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Statistical and Mechanical Properties of Semiflexible Polymers in an External Field YA LIU, BULBUL CHAKRABORTY, Martin Fisher School of Physics, Brandeis University — Semiflexible polymers such as the double-stranded DNA, are well described by the worm-like chain model originally proposed by Kratky and Porod (Rec. Trav. Chim. 68, 1106, (1949)). Recent work has focused on understanding statistical properties such as their end-to-end distribution function (J.Chem.Phys 121, 6064 (2004), PRE 71, 031803 (2005)) and their mechanical properties in response to a stretching force or the electric field (PRE 72, 041918 (2005)). The problem becomes very complicated unless the long-chain or rod-like-chain approximations for the persistence length are made. Self-avoidance effects are always neglected even for long chain in two dimensions and for confined polymers where these effects could become important. We make use of the Bond Fluctuation Algorithm (Macromolecules 21, 2819(1988)) to study the behavior of semiflexible polymers for all persistence lengths and investigate the relationship of their shape to the persistence length, the chain length and the external field. We will compare our results for the extension of a polymer under a constant stretching with analytical results in weak and strong force limit (PRE 72, 041918 (2005)). This work has been supported by NSF-DMR 0403997.

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