Transforming Light and Sound With Metamaterials
By
Prof. Nicholas Xuanlai Fang
MIT Mechanical Engineering

Date: 3 July 2012, Tuesday
Time: 4pm to 5pm
Venue: Hilbert Space (PAP-02-02)
Host: Asst. Prof. Zhang Baile

Abstract
Recently, exciting new physics and applications are emerging from metamaterials made of artificial “atoms” and “molecules”. These metamaterials has inspired a series of key explorations to manipulate, store and control the flow of energy at unprecedented dimensions. Yet, these ground-breaking achievements are only the tip of the iceberg, where the next-generation metamaterials, incorporating unique topological interactions between waves and matter, are waiting to be discovered.

In this talk, I will discuss our progress of fabrication and characterization of these optical and acoustic metamaterials. We demonstrated, for the first time, focusing and rerouting ultrasound through broadband and highly transparent metamaterials. We also observed a set of localized modes in optical metamaterials, using novel near field optical and electron probes. These novel metamaterials, could be the foundation of broadband photo-absorbers, directional emitters, as well as compact and power-efficient devices in highly parallel optical networks.

Biography
Professor Nicholas X. Fang received his BS and MS in physics from Nanjing University, and his PhD in mechanical engineering from University of California Los Angeles. He arrived at MIT in 2011 as an associate professor in MechE. Prior to MIT, he worked as an assistant professor at the University of Illinois Urbana-Champaign. Professor Fang's areas of research look at nanophotonics and 3D nanomanufacturing. He is an invited participant of the Frontiers of Engineering Conference by National Academies in 2010, a recipient of the NSF CAREER Award (2009), the Society of Manufacturing Engineering Outstanding Young Investigator Award (2009); MIT Technology Review Magazine’s 35 Young Innovators Award (2008); and the ASME Pi Tau Sigma Gold Medal Award (2006).