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Shape and conformation of confined biopolymers.[1] YA LIU, BULBUL CHAKRABORTY, Brandeis University — Biological macromolecules living in cells are confined on length scales comparable to their intrinsic persistence length. In these environments, the bending rigidity plays a decisive role in determining shape and conformations. We have used numerical simulations to investigate the statistical properties of a semiflexible polymer confined in a square box. Simulations exhibit a shape transition when the bare persistence length becomes comparable to the box size. An order parameter is introduced to quantify and analyze the nature of this transition. The shape change is accompanied by a qualitative change in the effective persistence length, which starts differing significantly from the intrinsic persistence length. A mean-field model, including Gaussian fluctuations around the saddle point solution, provides a quantitative description of the evolution of the tangent-tangent correlation function with increasing confinement.

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