Disorder Induced by Capillary Interaction between Colloidal Particles Trapped at the Air/Water Interface

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The thermodynamic consequences of quadrupolar capillary interaction between colloidal particles on macroscopic length scales have been explored. At low densities square order prevails, while it competes with the hexagonal order that finally dominates at high densities, although it ends up frustrated.Colloid chemical modification enhances the capillary interaction and order frustration. Deconvolution of Ornstein-Zernike equation using the experimental radial distribution functions shows the existence of a micrometer range effective interaction with two wells.