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Shear Induced Diffusivity of spherical and non-spherical particles MAURICIO LOPEZ, MICHAEL D. GRAHAM, U. Wisconsin-Madison — The shear induced diffusivity due to two-particle interactions of spherical and non-spherical particles is studied to better understand the consequences of irreversibility and symmetry- breaking for shear-induced diffusion. The diffusivity of spheres, rods, and branched particles is computed by integrating the mean square displacement upon collisions. An approximate upper bound for the diffusivity is calculated by assuming that the particles leave the collision at their maximum separation. Different sources of irreversibility between the two particles are used. For spheres the irreversibilities considered are: surface roughness, repulsive force and electrostatic interaction; for the non spherical particles the diffusivity is calculated in the purely hydrodynamic case and also with a repulsive force between beads belonging to different particles. It is found that spheres are much more sensitive to the irreversibility when compared to the other particles. At small repulsion, when the range of the repulsive force r_c is 10^{-6} the particle radius, the shape of the particle has a large impact on the shear induced diffusivity, and therefore particles with broken symmetry have diffusivities that are up to five orders of magnitude larger than the ones of spheres. At high repulsion, $r_c = 10^{-1}$, all particles have diffusivities with the same order of magnitude.

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