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Critical transition in 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 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 system [1]. The non-reversible motion of the fiber suspension in oscillatory flow is monitored with a) quantitative image analysis and b) measurement of the in-phase torque response. A dynamical phase transition from a quasi-reversible state to a fluctuating one is observed as the strain amplitude is increased over a threshold at which the transient time exhibits a power law divergence. We discuss here the nature of this transition and its universality class. The main features of this transition are consistent with earlier results on sphere suspensions [2, 3], such systems might be one of the few realizations of conserved directed percolation [4].

[1] Okagawa A and al, 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)
[4] Menon GI and al, PrE, vol 79, 061108 (2009)

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