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Dielectrophoretic Force Microscopy of Aqueous Interfaces

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Abstract

A novel scanning probe microscopy technique has allowed dielectrophoretic force imaging with nanoscale spatial resolution. Dielectrophoresis (DEP) traditionally describes the mobility of polarizable particles in inhomogeneous alternating current (AC) electric fields. Integrating DEP with atomic force microscopy allows for non-contact imaging with the image contrast related to the local electric polarizability. By tuning the AC frequency, dielectric spectroscopy can be performed at solid/liquid interfaces with high spatial resolution. In studies of cells, the frequency-dependent dielectrophoretic force is sensitive to biologically relevant electrical properties, including local membrane capacitance and ion mobility. Consequently, dielectrophoretic force microscopy is well suited for *in vitro* non-contact scanning probe microscopy of biological systems.