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Fluid dynamics of floating particles NADINE AUBRY, Carnegie Mellon University, PUSHPENDRA SINGH, New Jersey Institute of Technology, D.D. JOSEPH, University of Minnesota — We study the motion of micron sized particles floating on the interface between two immiscible fluids both experimentally and numerically. In our direct numerical simulations (DNS) the particles are moved respecting the fundamental equations for the motion of both the fluids and the solid particles without the use of any models. The fluid-particle motion is resolved by the method of distributed Lagrange multipliers and the interface is deformed by the method of level sets. We simulate the evolution of heavier-than-liquid hydrophobic spheres to their equilibrium depth and their transient free motions leading ultimately to self-assembly under lateral forces collectively called capillary attraction. We also investigate the influence of an externally applied electric field on the particles motion at the interface. The dependence on the parameters such as the dielectric properties of the fluids and the particles, the particles' position within the interface, and the strength of an externally applied electric field on the motion of the particles is also studied.

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