Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Critical behavior at the isotropic to nematic phase transition in a bent-core liquid crystal DAVID WIANT, STRAHINJA STOJADINOVIC, KRISHNA NEUPANE, SUNIL SHARMA, Physics Dept. Kent State U., KATALIN FODOR-CSORBA, Hungarian Research Institute for Solid State Physics and Optics, ANTAL JAKLI, Liquid Crystal Institute Kent State U., JAMES GLEESON, SAMUEL SPRUNT, Physics Dept. Kent State U. — Magnetic birefringence and dynamic light scattering measurements of orientational order parameter fluctuations at the isotropic- nematic phase transition of a bent-core liquid crystal reveal a pretransitional temperature dependence consistent with the standard Landau-deGennes mean field theory. However, the transition in the bent-core compound is more weakly first-order ($T_{NI} - T^* \approx 0.4°\mathrm{C}$), the leading Landau coefficient is ~ 10 times lower, and the viscosity associated with nematic order fluctuations is ~ 50 times higher, than typically observed in calamitic (rod- shaped) liquid crystals. These anomalies can be explained by an unconventional optically isotropic phase composed of complexes of bent-core molecules. Also, we will present preliminary magnetic birefringence and density measurements at temperatures above the nematic-isotropic transistion which support the existence of an optically isotropic state.

David Wiant
Physics Dept. Kent State U.

Date submitted: 30 Nov 2005 Electronic form version 1.4