

PHYSICAL MATHEMATICS SEMINAR

DESIGNING NOVEL STRUCTURES AND FUNCTIONALITY FOR PHONONIC TOPOLOGICAL INSULATORS

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ABSTRACT:

The discovery of topological insulators (TIs) in quantum mechanical systems has stimulated significant interest in developing analogues in other fields, including acoustics, photonics and phononics. In this presentation, I will discuss approaches to mitigating two challenges in phononic TIs. First, I will present a novel computational methodology for the inverse design of continuous, two-dimensional square phononic metamaterials based on the quantum spin hall effect. Simulations prove that helical edge states emerge at the interface between two topologically distinct square phononic metamaterials, opening the possibility of pseudospin-dependent phonon transport beyond hexagonal lattices. Second, I will discuss how geometric nonlinearity in the form of an elastic snap-through instability can be exploited to enable topologically tunable and switchable structures, which are in contrast to the topologically constant structures that are typically investigated today.

**TUESDAY, DECEMBER 8, 2020
2:30 PM – 3:30 PM**

<http://math.mit.edu/seminars/pms/>

**<https://mit.zoom.us/j/97273690529>
Meeting ID: 972 7369 0529**