

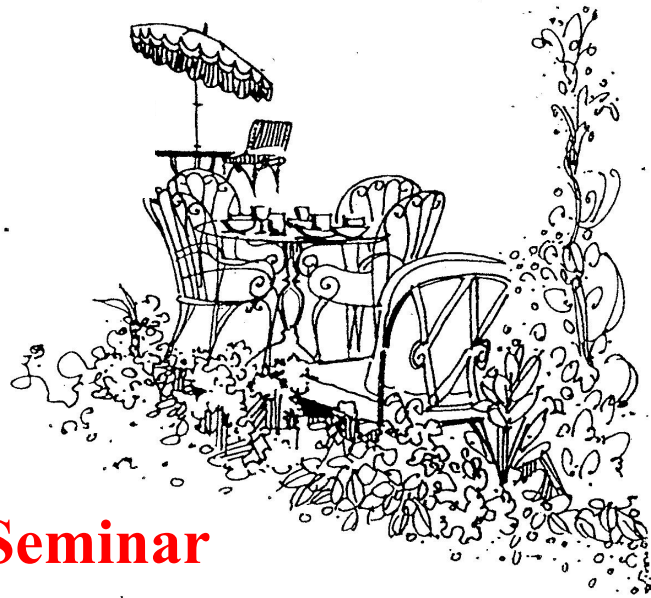
Chez Pierre

Presents ...

Monday, November 23, 2015

12:00pm

MIT Room 4-331



Chez Pierre Seminar

Kin Fai Mak

Pennsylvania State University

” Valley and spin dependent physics in two-dimensional van der Waals’ materials“

Electrons in two-dimensional (2D) van der Waals’ materials with a honeycomb lattice structure possess both the valley pseudospin and the spin degree of freedom (DOF). The valley DOF is associated with the degenerate conduction/valence band extrema at the K and the K’ point of the Brillouin zone. When inversion symmetry is broken, interesting valley and spin dependent phenomena, such as spin-valley locking and the valley Hall effect (VHE), emerge. These unique properties are not only fundamentally important, but may also find applications in valley/spin based electronics and optoelectronics. In this talk, I will discuss our recent experiments on probing the valley and spin dependent physics in 2D transition metal dichalcogenides (TMDs). In particular, I will present results on the observation and control of the VHE in 2D molybdenum disulfide (a TMD semiconductor). I will also discuss our recent observation of superconductivity in single layer niobium diselenide (a TMD metal) and the effect of spin-valley coupling on superconductivity.