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Liquid Crystal Phases of Semiflexible Polymers IAN MACKAY, DON SULLIVAN, University of Guelph — Liquid crystal polymers exhibit orientational order (nematic phase) and position order (smectic phase). Previous work on semiflexible polymers using self consistent field theory studied the isotropic-nematic and nematic-smectic transition for homogenous and diblock copolymers. The nematic phase is stabilized by excluded-volume effects between wormlike cylindrical segments. The smectic phase is further stabilized by excluded-volume effects between terminal end segments. Because models of semiflexible polymers include orientational degrees of freedom, in addition to the usual positional degrees of freedom, they are computationally more demanding to study. Spectral decomposition applied to segment orientations has previously been used to make computation feasible. However this method does not converge well for strongly ordered states, which arise in many real systems. I describe a Crank-Nicolson finite difference method applied to the orientations which is expected to converge well for highly ordered systems. This method also exhibits better numerical stability and accuracy and may thus serve as a better foundation for further studies of highly ordered systems. I also describe a modification to the spectral method which can compute the tilted Smectic C phase.

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