

Abstract Submitted
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Shear stress developed on concentrated suspensions of large particles in turbulent shear flow ESPERANZA LINARES GUERRERO, MELANY HUNT, Caltech — Experiments were performed on concentrated suspensions of relatively large (mm size) non-spherical particles in an aqueous glycerine mixture. The suspension was sheared using the same coaxial-cylinder rheometer used by Koos *et al.*(2012) in which the outer cylinder rotated while the inner one was fixed. The rheometer walls were roughened to avoid slip. Torque measurements for pure fluid and no particles were performed to check for the presence of turbulence. For low Reynolds number ($0.3 - 3 \times 10^3$), the torque measurements compare favorably with the theoretical results for Couette flow but for higher Reynolds ($4 \times 10^3 - 1 \times 10^5$), the torques measured are higher than the ones predicted for a laminar flow. Torque measurements of suspensions of varying concentrations of polystyrene particles were performed. Neutrally and non-neutrally buoyant configurations were studied. To account for particle migration and obtain the local solid fraction, visualization of the flow at the inner wall was performed. Results of the effect of particles in a turbulent shear flow will be presented where focus will be given to distinguish whether the flow is dominated by particle interactions or hydrodynamic forces and the influence that the solid fraction has on these mechanisms.

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