NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

PAP Seminar Announcement

Breaking Reciprocity and Time-Reversal Symmetry with Metamaterials

By

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Date: 25 April 2018 (Wednesday)
Time: 3.00 pm - 4.00 pm
Venue: SPMS-LT3 (SPMS-03-02)
Host: Assoc Prof. Cesare Soci

Abstract

In this talk, I discuss our recent research activity in electromagnetics, nano-optics, acoustics and mechanics, showing how suitably tailored meta-atoms and suitable arrangements of them open exciting venues to realize non-reciprocal devices for light, radio-waves and sound, largely breaking Lorentz reciprocity and realize isolation without the need of magnetic bias. Our approaches are based on using suitably tailored mechanical motion, spatio-temporal modulation, and large nonlinearities in coupled resonator systems, and have enabled magnetic-free circulators and isolators for sound, microwaves, THz and optical frequencies, non-reciprocal antennas, emitters and absorbers breaking Kirchhoff's law, self-induced isolation for high-intensities triggered by nonlinearities, and a new generation of topological insulators for light, sound, and static systems in mechanics. In the talk, I will also discuss the impact of these concepts from basic science to practical technology.

Short Biography

Andrea Alù is the Founding Director and Einstein Professor at the Photonics Initiative, CUNY Advanced Science Research Center. He received his Laurea (2001) and PhD (2007) from the University of Roma Tre, Italy, and, after a postdoc at the University of Pennsylvania, he joined the faculty of the University of Texas at Austin in 2009, where he was the Temple Foundation Endowed Professor until Jan. 2018. Dr. Alù is a Fellow of IEEE, OSA, SPIE and APS, and has received several scientific awards, including the ICO Prize in Optics (2016), the NSF Alan T. Waterman award (2015), the OSA Adolph Lomb Medal (2013), and the URSI Issac Koga Gold Medal (2011).

His research interests span over a broad range of technical areas, including applied electromagnetics, nano-optics and nanophotonics, microwave, THz, infrared, optical and acoustic metamaterials and metasurfaces, plasmonics, nonlinearities and nonreciprocity, cloaking and scattering, acoustics, optical nanocircuits and nanoantennas.

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