Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

**Numerical study of suspensions of deformable particles.**[1] LUCA BRANDT, MARCO EDOARDO ROSTI, Linne FLOW Centre, KTH Mechanics, Stockholm, Sweden — We consider a model non-Newtonian fluid consisting of a suspension of deformable particles in a Newtonian solvent. Einstein showed in his pioneering work that the relative increase in effective viscosity is a linear function of the particle volume fraction for dilute suspensions of rigid particles. Inertia has been shown to introduce deviations from the behaviour predicted by the different empirical fits, an effect that can be related to an increase of the effective volume fraction. We here focus on the effect of elasticity, i.e. visco-elastic deformable particles. To tackle the problem at hand, we perform three-dimensional Direct Numerical Simulation of a plane Couette flow with a suspension of neutrally buoyant deformable viscous hyper-elastic particles. We show that elasticity produces a shear-thinning effect in elastic suspensions (in comparison to rigid ones) and that it can be understood in terms of a reduction of the effective volume fraction of the suspension. The deformation modifies the particle motion reducing the level of mutual interaction. Normal stress differences will also be considered.

[1]European Research Council, Grant No. ERC-2013-CoG- 616186, TRITOS; SNIC (the Swedish National Infrastructure for Computing)

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Date submitted: 31 Jul 2017 Electronic form version 1.4