

# Physics Colloquium

Michigan Technological University

Thursday, March 6, 2014  
at 4:00 pm in Room 139 Fisher

## Metallic Nanoparticles Functionalized Boron Nitride Nanotubes for Tunneling Electronic and Plasmonic Applications

Boyi Hao

Advisor: Dr. Yoke Khin Yap

**Abstract:** Boron nitride nanotubes (BNNTs) are wide band gap nanomaterials with extraordinary mechanical and chemical stability. Unlike carbon nanotubes (CNTs), the band gap of BNNTs is merely uniform, not sensitive to the change of chirality, diameter, and number of nanotubular walls. Furthermore, BNNTs are of advantage to nanowires as they are ideally free of dangling bonds at their surfaces. Thus BNNTs are promising nanostructures for nanoscale electronic and photonic devices. Theoretical calculations show wide band gap of BNNTs is tunable by various methods, such as giant stark effect, doping and etc. However, it remains very challenging to use BNNTs for electronic and photonic applications. Here we show a novel approach for the functionalization of BNNTs with metallic nanoparticles, which enable the applications of BNNTs in tunneling electronic and plasmonic devices.