“Effect of Interface Shape on Contact Angle and Contact Line around a Sphere at a Liquid Interface”

Contact angle and contact line are important parameters for determining the shape and movement of droplets on surfaces. When a sphere is adsorbed to a fluid interface, it deforms the interface and makes an angle defined as the contact angle. I will talk about how this angle (specifically advancing and receding contact angles) changes with the shape of the interface. For centuries, the contact angle has been considered to depend on the composition of the fluids and the solid as well as the solid topography, independent of shape of the interface. However, our results show that the receding contact angle of a sphere decreases at anisotropic interfaces. Difference in cosine of the receding angle between curved and flat interfaces depends linearly on the interface’s deviatoric curvature, a measure of shape anisotropy. In addition, an anisotropic interface deforms the contact line around the sphere and contact line becomes non-planar. It was predicted that at a curved interface, the contact line around the sphere adopts quadrupolar symmetry. These experiments provide the first direct measurements of quadrupolar symmetry (to our knowledge). Those results are important for self-assembly of particles and many other technological applications such as microfluidics, electricity generating, and self-cleaning surfaces.

*Refreshments available at 1:45 pm.