

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Critical Behavior of the Banded-Unbanded Spherulite Transition  
in a Mixture of Ethylene Carbonate with Polyacrylonitrile**

JOHN BECHHOEFER, BRAM SADLIK<sup>1</sup>, LAURENT TALON, SÉBASTIEN KAWKA, RUSSELL WOODS, Dept. of Physics, Simon Fraser University, Burnaby, BC, V5A 1S6 Canada — Banded spherulites appear generically when materials with viscous melts are frozen at high undercoolings. The characteristic striped pattern observed in thin samples is believed to reflect a rotation of crystalline axes that occurs as the front propagates radially away from a nucleation site. Common features include an onset of banding at finite undercooling and a divergence of the wavelength near this critical undercooling. Here, by carefully considering systematic errors, we show that the band spacing diverges with a power-law form showing scaling over nearly two decades. We also observe that the bands disorder as the transition point is approached. The critical exponent is non-classical. One possible explanation is that the transition is actually weakly first order. An analogous situation exists for cholesteric liquid crystals in the vicinity of a cholesteric–smectic-A transition.

<sup>1</sup>present address: Capilano College, 2055 Purcell Way, N. Vancouver, BC V7J 3H5, Canada

John Bechhoefer  
Simon Fraser University

Date submitted: 30 Nov 2004

Electronic form version 1.4