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Stokesian Dynamic Simulations of Colloid Assembly at a Fluid Interface ARCHIT DANI, CHARLES MALDARELLI, City College of New York — The collective dynamics and self-assembly of colloids floating at a gas/liquid or a liquid/liquid interface is a balance between deterministic lateral interaction forces, e.g. capillary attraction and dipolar electrostatic repulsion if the particles are charged, viscous resistance to colloid motion along the surface and thermal fluctuations. As the colloid size decreases, thermal (Brownian) forces become important and can affect the self assembly into ordered patterns and crystal structures that are the starting point for materials applications. Stokesian dynamics simulations are presented to describe the lateral organization of particles along the surface in Brownian dominated regimes that includes (using a pairwise approximation) capillary attraction and the hydrodynamic interaction between particles (incorporating the effect of the particle immersion depth) and thermal fluctuations. Clustering, fractal growth and particle ordering are observed at critically large values of the Peclet numbers, while smaller values yield states in which particles remain uncorrelated in space and more widely separated.

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