Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Controlling bond-bending forces in disordered meta-material networks NIDHI PASHINE, DANIEL REID, University of Chicago, JASON W. ROCKS, ANDREA J. LIU, University of Pennsylvania, JUAN DE PABLO, SIDNEY R. NAGEL, University of Chicago — Disordered elastic networks can be tuned to have unconventional response by pruning bonds selectively. This has been demonstrated in simulations of networks consisting of harmonic, central-force springs between nodes. We have experimentally built such networks by laser cutting them out of rubber sheets. The bond-bending forces inherent in these realizations significantly and adversely impact the network response and in some cases destroy its ability to exhibit the desired behavior. We can control the strength of bond-bending forces by suitably designing the geometry and aspect ratio of the struts. We can also include bond-bending forces directly into the tuning algorithm. Both strategies allow us to create a desired response in our experimental networks.

Nidhi Pashine
University of Chicago

Date submitted: 11 Nov 2016 Electronic form version 1.4