theoretical and computational techniques to better understand and create models of disordered solids that describe real systems. We derive exact distributions for the elements of the Hessian matrix, which describes the 'effective spring-constants' between the constituent particles of a material. We show that these distributions display singularities depending on the nature of the underlying inter-particle potential. The knowledge of these distributions allows us to predict and probe effects on the stability of glass-forming model systems. Next, we detail an appropriate 'shear-stress' ensemble with which to simulate amorphous solids, and the drastic effects that such ensembles have on their vibrational properties. Lastly, we introduce novel techniques to better understand the disorder-induced complexity of the energy landscape of amorphous systems, by making use of mechanical annealing procedures.

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2:00 PM