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Modelling colloidal dynamics in complex systems CHRISTOPHER SMITH, COLIN DENNISTON, University of Western Ontario — We present a lattice Boltzmann method for dealing with solid moving boundaries in a fluid. A novel method is introduced to distribute a solid surface onto the fluid mesh. We show that for a single particle in a chute with Stokes flow, the quantitatively correct Stokes drag is obtained. Comparing two scenarios at the same Reynolds number, where the walls induce the flow or where the particle is moving, we show there is little discernible difference in the force measured. Next, we have a system with two particles and show we get quantitative agreement for the interaction between the two particles measured by our algorithm and the interaction expected according to the Rotne-Prager (RP) tensor or the Oseen tensor, in the regimes in which they are expected to be accurate. Moving away from irrotational flow, for a cylinder in a two dimensional chute the Reynolds number of the flow is increased further into the laminar region and we show the formation of eddies shedding off the solid surface. We incorporate this new algorithm into liquid crystals simulations to look at novel colloidal interactions through topological defects.

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