

HYDRODYNAMIC COUPLING AND TWO-POINT CORRELATIONS OF ROTATING SPHERES

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Hydrodynamic interactions are a specific feature of colloidal dispersions. They play an important role in recent microrheological experiments where, e.g, the correlation functions for a pair of optically trapped particles is measured in order to determine properties of the surrounding complex fluid.

This talk addresses hydrodynamic interactions of two colloidal particles including the rotational degree of freedom. We consider two particles, harmonically trapped in their positions and orientations, and analyze their correlated Brownian motion in a Newtonian fluid. The coupling between rotation and translation gives rise to several two-particle correlation functions which will be explored in this talk.

In experiments, we use birefringent liquid crystal droplets. Their orientation can be trapped by linearly polarized light. We give a first account on the ongoing experimental efforts.

If time admits, we also shortly review the collective motions of particles circling in a toroidal optical trap and investigate their drafting properties.