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Dielectric Anistropy and Elastic Constants Near the Nematic-Smectic A Transition[1] ANGELO VISCO, RIZWAN MAHMOOD, DONALD ZAPIEN, Slippery Rock University — The present work examines the behavior of dielectric anisotropy and the elastic constants associated with the deformation of liquid crystal molecules under the influence of an AC electric field and measured by an Automatic Liquid Crystal Tester (ALCT). The systems investigated are of various concentrations of 5CB (4-Cyano-4'-pentylbiphenyl) and 8CB (4-octyl-4'-cyanobiphenyl) liquid crystal as a function of temperature. These studies are important due to the complexity of the coupling between the orientational (nematic) and positional (smectic A) order parameters that can drive this transition to be either continuous or discontinuous. Theoretically, NA transition is weakly first order due to nematic director fluctuations in semctic A phase. This is similar to the transition from normal to superconductor. Thus, there exists a triple point similar to He3/He4 mixtures. Moreover, despite more than four decades of intense work, our understanding of this complex and interesting problem remains unclear.

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Angelo Visco
Slippery Rock University

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