MAR08-2007-002890

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

**Generalized Crumpling: induced singularities in gently deformed elastic sheets**

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If a thin disk of elastic material is confined in a shrinking sphere, the deformation of the disk is not smooth but nearly singular when its radius becomes larger than that of the sphere: the curvature at one point diverges as the thickness goes to zero. This talk considers *induced* singularities that arise from the interaction of these "vertex" singularities with their environment. For example, if two vertices are present, the curvature on the line joining them also diverges, forming the familar ridge singularity [1]. Other induced singularities are coming to light. Here we consider two such singularities. The first is the induced vertex at the boundary [2] of a disk that has been compressed until it contains two interior vertices. Asymptotically, the triangular region bounded by the three vertices becomes arbitrarily flat as the sheet thickness goes to zero, while the curvature outside approaches a nonzero limit. The second singularity appears when a vertex is formed by forcing a flat sheet into a circular ring so that the sheet buckles. Then the ring force induces a singular radial curvature in the sheet. Remarkably this curvature just sufficient to make the mean curvature vanish where the the ring contacts the sheet [3]. We explore the generality of this curvature cancellation phenomenon.

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[3] T. Liang, T. A. Witten, *Phys. Rev. E* **73** 046604 (2006)