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The Configuration and Dynamics of Self-Attractive Flexible and Semi-Flexible Polymers RONALD LARSON, INDRANIL SAHA DALAL, MIQIU KONG, University of Michigan — We study "bead-rod" chains containing stiff Fraenkel springs with nearly fixed Kuhn length, but with varying numbers of rods representing each Kuhn length, $N_{r,K}$, modeled by incorporating a bending potential between consecutive rods. We find converged results as we increase the number of rods per Kuhn step. We find that at high $\varepsilon^* N_{r,K}$, where ε^* is the attractive interaction strength per bead normalized by kT, collapsed globules are produced at moderate dimensionless chain diameter $\sigma^* = 1/4$, while for $\sigma^* = 1$, helices are formed, and for $\sigma^* = 1/16$, tori, folded bundles, and finally globules, are formed as $\varepsilon^* N_{r,K}$ increases. Under shear, a universal tumbling state is found where chain width in the shear gradient direction is independent of chain length and proportion to shear rate to the fourth power.

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