

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**The Mechanics of Curly Hair** JAMES MILLER, Massachusetts Institute of Technology, ARNAUD LAZARUS, BREANNA BERRY, MIT, BASILE AUDOLY, Institut d'Alembert (University Paris 6), PEDRO REIS, MIT — We explore the oft-neglected role of intrinsic natural curvature on the mechanics of elastic rods. Our testbed, a hanging hair, is a deceptively simple system that exhibits complex mechanics and geometrically nonlinear behavior. Through a combination of precision desktop-scale experiments, numerical simulations, and theoretical analysis, we seek physical insight into the nontrivial configurations adopted by a naturally curved elastic rod that is suspended under its own weight. In particular, we aim to gain predictive understanding of the transition from planar to non-planar solutions as well as the localization of torsion in the non-planar configurations. The experimentally observed behavior of our custom-fabricated naturally curved rods is captured well by simulations and is rationalized through scaling arguments.

James Miller  
MIT

Date submitted: 11 Nov 2011

Electronic form version 1.4