

MATHEMATICS DEPARTMENT
North Carolina State University

DIFFERENTIAL EQUATIONS SEMINAR

Wednesday, March 17
2:35 p.m. 330 Harrelson Hall

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“The phase diagram for nematic polymers”

In this talk, I will review the Smoluchowski equation that models the orientational probability distribution function (PDF) of nematic polymers using kinetic theory. The phase diagram of quiescent nematic polymers will be examined with emphasis on $O(3)$ degeneracy of the nematic states. We then explicitly construct and establish the shear perturbed PDF for dilute concentrations, and provide an explicit mesoscopic theory solution to the problem of how the $O(3)$ degeneracy breaks in weak shear, leaving a finite set of steady stationary states, whose number, type, stability, and phase transition scale with parameters of the model. Finally we give the bifurcation diagram of all stable states of nematic polymers versus the material concentration and shear rate using kinetic theory.

Graduate students are invited to attend.

For questions, comments, and offers to talk, contact Steve Schechter, schechter@math.ncsu.edu.
Please visit the DE Seminar web page at www.math.ncsu.edu/seminars.html.