**The effect of particle rotation in multi-particle flow simulations[1]**

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In multi-particle flow simulations, particle rotation is difficult to calculate and is often imprecisely accounted for or ignored altogether. We examine the effect of these procedures on the overall flow characteristics through large systems of particles when the particle center is fixed and either allowed or not to rotate. We use a newly developed GPU-centric implementation of the Physalis method for the solution of the Navier-Stokes equations in the presence of finite-size spheres. We investigate periodic systems of more than 100 randomly-distributed particles at Reynolds numbers up to 100. By considering flow characteristics such as mean velocity and pressure drop, we shed light on the importance of including particle rotation effects in large particle-flow simulations.

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