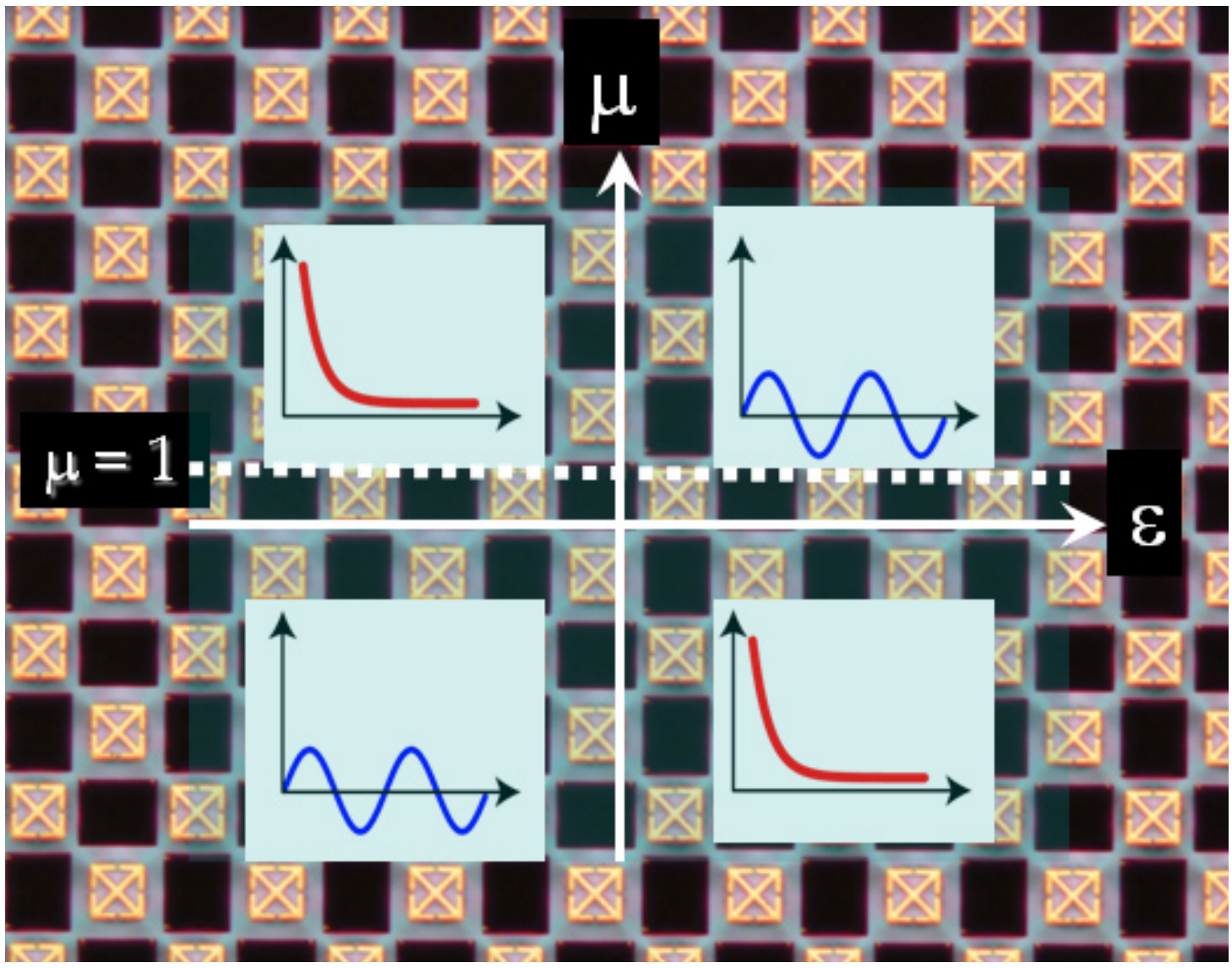
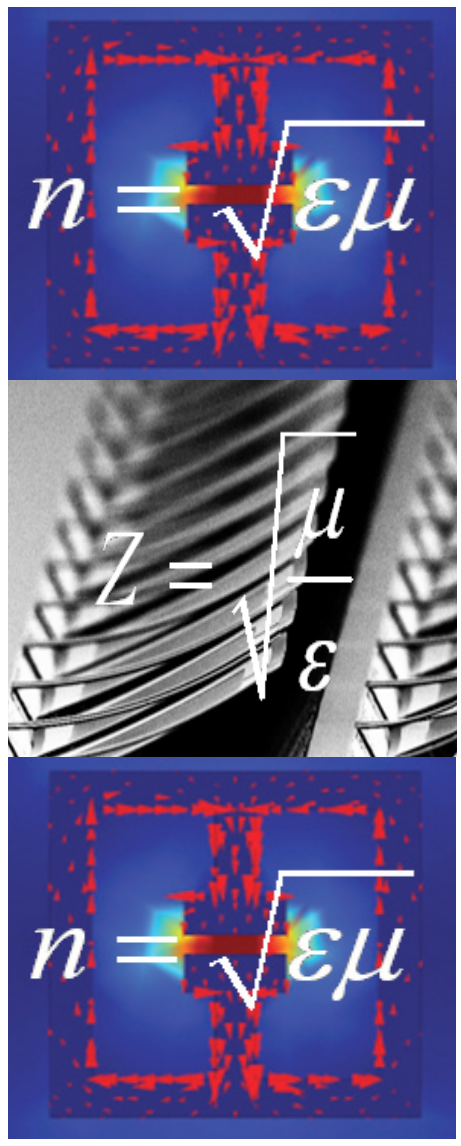
Boston University Physics Colloquium





Magnetic Metamaterials:
New Opportunities in Electromagnetism

Metamaterials are a new type of artificial composite with unique electromagnetic properties that derive from their sub-wavelength structure. The canonical sub-wavelength “particle” from which metamaterials are fashioned is the split ring resonator (SRR) which consists of nothing more than an inductive metallic ring with a gap to provide capacitance. This seemingly innocuous particle has resulted in the emergence of a new paradigm in classical electromagnetism during the past decade. Namely, it is possible to design materials which are magnetically resonant at any desired wavelength from the microwave through the visible. This, in turn, has led to the realization that possibilities abound for creating effective materials displaying phenomena not exhibited by naturally occurring materials. This includes negative refractive index and cloaking.

Following an introduction into these exciting developments, I will describe our work at far-infrared wavelengths. For example, through the judicious combination of metamaterials with MEMS technology we have created micromechanically active metamaterials where the orientation of the individual SRRs – and hence the magnetic response – can be precisely controlled. Such adaptive metamaterials are the starting point for the development of a host of new functional electromagnetic devices.

Richard Averitt
Boston University

January 19, 2010 (Tuesday) at 3:30pm (Refreshments at 3:15pm)
SCI 107, Metcalf Science Center, Boston University
Call: Winna Somers (wsomers@bu.edu) (617) 353-9320
Host: William Klein