

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Fracton-Elasticity Duality"

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Abstract: Fractons are a new type of emergent quasiparticles which are strictly immobile in isolation. Until recently, these excitations had only been encountered in certain exactly solvable spin models. In this talk, I will show that fractons have a direct physical realization as the lattice defects of an ordinary two-dimensional crystal. Conventional two-dimensional elasticity theory maps exactly onto a tensor gauge theory coupled to fractons, in a natural tensor analogue of particle-vortex duality. Phonons map onto gapless gauge modes, while disclination and dislocation defects map onto fracton charges and dipoles, respectively. I will also show how to extend the duality to three-dimensional elasticity theory, which leads to a fundamentally new type of fracton excitation.

1:00pm
Thursday, March 15, 2018
Duboc Room (4-331)

Host: Itamar Kimchi