

Abstract Submitted
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Blocking effects of a sphere or spheroid immersed in linear shear flows in the Stoke's regime¹ LONGHUA ZHAO, ROBERTO CAMASSA, RICHARD MCLAUGHLIN, University of North Carolina at Chapel Hill, UNC RTG FLUIDS GROUP TEAM — Building on work by Wu and Chwang who developed closed form exact solutions of the Stokes for the case of a sphere or spheroid embedded in a linear shear layer, we study the behavior of fluid particles in such flows and document rigorously that the blocking behavior which was observed by Wu and Chwang for the two dimensional case occurs in the fully 3D case well. We compute explicitly the volume of the blocking region, which is seen to be infinite, and present the explicit and analytic solution for the particle trajectories for this fully 3D flow. Time permitting, we explore cases when the sphere or spheroid have centers displaced from the background shear symmetry line. We document an interesting bifurcation in the particle trajectories using numerical techniques.

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