

Massachusetts Institute of Technology  
Department of Physics

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**Condensed Matter Theory Seminar**

"Optical Scattering in Coupled Nanoparticle Systems"

**Benjamin Hopkins, Australian National University**

**Abstract:** The use of subwavelength geometry in nanostructured materials has provided a new paradigm for going beyond conventional optical properties. However, utilizing the unprecedented freedom in nanoscale design demands we understand the relationships between geometry and the associated optical resonances. In this talk I will present work on describing the resonances of both plasmonic and dielectric scattering systems through their relationship to the eigenmodes of the local induced current system. An implication of this approach is the concept of interference between eigenmodes, with consequences relating to optical Fano resonances and circularly dichroic behavior in planar surfaces. Particular emphasis will further be placed on high-index dielectric systems to address the growing adoption of low-loss, all-dielectric scattering systems. Finally, I will cover some more recent work on the unique opportunities that arise from single-particle magnetic resonances in collective nanoparticle oligomer geometries and arrays.

**11:00am**  
**Tuesday, March 15, 2016**  
**Duboc Room (4-331)**