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**Elastomeric Network/Air Structures for Mechanically Tunable Hypersonic Phononic Crystals** TARAS GORISHNYY, JI-HYUN JANG, CHAITANYA K. ULLAL, EDWIN L. THOMAS, Massachusetts Institute of Technology — Hypersonic phononic crystals allow control over high frequency phonons, which is crucial for a whole range of applications from acousto-optics to thermal management and high resolution nondestructive evaluation techniques. The ability to fabricate phononic crystals with a band diagram that can be modified reversibly and repeatedly opens an interesting possibility to create tunable acoustic devices. In this talk we will describe the use of submicron elastomeric PDMS (poly(dimethylsiloxane))/air network structures as tunable phononic crystals operating in hypersonic frequency regime. The structures were fabricated from interference lithography templates, which were infiltrated with PDMS precursor and then after crosslinking the photoresist template was removed in water-based basic solution. Brillouin light scattering was used to monitor the modification of the phononic band diagram of these elastomeric structures as a function of the direction and degree of reversible mechanical deformation. The influence of symmetry and anisotropic sound velocities on the features of the phononic band diagram will be discussed.

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