Dynamic Statistical Scaling in Landau-de Gennes Theory

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In this talk, we consider the behaviour of thermotropic nematic liquid crystals at the onset of the isotropic-nematic phase transition. There is evidence in the physics literature that those regions where the material is in the nematic phase invade the ambient isotropic phase in a self-similar manner as time progresses. We perform a rigorous investigation of this phenomenon. The model of the isotropic-nematic phase transition we employ is the $L^2(\mathbb{R}^3)$-gradient flow of the well-known Landau-de Gennes energy. By studying measures which evolve under the gradient flow dynamics, we prove for suitable initial data that the structure of solutions is self-similar *in an average sense* as time $t \to \infty$. This is joint work with Eduard Kirr and Arghir Zarnescu.