Abstract Submitted for the DFD10 Meeting of The American Physical Society

Direct measurement of a normal stress in a sheared suspension<sup>1</sup> JEROME MARTIN, CNRS, Lab. FAST, Orsay, FR, GEORGES GAUTHIER. STEPHEN GARLAND, University Paris XI, Lab. FAST, Orsay, FR, ANGELIQUE DEBOEUF, ESPCI, Lab. PPMD, Paris, FR, JEFFREY MORRIS, Levich Institute, CCNY, LAB. FAST, ORSAY, FR TEAM, PR JEFFREY MORRIS COLLABO-RATION — A method was recently proposed (Deboeuf et al., Phys. Rev. Lett., 2009), to measure the shear-induced "particle pressure" in a sheared non-colloidal suspension. The "particle pressure" was obtained in a Couette device through the liquid pressure, measured behind a grid permeable to the fluid but impermeable to the particles, placed at the outer cylindrical wall of the device. The liquid pressure is equal to the (vertical) component of the particle stress, in the direction of the vorticity. It gives a good estimation of the particle pressure, assuming the shear-induced particle stress is nearly isotropic. The apparatus enables also the measurement of the total pressure at the outer wall. Coupled with the grid pressure, the latter measurement gives access to the radial component of the particle stress. Our collected data demonstrate that anisotropy does exist, with a normal stress one order of magnitude lower than the particle pressure.

<sup>1</sup>Supported by Reseaux de Thematiques de Recherches Avancees "Triangle de la Physique," by the french A.N.R. project Coliner, and by an ERASMUS grant for Stephen Garland.

Jeffrey Morris Levich Institute, CCNY

Date submitted: 04 Aug 2010

Electronic form version 1.4