

Abstract Submitted  
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**An effective substrate stiffness induced by curvature and its consequences in wrinkling problems** EVAN HOHLFELD, BENJAMIN DAVIDOVITCH, University of Massachusetts Amherst — Thin elastic plates will wrinkle to relax compressive stress. The wavelength of the wrinkle pattern is set by a combination of the plate’s bending stiffness and an “effective substrate” stiffness, e.g. due to an elastic foundation or as a consequence of tension in the plate. We discuss another, previously unrecognized effective stiffness due to macroscale, out-of-plane curvature of the plate. In applications, this stiffness often dominates the elastic and tensile stiffnesses, and so controls the wrinkle wavelength. The energy of the resulting wrinkle pattern directly depends on the macroscale curvature—unlike in the elastic and tensile cases—and we argue that this dependence can lead to a breakdown of Tension Field Theory.

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