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How do singularities fade away? From stress-focusing zones to smoothly deformed regions of elastic sheets BENNY DAVIDOVITCH, LEE WALSH, Physics Dept., UMass Amherst — Confining elastic sheets often results in the formation of singular, stress-focusing structures: ridges and vertices in which strain is localized, allowing the sheet to reach a developable shape in the limit of vanishing thickness. The formation of such developable shapes through a network of singularities may become impossible, however, when certain types of geometric constraints are imposed on the sheet. One may ask: Are there other fundamental types of stress distribution that govern patterns on elastic sheets under such conditions? In particular – what is the nature of transition zones between singular and smoothly bent structures that may emerge in separate parts of a stressed sheet? We will address these questions through simple model systems that demonstrate the emergence of nontrivial shapes under such conditions.

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