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Capillary Interactions Among Spherical Particles at Cylindrical Air/Liquid Interfaces PAUL KIM, THOMAS RUSSELL, DAVID HOAGLAND, Univ of Mass - Amherst — When particles are absorbed on interfaces between immiscible fluids, spontaneous capillary interaction occurs. Particles migrate to specific locations and orient themselves in the way that decrease the interfacial area. The shape of interfaces plays an important role in the mechanics of adsorbed particles, since the initial interfaces curvature overlaps with the interfaces deformation by particles. Theory suggests that spheres adsorbed on a cylindrical interface exhibit a quadrupolar capillary interaction. The interface is deformed non-symmetrically around spheres to make a constant contact angle, resulting in attractive or repulsive interaction among spheres according to their relative angles. To understand the role of the interface shape on the capillary interactions, experiments were performed to test theoretical arguments. Polystyrene microparticles of different sizes are sprinkled on hemi-cylindrical air/liquid (i.e. ionic liquid or PEG700) interfaces and tracked by optical microscopy. The investigation affords insights into directed assembly of particles at interfaces and point to routes by the lateral assembly of particles can be manipulated and controlled.

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