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Experiments on a two dimensional lattice of charged colloids above a water-oil interface WILLIAM IRVINE, YAEL ROICHMANN, ANDREW HOLLINGSWORTH, DAVID GRIER, PAUL CHAIKIN, Department of Physics and Center for Soft Matter Research, New York University — Charged hydrophobic (PMMA) colloids in an oil phase (cyclohexyl bromide) are attracted, without wetting, by image charge effects to an oil-water interface. The micron size spheres form a monolayer on the interface and interact via screened coulomb interactions to form a crystalline or hexatic lattice, depending on the tunable ratio of lattice spacing to screening length. We study the statics and dynamics of this system in periodic, commensurate, incommensurate, random and quasi-periodic potentials applied by holographic optical tweezers. The use of holographic tweezers allows considerable control over the character and strength of the applied potential. A similar system has been used to study the effects of a curved fluid interface on the particle density and on topological defects.

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