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Curvature-Induced Potential for Colloidal Particles at an Oil-Water Interface COLM KELLEHER, PAUL CHAIKIN, New York University — At the micrometer scale, surface tension plays a predominant role in the interactions that occur at fluid interfaces. For example, when a spherical colloidal particle is adsorbed onto a curved oil-water interface, the surface must deform in order to satisfy the requirement of constant contact angle. The energy cost of the deformation depends on the local curvature of the interface, and so a particle sitting on an interface of varying curvature will experience a potential which depends on the particle's position on the interface. We present results from an experiment in which a capillary bridge droplet creates an interface of varying Gaussian curvature. The shape of this interface is obtained by using confocal microscopy. One or more spherical microparticles are then introduced to the interface. We demonstrate that a curvature-induced potential exists for a single wetting particle, which attracts the particle to the most highly curved regions. By tracking the motion of the particle in 3D, we are able to calculate the forces acting on the particle. We can then compare these forces to theoretical and numerical predictions based on the shape of the interface.

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