

Abstract Submitted
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Low-electric-field phase behaviour of Brownian colloidal suspensions in sedimentation equilibrium¹ AMIT AGARWAL, NING LI, ANAND YETHIRAJ, Department of Physics and Physical Oceanography, Memorial University of Newfoundland — We study the phase diagram of the suspension of micron-scale fluorescent labeled silica colloids in aqueous suspension as a function of concentration in the presence of a moderate (less than 1 volt per μm) AC electric field. Confocal microscopy was used to track three-dimensional structure and dynamics of colloidal suspensions in sedimentation equilibrium. We characterize thresholds for field-induced organization in monodisperse colloidal suspensions of two particle diameters using orientational order parameters. We then study structure formation at moderate fields above the field threshold. At concentrations greater than 10%, and electric fields much larger than the field threshold measured, the colloidal suspension crystallizes to form a body centered tetragonal structure as has been previously reported. At lower concentrations and moderate fields, we uncover complex structure formation phenomena that include equilibrium cellular structures.

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