

Mesoscopic simulations of anisotropic chemically-powered nanomotors

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Chemically powered self-propelled colloids generate a motor force by converting locally a source of energy into directed motion, a process that has been explored both in experiments and in computational models. The use of active colloids as building blocks for nanotechnology opens the doors to interesting applications, provided we understand the behaviour of these elementary constituents. In this talk, we present a consistent mesoscopic simulation model for self-propelled colloids of complex shape with the aim of resolving the coupling between their translational and rotational motion. Considering a passive L-shaped colloidal particle, we study its Brownian dynamics and locate its center of hydrodynamics, the tracking point at which translation and rotation decouple. The active L particle displays the same circling trajectories that have been found experimentally, a result which we compare with the Brownian dynamics model. We obtain these original simulation results without any parametrization of the algorithm, which makes it a useful method for the preliminary study of active colloids, prior to experimental work.