Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Angular momentum transport in complex fluids[1] XIAOYU ZHENG, Kent State University, PETER PALFFY-MUHORAY, Liquid Crystal Institute, KSU, MICHAEL SHELLEY, Courant Institute of Mathematical Sciences, NYU — When dyes are dissolved in nematic liquid crystals, the light intensity required for the optical Freedericksz transition can be dramatically decreased. This is due to the torque exerted by the dye on the liquid crystal. The dye molecules absorb light energy and rotate; torque balance is mediated by angular momentum transport from the cell walls via shear flow generated by the rotation [1]. We present a model which accounts for the transport of angular momentum caused by singular vortices present in these complex fluids. The singular vortices generate flow, and are transported by the flow which they generate. For simple fluids, the distribution of vorticity satisfies the biharmonic equation in the Stokes limit, which can be solved analytically. In the case of the non-Newtonian fluids, such as liquid crystals, Leslie-Ericksen continuum theory is used to describe the interactions between the rod-like molecules. [1] P. Palffy-Muhoray, T. Kosa and Weinan E, "Brownian Motors in the Photoalignment of Liquid Crystals", *Appl. Phys. A* **75**, 293-300 (2002).

[1]This work was supported by the NSF under grant DMR 0606357.

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Date submitted: 04 Dec 2007 Electronic form version 1.4