

# *Chez Pierre*

Presents ...

Monday, March 11, 2024

12:00 pm -1:00 pm

Duboc Room – 4-331



## **Chez Pierre Seminar**

Sang-Wook Cheong, Rutgers University

### **“Chirality and Kinetomagnetism”**

Chirality, which arises from the breaking of mirror symmetries combined with any spatial rotations, plays a ubiquitous role in a wide range of phenomena, from the DNA functionality, vine climbing to the piezoelectricity of quartz crystals. It's important to note that chirality does not necessarily involve a screw-like twisting, and magnetic chirality means chirality in spin ordered states or mesoscopic spin textures. Despite being mathematically well-defined, the term "chirality" has been extensively used, often in confusing ways, in recent years. In steady states, chirality ( $C$ ) does not change with time-reversal operation, while chirality prime ( $C\prime$ ) denotes the breaking of time-reversal symmetry in addition to broken all mirror symmetries, combined with any spatial rotations. Various examples of magnetic chirality and chirality prime and their emergent phenomena, such as self-inductance, directional nonreciprocity in magnetic fields, current-induced magnetization, chirality-selective spin-polarized current, Schwinger scattering, magneto-optical Kerr effect, linear magnetoelectricity, and chiral tunneling will be discussed. Many of these phenomena can be understood with one hypothesis on “kinetomagnetism in chiral systems” that I will present. Some of these exotic phenomena have been recently observed, while many others require experimental confirmation in the future.