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**The Taming of the Screw: Nonlinear Interactions in Smectic Liquid Crystals** ELISABETTA MATSUMOTO, GARETH ALEXANDER, RANDALL KAMIEN, University of Pennsylvania — From the twist grain boundary phase to the smectic phases of bent core liquid crystals, beautiful and intricate textures composed of screw dislocations appear time and again in a wide variety of smectic systems; yet, little is known about the interactions of screw dislocations. The linear smectic free energy is not sufficient to describe the energetics of single screw dislocations, and superposition cannot shed light on the interaction of many such defects. The full rotationally invariant nonlinear smectic free energy provides insight into systems of multiple screw dislocations. Such nonlinear interactions allow us to begin to understand the stability of the bulk phases observed in both smectic A liquid crystals and their chiral smectic C\* counterparts.

Elisabetta Matsumoto  
University of Pennsylvania

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