Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Contact-line deformation around a spherical particle at an anisotropic liquid interface NESRIN SENBIL, WEI HE, ANTHONY DINSMORE, University of Massachusetts, Amherst — The shape of the contact line around a particle determines its interaction with other particles at liquid interfaces. Thus, the shape of the interface and contact line is significant for self-assembly and many other applications of colloids. In our experiments, we used PDMS-coated millimeter-sized glass spheres to avoid pinning. The contact line around the sphere is observed at initially flat, cylindrical-like and saddle-like shapes with a camera placed perpendicular to the plane of the initially flat interface. Unlike flat interfaces, at anisotropic interfaces, the contact line around the sphere is not circular. Our results demonstrate that the quadrupolar deformation of the contact line (z_2) increases with deviatoric curvature (anisotropy) of the interface (D_0). For instance, for a PDMS-coated glass sphere with a diameter 3.2mm, as D_0 increases from 0 to 0.12mm^{-1}, z_2 increases from 0 to about 0.3mm. We will discuss the relation among z_2, D_0, mean contact radius, particle radius, and contact angle and compare to theory. Our results are important to understand the assembly of particles at anisotropically curved interfaces. This work is funded by the NSF through CBET-0967620 and by the Gulf of Mexico Research Initiative through the C-MEDS consortium.

Nesrin Senbil
University of Massachusetts, Amherst

Date submitted: 14 Nov 2014 Electronic form version 1.4