

Defects in Landau-de Gennes Theory

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The Landau-de Gennes model is a widely used continuum description of nematic liquid crystals, in which liquid crystal configurations are described by fields taking values in the space of real, symmetric traceless 3×3 matrices (called Q -tensors in this context). The model is an extension of the simpler S^2 - or RP^2 -valued Oseen-Frank theory, and provides a relaxation of an RP^2 -, S^2 - or S^3 -valued harmonic map problem on two- and three-dimensional domains. There are similarities as well as differences with the C -valued Ginzburg-Landau model. There is current interest in understanding the structure and disposition of defects in the Landau-de Gennes model. After introducing and motivating the model, I will discuss some recent and current work on defects in two-dimensional domains, in the harmonic-map limit as well as perturbations therefrom. This is joint work with G. di Fratta, V. Slastikov and A. Zarnescu.