Physics
AT QUEENS COLLEGE

Colloquium Notice

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Optical Nano-Circuit Applications and Plasmonics for Nano-Photonic Devices

Bringing circuit functionalities into the optical domain requires the introduction of new conceptual paradigms and experimental methods, and would represent an important advance in nanoelectronics technology. In this seminar, I will introduce the lumped circuit elements in the near infrared regime by making use of plasmonic materials and simple geometries with subwavelength cross-sectional dimensions. The control of the functionality of these optical nanocircuits, completely consistent and analogous with the notion of radio-frequency circuits, and can be done by changing the impedances of the circuit elements. Such nanocircuits' elements function as building blocks for future plasmonic devices.

I will also present a novel structure that effectively behaves as an n=0 metastructure in the visible and near-infrared spectral range. This metal/dielectric optical waveguide structure operating at the cutoff of its TE mode behaving effectively as an Epsilon-Near-Zero (ENZ) metamaterial, exhibiting uniform phase distribution and essentially uniform amplitude, which enables opportunities for better control and enhancement of light propagation in waveguides, as well as development of nano-photonic devices. Finally, I will discuss the effect of the ENZ medium on the control of degree of coherence by comparing the field radiated by sources with varying degrees of randomness in a conventional medium to that in an ENZ medium.

Wednesday
February 6, 2013
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326