Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Self-organization of fiber suspension ALEXANDRE FRANCESCHINI, NYU, Dept Phys, Ctr Soft Matter Res, New York, NY 10003 USA, ELIZABETH GUAZZELLI, Aix Marseille Univ U1, IUSTI, CNRS, UMR Polytech Marseille 6595, F-13453 Marseille 13, France, DAVID PINE, NYU, Dept Phys, Ctr Soft Matter Res, New York, NY 10003 USA — A single buoyant non-Brownian fiber in a low Reynolds shear flow has a fully determined motion, so-called Jeffery orbit. However, the behavior of a concentrated fiber suspension remains unclear; even slight interactions between objects can disturb the orbits and collective behavior cannot be neglected [1]. By observing the system under a periodic shear, we are able to specifically observe the irreversible motions due to fiber-fiber interactions. collective motion is followed by viscosity measurements and quantitative image analysis [2, 3]. The angle and center-of-mass of marked fibers are also tracked. The system self-organizes and always becomes more reversible with time until a steady state, fluctuating or not, is reached. A dynamical phase transition between a quasi-reversible and a fluctuating state is observed, with a transient time that exhibit a power law divergence at the critical points. [1] Okagawa A and Mason SG, Science, Volume 181, Issue 4095, p159 (1973) [2] Pine DJ and al., Nature, vol 438, Issue 7070, p997 (2005) [3] Corte L and al., Nature physics, vol 4, Issue 5, p420 (2008)

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Date submitted: 11 Aug 2009 Electronic form version 1.4