PHYSICAL MATHEMATICS SEMINAR

THE GEOMETRY AND TOPOLOGY
OF SMECTICS

RANDALL D. KAMIEN
University of Pennsylvania

ABSTRACT:

The theory of smectic liquid crystals is notoriously difficult to study. Thermal fluctuations render them disordered through the Landau-Peierls instability, lead to anomalous momentum dependent elasticity, and make the nematic to smectic-A transition enigmatic, at best. I will discuss recent progress in studying large deformations of smectics which necessitate the use of nonlinear elasticity in order to preserve the underlying rotational symmetry. By recasting the problem of smectic configurations geometrically it is often possible to exploit toplogical information or, equivalently, boundary conditions, to confront these highly nonlinear problems. Specifically, I will discuss edge dislocations, disclination networks in three-dimensionally modulated smectics, and large angle twist grain boundary phases. Fortuitously, it is possible to make intimate comparison with experimental systems!

TUESDAY, APRIL 25, 2006
2:30 PM
Building 3, Room 270