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Statistical Mechanics of Helical Wormlike Model¹ YA LIU, TONI PEREZ, WEI LI, JAMES GUNTON, Lehigh University, AMANDA GREEN, Bucknell University — The bending and torsional elasticities are crucial in determining the static and dynamic properties of biopolymers such as dsDNA and sickle hemoglobin. We investigate the statistical mechanics of stiff polymers described by the helical wormlike model. We provide a numerical method to solve the model using a transfer matrix formulation. The correlation functions have been calculated and display rich profiles which are sensitive to the combination of the temperature and the equilibrium torsion. The asymptotic behavior at low temperature has been investigated theoretically and the predictions fit the numerical results very well. Our analysis could be used to understand the statics of dsDNA and other chiral polymers.

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Ya Liu
Lehigh University

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