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Topological defects in colloidal Wigner crystals on curved surfaces

WILLIAM IRVINE, Center for Soft Matter Research, NYU

Charged hydrophobic (PMMA) colloids in an oil phase (cyclohexyl bromide) are attracted, without wetting, by image charge effects to an oil-water interface. The micron size spheres form a monolayer and interact via screened coulomb interactions to form a crystalline lattice. By creating curved oil-water interfaces having positive, negative and varying Gaussian curvature as well as different Euler numbers, we study the influence of curvature on the distribution and dynamics of topological defects. We image and manipulate the full crystal on the curved surface using a setup capable of simultaneous holographic optical tweezing and confocal imaging.