

# Colloquium Notice

## Fengnian Xia

**IBM Thomas J. Watson Research Center**

### *Graphene Nanophotonics and Nanoelectronics*

Graphene, a 2-dimensional carbon based material system, recently attracts world-wide attention from physicists and engineers due to its unique electronic and photonic properties. In this talk, I will first discuss the historical evolvement of electronics and photonics, followed by the potential of graphene in electronics and photonics. A few important developments in graphene photonics will then be presented, including photocurrent imaging, ultrafast ( $> 40$  GHz) photoresponse, and the application of graphene photodetector in a realistic optical communication link. Next, two approaches to create a bandgap, using lateral confinement in single layer graphene and vertical E-field in bi-layer graphene, will be covered in detail. I will show that a transport bandgap of  $> 130$  meV can be realized in biased bilayer graphene. The developments in graphene bandgap engineering may enable a few important applications, such as graphene digital electronics, electron Veselago lens and graphene spin qubit.

Monday

**October 18, 2010**

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326