

Abstract Submitted
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Anisotropic diffusion of vibrated semi-flexible granular rods

VIKRANT YADAV, ARSHAD KUDROLLI, Clark University — We discuss the diffusive dynamics of semi-flexible granular rods as a function of their concentration in a vertically vibrated container. These rods are composed of short beaded chains and are tracked with a camera, and their trajectories used to analyze the rotational and translational displacement as a function of area fraction ϕ . We observe that the diffusion in the parallel and perpendicular direction in the body frame of reference deviate from those calculated for thermally excited elastic polymer rods. In particular we find that the diffusion perpendicular to the major axis in dilute regime is observed to be greater than that in the parallel direction due to rotation about the major axis of the rod. The motion is observed to become sub-linear above $\phi = 0.48$ and 0.54 in the perpendicular and parallel directions, respectively, both lower than for spherical particles. Rotational diffusion is also investigated and found to deviate systematically from exponential decays with increase in ϕ .

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