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**Density of states and soft modes in ordered and disordered colloidal systems: Experimental observations** ANTINA GHOSH, VIJAYAKUMAR K. CHIKKADI, PETER SCHALL, University of Amsterdam, JORGE KURCHAN, ESPCI, Paris, DANIEL BONN, University of Amsterdam — Glasses are structurally disordered systems that exhibit mechanical properties of solids. At low temperature the thermodynamic properties (heat capacity) of such glassy disordered materials are found to be markedly different from the respective crystal indicating a richer microscopic dynamics. Such deviations are attributed to an “excess” of modes at low frequencies observed in the density of states. Further insight in this problem could be gained by understanding the nature of such anomalous modes. In the present study, we compute and compare the vibrational density of states and corresponding long wavelength modes of colloidal hard sphere glasses with its crystalline counterpart from the experimental data. This identifies the observed “excess” modes in glasses as transverse modes. These modes appears to be quasi-localized for glasses: the participation ratio provides a quantitative measure of such localization.

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