Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Inter-particle interactions and assembly of ellipsoidal Janus particles at liquid interfaces HOSSEIN REZVANTALAB, STEPHEN ROWE, SHAHAB SHOJAEI-ZADEH, Rutgers, The state University of New Jersey — We study the capillary-induced interactions between ellipsoidal Janus particles adsorbed at flat liquid-fluid interfaces. In contrast to spherical particles, isolated Janus ellipsoids with a large aspect ratio or a small difference in the wettability of the two regions tend to tilt at their equilibrium orientation. The interface around such tilted particles deforms and their overlap results in capillary interactions between neighboring particles. These interactions are quantified through minimization of interfacial energy variation as a function of the separation distance between the particles. We show that Janus ellipsoids prefer to align side-by-side at the interface. We also evaluate the role of particle aspect ratio and the degree of amphiphilicity between its two regions on the inter-particle capillary forces and torques. For particles of equal surface area, the energy profiles are independent of the aspect ratio, while increasing the amphiphilicity results in an enhancement in the capillary force in-contact and the torque inducing the side-by-side configuration. This indicates that Janus ellipsoids exhibit stronger interactions compared to their homogeneous counterparts.

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Date submitted: 02 Aug 2013 Electronic form version 1.4