MSS-Seminar
Wednesday, Nov. 6th, 15:30, Nägelsbachstr. 49b

Particles in fluids: from dilute gases to dense suspensions of deformable objects

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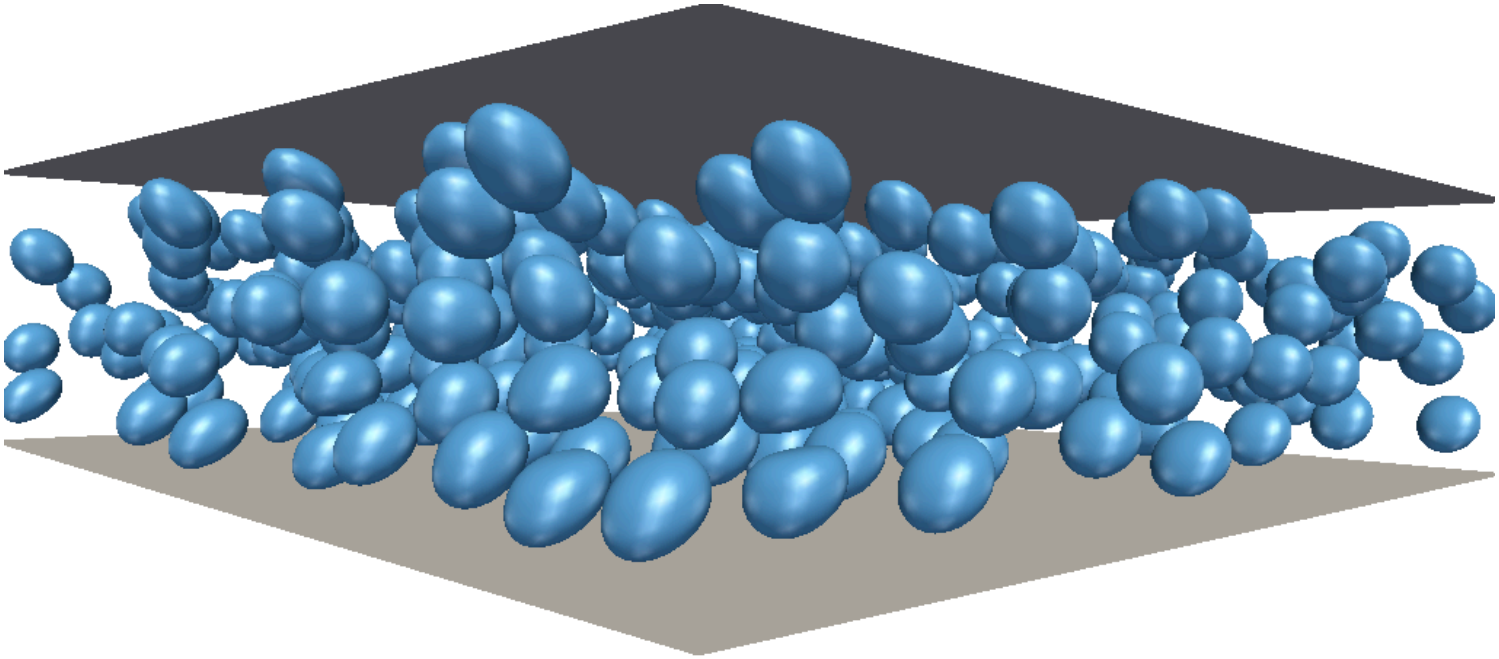

The simulation of particle-laden flows requires a combination of a solver for the underlying hydrodynamics, together with an algorithm to compute the equations of motion of the suspended objects. We present recent results from three distinct applications in different flow regimes: at first, we focus on the transport of macromolecular contaminants in dilute gas flows. Here, we use a combination of the lattice Boltzmann method for the gas flow and an event driven algorithm based on the discrete simulation Monte Carlo method for the contaminant particles. The second application focuses on dense suspensions of spherical and ellipsoidal objects, where a combination of the lattice Boltzmann method and the discrete element method is used. We report on numerical problems which cannot be avoided due to the finite resolution of any simulation, but which can be cured by applying proper lubrication corrections. At last, we report on deformable microparticles in a Poiseuille flow as a model system to study the interplay of inertia and deformability. Here, a combination of the lattice Boltzmann method, together with the immersed boundary and finite element methods for the deformable particles is used.