Marginal elasticity of periodic triangulated origami BRYAN CHEN,
UMass Amherst, DAN SUSSMAN, Syracuse University, TOM LUBENSKY, University of Pennsylvania, CHRIS SANTANGELO, UMass Amherst — Origami, the
classical art of folding paper, has inspired much recent work on assembling complex
3D structures from planar sheets. Origami, and more generally hinged structures
with rigid panels, where all faces are triangles have special properties due to having
a bulk balance of mechanical degrees of freedom and constraints. We study two families of periodic triangulated origami structures, one based on the Miura ori and one
based on a kagome-like pattern due to Ron Resch. We point out the consequences
of the balance of degrees of freedom and constraints for these "metamaterial plates"
and show how the elasticity can be tuned by changing the unit cell geometry.

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