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Exploring the phase behavior of microgel suspensions with Neutron Scattering and Hydrostatic Pressure JUAN-JOSE LIETOR-SANTOS, Georgia Institute of Technology, URS GASSER, Laboratory for Neutron Scattering, ETH, Zurich and Paul Scherrer Institute, 5232, Villingen, PSI, Switzerland, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology — Gels are crosslinked-polymeric networks immersed in a solvent, whose size is sensitive to changes in environmental properties such as temperature, pH or light. Microgels are gels in the colloidal domain. The intrinsic particle elasticity allows microgel suspensions to display a very rich phase behavior as opposed to a system of hard spheres in which liquid, crystal and glassy phases are observed depending solely on the volume fraction of the particles. We study the phase behavior of microgel suspensions varying the volume fraction of the system by using the swelling properties of the particles, which we tune using hydrostatic pressure; the use of pressure allows fast particle size changes that occur homogeneously throughout the sample. To characterize the structural and dynamical properties of the system we use Light and Small Angle Neutron Scattering. We observe formation of crystal and glassy phases, reminiscent of the behavior of colloidal hard spheres. However, our data seems to suggest that the suspension polydispersity changes with particle volume fraction; through these changes, the system manages to crystallize and forms glasses with unusual structural features.

Juan-Jose Lietor-Santos
Georgia Institute of Technology

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