

Compressible Active Nematic Liquid Crystals: Existence of Dissipative Solutions

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Abstract

We discuss the hydrodynamics of compressible active nematic liquid crystals in a three-dimensional and bounded domain, with a nonlinear viscosity tensor and nonhomogeneous boundary data, in a Landau-de Gennes framework. We prove the existence of *dissipative solutions* within a Beris-Edwards type model for active nematodynamics, which are weak solutions satisfying the underlying equations modulo a defect measure. The proof follows from a three level approximation scheme – the Galerkin approximation, the classical parabolic regularization of the continuity equation, and the convex regularization of the potential generating the viscous stress. This is a joint work with Apala Majumdar (Manchester) and Šárka Nečasová (Prague).

References

- [1] K. Bhandari, A. Majumdar, Š. Nečasová. Dissipative solutions to a Beris-Edwards type model for compressible active nematic liquid crystals. <https://arxiv.org/pdf/2601.02051>, 2026.