

A transient amorphous solid formed from low density aqueous charged sphere suspensions

Ran Niu^{*}, Sabrina Heidt, Maximilian Hofmann, Thomas Palberg

Institute of Physics, Johannes Gutenberg University, D-55099 Mainz, Germany

**ranniu@uni-mainz.de*

Glass transition is one of the fundamental problems in condensed matter physics. Colloidal glasses are most commonly observed in hard spheres or hard sphere polymer mixture systems. In charged sphere systems, they have so far been reported at elevated packing fractions, where strong self-screening renders the electrostatic repulsion very steep. Here we report the observation of a low density amorphous solid, formed in a thoroughly deionized suspension of highly charged latex spheres with diameter of 118 nm. The transition occurs close to the fluid-solid phase boundary with number density of $n = 2 \cdot 10^{-18} \text{ m}^{-3}$ corresponding to a volume fraction of 0.005. From static light scattering experiments, the samples show a liquid-like structure factor. Torsional Resonance Spectroscopy provides a shear rigidity in the range of 0.3-0.5 Pa. The intensity auto-correlation function of samples manifests the typical two-step decay [1]. Although our data are still somewhat preliminary, this seems to be the first experimental observation of a low density Wigner glass in colloidal system.

[1] T. Palberg, E. Bartsch, R. Beyer, M. Hofmann, N. Lorenz, J. Marquis, R. Niu and T. Okubo, arXiv:1602.08947.