

# Colloquium Notice

## **Humeyra Caglayan**

**University of Pennsylvania**

### *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