

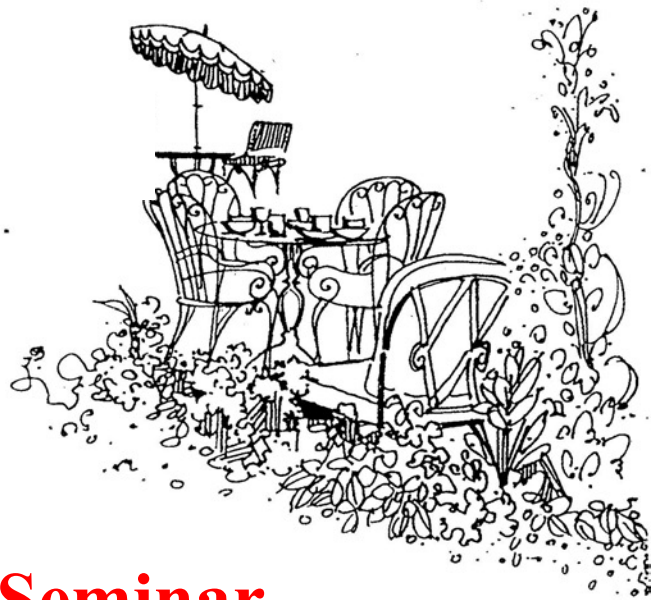
Chez Pierre

Presents ...

Monday, November 29, 2021

12:00pm Noon

Broadcast via Zoom



Chez Pierre Seminar

Xi Ling— Boston University

” Spin-correlation of the light-matter interaction in van der Waals antiferromagnetic NiPS₃ “

Since the discovery of monolayer ferromagnets, magneto-optics plays a compelling role in revealing new physics of magnetism in the extreme nanoscale limit. Compared to ferromagnets, however, the studies of magneto-optics in 2D antiferromagnets are far more difficult due to the lack of net magnetic moments, despite their appealing natures for next-generation spintronic devices, due to their terahertz resonance, multilevel states, and absence of stray fields. The zero net magnetic moment of antiferromagnets makes the detection of the antiferromagnetic order and the investigation of fundamental spin properties notoriously difficult. Here, I will first discuss our recent discovery of the ultra-sharp photoluminescence in the van der Waals antiferromagnetic NiPS₃ from bulk to atomically thin flakes. Magneto-optical measurements under in-plane field is used to reveal the strong coupling between the spin the electrical dipole oscillator, leading to the linear polarization of the sharp emission. Benefiting from the spin-correlated emission in NiPS₃, the Néel vector orientation can be optically detected as perpendicular to the PL polarization, providing an easy, fast, nondestructive strategy to determine the Néel vector orientation and investigate the spin properties of atomically thin antiferromagnets. In the second part, I will talk about the electronic Raman scattering and enhanced d-d emission in NiPS₃ and their contribution in providing detailed information about the d-orbitals in the material. We anticipate our work will stimulate future theoretical and experimental studies on the spin-correlated 2D systems in the field, promoting the development of opto-spintronic device and magnetic quantum information technology.