

Meeting: 1000, Albuquerque, New Mexico, SS 11A, Special Session on Nonlinear Partial Differential Equations Applied to Materials Science

1000-35-60 **Sookyung Joo*** (sjoo@math.purdue.edu), 400 Lind Hall, 207 Church Street S.E., Minneapolis, MN 55455-0436, and **Daniel Phillips** (phillips@math.purdue.edu), Department of Mathematics, 150 N. University street, Purdue University, West Lafayette, IN 47907. *The phase transition between the chiral nematic and smectic liquid crystals.*

We study the Chen-Lubensky model to investigate the phase transition between chiral nematic and smectic liquid crystals. First, we prove the existence of the minimizers in an admissible set consisting of order parameters $\Psi \in H_0^2(\Omega)$ and molecular directors $\mathbf{n} \in \mathbf{W}^{1,2}(\Omega : \mathbb{S}^2)$. The splay, twist, and bend Frank constants, K_1, K_2 , and K_3 are considered to diverge based on physical observation near chiral nematic, N^* , to smectic C^* phase transition, while only K_2 and K_3 diverge near N^* to smectic A^* phase transition. Then we describe the transition temperature in both regions, $N^* - C^*$ and $N^* - A^*$, when a domain Ω is a considerably large liquid crystal region confined in two plates.