

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Normal stress differences in suspensions of rigid fibers¹ BRADEN SNOOK, University of Florida; Aix-Marseille Universite, LEVI DAVIDSON, JASON BUTLER, University of Florida, OLIVIER POULIQUEN, ELISABETH GUAZZELLI, Aix-Marseille Universite, UNIVERSITY OF FLORIDA TEAM — Numerical and experimental studies of normal stress differences in suspensions of rigid, non-Brownian fibers were carried out for length (L) to diameter (d) ratios of 11 to 30 at concentrations $nL^2d=1.5$ to 3, where n is the number density of fibers. The numerical results are in quantitative agreement with the experimental results and allow calculation of the hydrodynamic and contact contributions to the stress in the suspension. The simulations show that the contact contribution to the rheology is dominant in determining the normal stress differences, where the first normal stress difference is positive and approximately twice the magnitude of the second normal stress difference, which is negative.

¹This work was supported by the National Science Foundation (Grant No. 0968313). B. Snook acknowledges support from a Chateaubriand Fellowship provided by the Embassy of France.

Braden Snook
University of Florida; Aix-Marseille Universite

Date submitted: 28 Jul 2014

Electronic form version 1.4