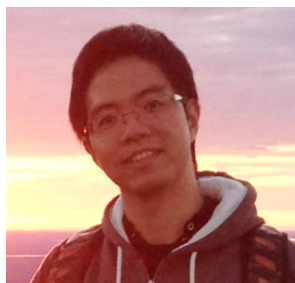


# Research Exchange Seminar



**Yuan Yang**  
Heller Group  
Harvard University

***A Comprehensive Understanding of Raman  
Spectrum in One and Two Dimensional  
Conjugated Carbon Systems***

Raman spectroscopy is very widely used to characterize graphene samples. The understanding of the spectroscopy depends critically on the underlying theory. For a doze of years, a Raman scattering narrative theory called "double resonance" has developed, created for and applied only to graphene, carbon nanotubes and graphite. It relies heavily on post-photoabsorption electron-phonon scattering, which is intrinsically a non Born-Oppenheimer, nonadiabatic process, and neglects the nuclear position dependence of the electronic transition moment. In the talk, we will show electron-phonon scattering is in fact not needed to explain the Raman spectra, the transition moment coordinate dependence explains and predicts graphene spectroscopy more directly and simply. This general understanding also applies to the one dimensional equivalence of graphene, polyacetylene system.

**January 28, 2015**  
**12:00 PM MD 119**  
Pizza will be served

