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Structure and Transport Anomalies in Soft Colloids SAMANVAYA SRIVASTAVA, LYNDEN ARCHER, Cornell University — We present structure, dynamics and rheology measurements for model nanoparticle suspensions comprising of silica nanoparticles, densely grafted with oligomeric polyethylene glycol (PEG) chains and suspended in similar PEG oligomers. Small angle X-ray scattering reveals anomalous structural trends wherein the particle-particle correlations are found to decrease as the particle volume fraction rises beyond the point of particle overlap. Upon further increase in the particle loading, investigation of the particle dynamics through X-ray photon correlation spectroscopy points towards an unusual speeding up of the nanoparticles. Analogous "cascade of anomalies" are observed in systems including complex molecular fluids like water and silica as well as in systems interacting via soft repulsive potentials, and similar forces are expected to lead to the origin of these anomalous trends in all the cases.

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