

Abstract Submitted  
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**Transition from wrinkles to crumples in an elastic sheet**<sup>1</sup> HUNTER KING, NARAYANAN MENON, University of Massachusetts, Amherst — A circular sheet confined to a surface of increasing curvature initially breaks azimuthal symmetry creating a finite pattern of radial wrinkles along its perimeter. At larger curvature, sharp crumpled features emerge and dominate the shape. Using optical profilometry, we study the transition from wrinkling to crumpling of a polystyrene sheet floating on a drop of glycerol by measuring the spatial distribution of curvatures of the sheet as a function of drop curvature. We observe that collisions of neighboring wrinkles at their tips generate cusps. These cusps subsequently sharpen and merge to produce large crumpled features, around which gaussian curvature focuses. Surprisingly, the stress field in the central, unwrinkled portion is not sensitive to the appearance of crumpled features. The transition shows little hysteresis and is smooth with respect to measured quantities.

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