



*Applied Physics & OSA
Optics Seminar*

What Do Optical Nanocircuits, Cloaking, Squeezing Light, and Supermicroscopy Have in Common?

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Abstract:

In the microwave and optical domains, materials with unconventional constitutive parameter values, such as negative or near-zero, exhibit interesting properties in their interaction with electromagnetic waves. Negative-permittivity plasmonic media, such as noble metals in the infrared and optical frequencies, and epsilon-near-zero (ENZ) materials, such as plasmonic materials near their plasma frequencies, can be exploited as the building blocks for synthesis of metamaterials. In my group, we have been investigating various fundamental features and potential applications of such plasmonic metamaterials including: (1) Lumped nanocircuit elements at optical frequencies, for which material nanoparticles are arranged to form novel nanocircuits and nanoprocessors at optical wavelengths; (2) Cloaking, which can provide significant reduction of total scattering from objects when plasmonic metamaterials with negative or near-zero permittivity are used as cloaks; (3) Squeezing and tunneling of light through highly subwavelength narrow channels and tight bends; (4) Supermicroscopy, which can lead to far-field sub-diffraction optical microscopy (FSOM).

Brief Biography:

Nader Engheta received his B.S. degree in EE from the University of Tehran, and his M.S and Ph.D. degrees in EE (with a minor in Physics) from Caltech. He is a Guggenheim Fellow, an IEEE Third Millennium Medalist, IEEE Fellow, Optical Society of America Fellow, and the recipient of the Fulbright Naples Chair Award, NSF Presidential Young Investigator award, the UPS Foundation Distinguished Educator term Chair, and several teaching awards. His current research activities span a broad range of areas including nanooptics and nanophotonics, metamaterials and plasmonics, bio-inspired sensing and imaging, miniaturized antennas and nanoantennas, physics and reverse-engineering of polarization vision in nature, and bio-inspired imaging, mathematics of fractional operators and physics of fields and waves phenomena.

Friday, April 13, 2007.

4:00pm-5:00pm.

Watson 104