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Correlated Motion of Rods Diffusing in 3D KENNETH DESMOND, ERIC R. WEEKS, Emory University — It's well known that micron size particles suspended in a fluid will undergo Brownian motion. This Brownian motion is the result of thermal fluctuations that cause the particles to exhibit both translational and rotational diffusion. Translational diffusion due to Brownian motion has been well studied in the past, but rotational diffusion has not received nearly as much investigation. In our experiments, we observe rotational diffusion using polystyrene ellipsoids suspended in a water glycerol mixture. We have developed an algorithm to detect both the center of mass and orientation of our ellipsoidal particles in 3 dimensions. We examine spatial correlations between rotational and translational motion of pairs of these particles. It's known that the spatial correlation between the translational motion of spherical particles decays as 1/r in a homogeneous solution where r is the separation distance between two particles. We are currently investigating the spatial decay of rotational correlation of the colloidal rods.

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