

Abstract Submitted
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Mystery on Charge Asymmetry: Anionic Macroions in Periodic Lattices Held by Hydrated Cations and Not vice versa¹ WILLIAM KUNG, MONICA OLVERA DE LA CRUZ, Northwestern University — We propose a mean-field analytical model to account for the observed asymmetry in the ability to form long-range attraction by the negatively charged colloidal particles and not their equivalently charged positive counterpart. We conjecture that this asymmetry is due to solvation effects, and we phenomenologically capture its physics by considering the relative strength of this water-induced short-range repulsion between the different charge species. We then apply our model to the colloidal system of negatively charged disks that are neutralized by a sea of counterions and strongly absorbed to an interface in a compressible binary system. We demonstrate the resulting coexistence between a dilute isotropic ionic phase and a condensed hexagonal lattice phase as a function of density and interaction strength.

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