

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Suspensions in a tilted trough: second normal stress difference ELISABETH GUAZZELLI, ETIENNE COUTURIER, FRANCOIS BOYER, OLIVIER POULIQUEN, IUSTI CNRS Aix Marseille University — We measure the second normal-stress difference in suspensions of non-Brownian neutrally-buoyant rigid spheres dispersed in a Newtonian fluid. The second normal-stress-difference is found to be negative and linear in shear stress. The ratio of second normal-stress difference to shear stress increases with increasing volume fraction. A clear behavioural change exhibiting a strong (approximately linear) growth in the magnitude of this ratio with volume fraction is seen above a volume fraction of 0.22. By comparing with previous data obtained for the same batch of spheres in a rotating rod geometry, the ratio of first normal-stress difference to shear stress is estimated and its magnitude is found to be very small.

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Date submitted: 27 Jul 2011

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