Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Effect of boundary conditions on the buckling instabilities of a ribbon under twist[1] CASEY TRIMBLE, ARSHAD KUDROLLI, Department of Physics, Clark University — We investigate the buckling instabilities of a thin flat sheet in the shape of a ribbon which is held at its ends and twisted under tension. Recently it was shown that such a system with clamped boundary conditions exhibited a rich variety of buckled shapes with longitudinal and transverse wrinkles as a function of applied twist and tension for a given ribbon aspect ratio and elastic modulus [1], which could be described by a far from threshold analysis of the covariant form of the Foppl-von Karman equations [2]. Here, we focus on the effect of the boundary conditions on the observed buckling patterns by constraining the ends only at the midpoint towards imposing free boundary conditions normal to the ribbon. In particular, we compare and contrast the observed phase diagram and the shape of the longitudinal and transverse buckled modes as a function of applied constraints. [1] J. Chopin and A. Kudrolli, Phys. Rev. Lett. 111, 174302 (2013). [2] J. Chopin, V. Demery, and B. Davidovitch J. Elast. 119, 137 (2015).

[1]Supported by NSF DMR - 1508186

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Date submitted: 06 Nov 2015 Electronic form version 1.4