Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Stretching weakly bending filaments with spontaneous curvature in two dimensions PANAYOTIS BENETATOS, EUGENE TERENTJEV, Cavendish Laboratory, University of Cambridge, UK — Some important biomolecules are known to posses spontaneous (intrinsic) curvature. Using a simple extension of the wormlike chain model, we study the response of a weakly bending filament in two dimensions to a pulling force applied at its ends. The spontaneous curvature of such a chain or filament can in general be arc-length dependent and we study a case of sinusoidal variation, from which an arbitrary case can be reconstructed via Fourier transformation. We obtain analytic results for the force-extension relationship and the width of transverse fluctuations. We show that spontaneous-curvature undulations can affect the force-extension behavior even in relatively flexible filaments with a persistence length smaller than the contour length.

Panayotis Benetatos
Cavendish Laboratory, University of Cambridge, UK

Date submitted: 08 Dec 2009 Electronic form version 1.4