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Wetting Colloidal Particles at a Curved Interfaces COLM KELLEHER, PAUL CHAIKIN, New York University Center for Soft Matter Research — At scales much smaller than the capillary length, surface tension plays a predominant role in the interactions that occur at an oil-water interface. When a spherical colloidal particle is adsorbed onto such an interface, two surface-tension-related effects occur: the adsorbed particle reduces the area of the interface, and the interface deforms in order to satisfy the requirement of constant contact angle at the three-phase contact line. If the interface is not flat or spherical, these effects depend on the position of the particle on the interface. In other words, the particle experiences an effective potential induced by the shape of the interface. [A. Wurger, PRE, 74, 041402 (2006).] We present results from an experiment in which a capillary bridge creates an interface of varying Gaussian curvature, onto which a colloidal particle is introduced. The shape of this interface is obtained by using confocal microscopy. We demonstrate that a shape-induced effective potential exists for this system, which attracts the wetting particle to the most curved regions. By tracking the motion of the particle in 3D, we are able to calculate the effective spring constant of this potential. We then compare our result to numerical and analytical predictions based on the geometry of the droplet.

Colm Kelleher
New York University CSMR

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