**Multimode mechanical materials**
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Composite materials can have properties unlike any found in nature. Materials with negative Poisson's ratio which fatten as they are pulled are a classic example.

By using pentamode materials, which have five easy modes of affine deformation, one can construct composites with any desired elasticity tensor under infinitesimal deformations. Multimode materials under finite deformations are also interesting and a basic question is: What geometrically non-linear behaviors can one get in periodic materials constructed from rigid bars and pivots? It turns out that the range is enormous. Materials for which the only easy mode of macroscopic deformation is an affine deformation, can be classed as unimode, bimode, trimode,...hexamode, acccording to the number of easy modes of deformation. We give a complete chacterization of possible behaviors of nonlinear unimode materials.