MAR10-2009-001689

Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

Structure and Stability of Defect Arrays on Curved Interfaces[1]

MARK BOWICK, Syracuse University

In a wide variety of physical systems over many length scales one encounters interfaces or intrinsic two-dimensional surfaces that are curved. Condensed matter order on these surfaces has several novel features not encountered in flat space, including the presence of topological defects in the ground state that would normally only be excited states on planar surfaces, and the instability of otherwise stable configurations such as interstitials. I will discuss the structure and stability of these defect arrays as a function of the geometry and topology of the surface, the nature of the long range order itself and the number of ordering units. Since defects are prime candidates for sites to attach ligands via functionalization, this understanding may aid in the design of mesoscale "atoms" which themselves can self-assemble into novel mesoscale molecules and in turn bulk materials. I will emphasize several physical systems, including colloidal droplets and block copolymer vesicles, in which defect arrays may be imaged and the above ideas explored.

[1]Supported by NSF grant DMR0808812.