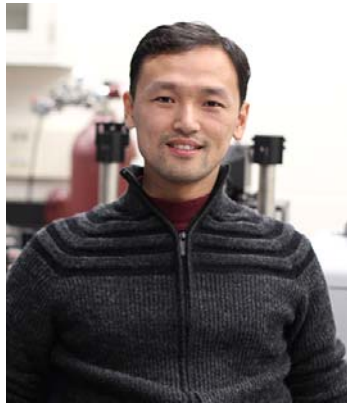


**DEPARTMENT OF PHYSICS AND ASTRONOMY  
JOINT CONDENSED MATTER AND SPINTRONICS  
SEMINAR**

**Friday, April 19, 2019  
3:30 PM, Room 203 Physics  
Refreshments 3:00 PM Room 242 Physics**



**Professor Kin Fai Mak  
Cornell University**

**Path towards exciton condensation at high temperatures**

Excitons, composite Bosons made of Coulomb bound electron-hole pairs, are important objects underlying the operations of many optoelectronics devices in our daily life. As a result of the much smaller exciton mass compared to that of atoms, they also hold great promise in the realization of Bose-Einstein condensation at high temperatures. However, the small exciton binding energy in conventional semiconductors has so far limited the condensation temperature to below 1K. In the past few years, a new class of two-dimensional (2D) semiconductors with much larger exciton binding energy has emerged. In this talk, I will first discuss the measurement of the exciton binding energy in these materials by optical spectroscopy methods. I will then tell you the path we have taken in trying to realize exciton condensation in these materials. Signatures of exciton condensation above 100K have been observed in a recent set of experiments. Prospects of condensate-based optoelectronics and exciton-mediated high-temperature superconductivity will also be discussed.