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Anisotropic Characteristic Lengths of Colloidal Monolayers near a Water-Air Interface

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Near-interface colloidal monolayers have often been used as model systems for research on hydrodynamics in biophysics and microfluidic systems. Using optical microscopy and multiparticle tracking techniques, the correlated diffusion of particles is experimentally measured in colloidal monolayers near a water-air interface. It is found that the characteristic lengths χ_{\parallel} and χ_{\perp} of such a colloidal monolayer are anisotropic in these two perpendicular directions. The former (χ_{\parallel}) is equal to the Saffman length of the monolayer and reflects the continuous nature of the system in the longitudinal direction. The latter (χ_{\perp}) is a function of both the Saffman length and the radius of the colloids and reflects the discrete nature of the system in the transverse direction. This discovery demonstrates that the hydrodynamics intrinsically follow different rules in these two directions in this system.

Keywords: Hydrodynamics, liquid interface, colloid, characteristic lengths.

Biography:

Wei Chen completed his Ph.D and he working as a associate professor in Fudan University. His research interests are Philosophy of logic, philosophy of language; legal logic; argumentation theory and critical thinking; analytical Marxism; philosophy of the internet.