Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

The effects of non-Newtonian viscosity on the deformation of red blood cells in a shear flow JULDEH SESAY, FOLUSO LADEINDE, SUNY Stony Brook — The analyses of the effects of non-Newtonian viscosity on the membrane of red blood cells (RBCs) suspended in a shear flow are presented. The specific objective is to investigate the mechanical deformation on the surfaces of an ellipsoidal particle model. The hydrodynamic stresses and other forces on the surface of the particle are used to determine the cell deformation. We extended previous works, which were based on the Newtonian fluid models, to the non-Newtonian case, and focus on imposed shear rate values between 1 and 100 per second. Two viscosity models are investigated, which respectively correspond to a normal person and a patient with cerebrovascular accident (CVA). The results are compared with those obtained assuming a Newtonian model. We observed that the orientation of the cell influences the deformation and the imposed shear rate drives the local shear rate distribution along the particle surface. The integral particle deformation for the non-Newtonian models in the given shear rate regime is higher than that for the Newtonian reference model. Finally, the deformation of the cell surface decreases as the dissipation ratio increases.

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Date submitted: 10 Aug 2005 Electronic form version 1.4