



# Old Dominion University Department of Physics

## Colloquium

**Thursday March 1, 2018**

**" Nano-plasmonics in graphene/hexagonal boron nitride heterostructures"**

Guangxin Ni

Columbia University in the City of New York

**Abstract:** The term ‘plasmonics’ often carries an applied connotation owing to its remarkable successes in controlling and manipulating light at the nano-meter length scales. Graphene is proposed as one of the most promising candidates for novel plasmonics, owing to its versatile tunability, broadband frequency capability and ultrafast operation speed. In this talk, we present infrared nano-optics studies of graphene encapsulated with hexagonal boron nitride (hBN) to forming van der Waals heterostructures. We have uncovered a rich variety of plasmonics effects that may enable functionalities not attainable through bulk metal-based plasmonics. Through direct nano-imaging of plasmonic standing waves we were able to quantify the fundamental losses in graphene. By examining the sub picosecond dynamics of plasmons in a unique set of pump-probe spectroscopy apparatus we were able to switch on plasmon on demand [Nature Photonics 10, 244 (2016)]. In addition, we performed nano-imaging of graphene/hBN assembling with the presence of a periodic moiré superlattice structures, which yielding rich insights into the electronic phenomena of the hosting material [Nature Materials 14, 1217 (2015)]. Furthermore, we will also discuss the able to map and characterize plasmonic domain boundaries in graphene that is created by a tunable potential barrier through nearby one-dimensional line-like perturbations [Physics Review Letters 117, 086801 (2016)].

Presentation: **OCNPS 200 @ 12:30 pm**  
Refreshments: **OCNPS Atrium @ 12:15 pm**

**All interested persons are cordially invited to attend.**