

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Elastic Instabilities of Nematic Liquid Crystals in Spherical Geometries** VINZENZ KONING, Leiden University, TERESA LOPEZ-LEON, K.B.S. DEVAIAH, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology, VINCENZO VITELLI, Leiden University — We investigate elastic instabilities of nematic liquid crystals confined in spherical shells characterized by extreme thickness inhomogeneity. For shells with a uniform thickness there exists an equilibrium defects structure containing two pairs of boojums at the north and south poles. By minimizing the elastic free energy (subject to tangential boundary conditions on both bounding surfaces), we determine the locations of the defects as a function of thickness inhomogeneity. We find that the defects make an abrupt confinement transition to the thinnest hemisphere from the initial antipodal arrangement, when the thickness inhomogeneity exceeds a critical value. Our results agree well with recent experimental studies on nematic double emulsions and suggest design criteria to engineer micron scaled particles with directional binding capabilities.

Vinzenz Koning  
Leiden University

Date submitted: 23 Dec 2010

Electronic form version 1.4