Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

The Short-range Capillary Force on Floating Objects ANDONG HE, Nordic Institute for Theoretical Physics (NORDITA), KHOI NGUYEN, SHREYAS MANDRE, School of Engineering, Brown University — We develop a general method to study the capillary force between objects of arbitrary shape which float close to each other on an interface, a regime in which multipole expansion is not useful. The force is represented as a power series in the small distance between the objects, of which the leading-order is finite. For objects with size a much larger than the capillary length l_c, the force scales as $\sqrt{a/l_c}$ and the prefactor depends on the mean radius of curvature R at the closest points. After contact the objects roll and/or slide with respect to each other to locally maximize R. For smaller objects ($a \ll l_c$), the force scales as $(a/l_c)^{-1}\log(a/l_c)^{-2}$, and the prefactor depends only weakly on the shape and relative orientation of the objects.

Andong He
Nordic Institute for Theoretical Physics (NORDITA)

Date submitted: 03 Aug 2012 Electronic form version 1.4