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Pair Interactions of Superhydrophobic Colloids at an Oil-Aqueous Phase Interface COLM KELLEHER, New York University, ANNA WANG, Harvard University, IVAN GUERRERO, Northwestern University , BHASKAR KRISHNATREYA, ANDREW HOLLINGSWORTH, DAVID GRIER, New York University, VINOTHAN MANOHARAN, Harvard University, PAUL CHAIKIN, New York University — Superhydrophobic PMMA colloids, dispersed in oil, can become highly charged. In the presence of an interface with a conducting aqueous phase, image charge effects lead to strong binding of colloidal particles to the interface, despite the fact that the equilibrium contact angle $\theta_c > 170°$. We present the results of a series of experiments designed to probe the attraction of individual colloids to the interface, and the repulsion between pairs of interfacially bound colloids. We show that these interactions are relatively uniform, reproducable, and time-independent, and can be described by a simple model in which the only parameters are the particle charge and the Debye screening length in the oil phase. These factors make this system a good candidate for studying various equilibrium and non-equilibrium phenomena in 2D condensed matter physics, for example defect formation and dynamics in 2D colloidal crystals, and structural rearrangements in sheared colloidal glasses.

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