# Dynamics of Nematic Liquid Crystal Flows: the Quasilinear Approach

Katharina Schade; Technische Universität Darmstadt

**Abstract**

Liquid crystals are matter in a state between liquid and solid. They flow like a liquid, but their molecular structure is similar to that of a solid crystal. In the most common nematic phase, molecules possess an orientation but no positional order. The Ericksen-Leslie model describes the flow of nematic liquid crystals with Navier-Stokes equations coupled with a diffusion equation governing the behavior of the direction field.

We analyze some Ericksen Leslie systems in a quasilinear setting. We show the local existence of strong solutions using a variant of Clément-Li together with maximal $L_p$-regularity results. We also investigate stability of equilibria with the generalized principle of linearized stability, obtain global existence of strong solutions which are eventually bounded on their maximal existence interval and discuss regularizing effects.