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Statistical Mechanics and Shape Transitions in Microscopic Plates EE HOU YONG, L. MAHADEVAN, Harvard University — We investigate the statistical mechanics of elliptical plates of parabolic thickness with free boundary condition using both analytical techniques and Monte Carlo simulation. We consider the energy landscape of this system and show that plates with spontaneous Gaussian curvature exhibit two minima while plates with zero Gaussian curvature only exhibit one stable conformation. For plate that exhibits bistability, it can undergo shape transitions between the two conformation minima if the white noise is large enough. Plates with negative spontaneous Gaussian curvature are found to be more susceptible to shape changes than its positive counterparts. Our results are applicable to many disk-like objects in the microscopic world where fluctuation effects are important.

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