

Honours Thesis Seminar: Unusual dielectrophoretic behaviour in a colloidal suspension

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PLACE: C3024

ABSTRACT: Tracking the movement of colloids in a liquid-medium in the presence of an external driving force provides an opportunity to study non-equilibrium behavior of materials. This out-of-equilibrium competition between an external driving force and diffusion in the presence of induced structures can be complex. By having colloids sediment by means of density-mismatch, one can make the system two-dimensional. In this work, we study the frequency and field amplitude dependence of electric field-induced dielectrophoresis in 3 colloidal suspensions.

We first study the time-dependent dielectrophoresis (DEP) phenomena at high electric field frequencies for colloidal suspensions with differences in dielectric constants between a particle and a liquid-medium, represented by the sign of the Clausius-Mossotti factor, $K(w)$. By changing solvent of different dielectric constant, we observed negative and positive DEP where expected. We then examined the frequency and field amplitude dependences of negative DEP in detail. The dependence of width of confinement on field amplitude is shown to be non-monotonic, implying the existence of an additional electrical force. In this talk, we discuss the possible origins of this unusual non-monotonic behavior.

ALL ARE WELCOME!!!