Shear Induced Precursors and Subsequent Crystal Growth in Double Wall Confined Colloidal Suspensions

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We aim at a refined understanding of the mechanisms and kinetics of nucleation after application of shear fields. In a first step we studied the equilibrium behaviour in single and double wall confinement by computer simulation and experiment. A rich phase behaviour was discovered as a function of geometry and interaction strength. The former was varied from confinement by thin slits to bulk geometries. The latter was varied between the theoretical limits of the one component plasma and the hard sphere case. Light scattering and microscopy extended these studies to sheared suspensions, where a strong correlation between the structure and the modes of motion was observed. While the equilibrium structure had been adjusted to be body centred cubic, the prevailing structure under shear were hexagonally ordered layers, After abortion of shear and registration of layers, the combination of different geometries and former shear conditions were observed to lead to different scenarios of crystal formation. Also these are reported and discussed in some detail.