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**Xiang Xu\*** (xu\_x@math.psu.edu), 1400 Martin Street, Apt 2052, State College, PA 16803, and **Hao Wu** and **Chun Liu**. *Global existence and long time behavior of the general Ericksen-Leslie system.*

The Ericksen-Leslie system modeling the flow of nematic liquid crystals is a coupled system consisting of Navier-Stokes equations and kinematic transport equations for molecular orientation. First, through different energetic variational approaches, we get a physical derivation of the system, and distinguish conservative and dissipative parts of the induced stress terms. Then the existence of global classical solutions is proved, under the assumption of one large viscosity coefficient. Furthermore, by a suitable type Lojaciewicz-Simon inequality, we find the convergence of the classical solutions to steady states as time tends to infinity and get the estimate on the convergence rate. Finally, we study the well-posedness of the system when the initial data is near a functional minimizer, and reveal the relation between Parodi's condition and stability property of the liquid crystal system. (Received September 20, 2010)