Abstract Submitted
for the FWS14 Meeting of
The American Physical Society

Particles on the interface of oil and water: Topological Defects Produced by Anisotropic Particles CHARLES MELTON, LINDA HIRST, University of California Merced — Topological defects have been the subject of many fascinating studies in soft condensed matter physics. The ability to control the onset of topological defects would prove to be invaluable to fields that benefit from defects such as electronics, the food industry, and pharmaceutical applications. In this study, the topological defects are studied in an oil/water emulsion system stabilized by polystyrene particles. The particles have varying aspect ratios, thus allowing for defects to be formed as a function of anisotropy. Fluorescence microscopy is used to image the particles on the interface between oil and water. Confocal microscopy is then used to image the particles in 3D space, allowing for a 3D mapping of the particles and reconstruction the oil/water interface. We observe spontaneous curvature of the interface when anisotropic particles are used and attribute this phenomenon to topological defects formed as a result of particle packing. Being able to visualize how particle packing and defect formation correlates to induced curvature of a deformable interface can aid in forming models that can explain the formation of topological defects in other systems, such as lipid bilayers and liquid crystal films.

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Date submitted: 07 Oct 2014 Electronic form version 1.4