

Abstract Submitted
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Circular kirigami structures: from bowl to vase shapes

JOSE BICO, ETIENNE LEPOIVRE, HADRIEN BENSE, ETIENNE REYSSAT, BENOIT ROMAN, PMMH-ESPCI-PSL, UPMC, UDD, Paris, France — Thin sheets have the property to be more difficult to stretch than to bend. This common fact constitutes a strong limitation to the development of stretchable electronics devices since thin brittle electrical circuits are prone to rupture under modest strains. Parallel alternate cuts on a thin plate can transform an actual bending deformation into a significant apparent elongation. Such kirigami structures provide a simple a solution to stretch a thin plate without damage and have been proposed for many applications ranging from graphene-based devices to adjustable diffraction gratings or tunable solar panels. Most studies have focused on 1D systems. We are interested in the deformation of structures obtained by applying arced cuts on a disk. Upon stretching, the initially flat plate is transformed into an axisymmetric 3D shape. Depending on the initial cut, bowl, cone, trumpet or even complex vase shapes are obtained.

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