Abstract Submitted
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Granular Fluid Kinetics Approach to Modeling Soft Colloid and Polymer Materials[1] DIMITER PETSEV[2], JHOAN TORO-MENDOZA[3], University of New Mexico, FRANK VAN SWOL[4], University of New Mexico and Sandia National Laboratories — The objective of this study is to understand the fundamental laws governing the Brownian motion of viscoelastic particles suspended in solvent at macroscopic equilibrium. Our hypothesis is that the internal degrees of freedom of the particles couple to their translational Brownian motion and affect their mean square displacement. Our system is similar to granular fluids with the important distinction that the energy absorbed by the particles during a collision is returned back thus maintaining a global thermodynamic equilibrium. We propose a new Molecular Dynamics model system that consists of tracer Brownian particles, solvent, and a virtual third component that serves as a thermal bath. The energy that is lost in an inelastic collision between Brownian and solvent particles is returned to the bath. The bath particles are undergoing elastic collisions among themselves and also with the solvent and Brownian particles. This provides a mechanism to restore and maintain an overall thermal equilibrium in the whole system. We report data on the effect of particle inelasticity on the translational diffusion.

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