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Coulomb Interactions of Colloidal Particles in Oil SUNIL SAINIS, Yale University Mechanical Engineering Department, ERIC DUFRESNE, Yale University, Departments of Mechanical Engineering, Chemical Engineering and Physics — We study the electrostatic interactions of microspheres (PMMA-PHSA) in solutions of surfactant (NaAOT) in oil (hexadecane). We directly measure the forces between isolated pairs of particles to extract the particle charge and solvent ionic strength. Over a wide range of surfactant concentrations, the interparticle forces are indistinguishable from unscreened Coulomb interactions. Far above the critical micelle concentration, however, the interactions assume the familiar screened Debye-Huckel form. Long-ranged interactions between micron-sized particles provide a window to study the structure and dynamics of strongly-correlated systems.

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