1125-52-2445 **Ciprian S. Borcea** (borcea@rider.edu), Rider University, Lawrenceville, NJ 08648, and **Ileana Streinu*** (istreinu@smith.edu), Smith College, Northampton, MA 01063. *Periodic auxetics.*

In materials science, auxetic behavior refers to the rather counter-intuitive property of a material becoming laterally wider when stretched and thinner when compressed.

We have recently proposed a purely geometric criterion, valid in arbitrary dimensions, for characterizing auxetic one-parameter deformations for periodic frameworks, which relies on the evolution of the periodicity lattice. A deformation path will be auxetic when the Gram matrix for a basis of periods gives a curve with all tangents in the positive semidefinite cone, analogous to a causal line in special relativity.

A special situation of auxetic behavior arises from expansive mechanisms, defined by the stronger property that the distance between any pair of vertices increases or stays the same. For two-dimensional periodic frameworks, expansiveness can be explained and explored in terms of periodic pointed pseudo-triangulations. An essential ingredient in the proof is our recent generalization, from finite to periodic frameworks, of a 150 year old theorem of James Clerk Maxwell relating stressed planar frameworks and their liftings to 3D polyhedral surfaces. (Received September 20, 2016)