

# *Chez Pierre*

Presents ...

**Thursday, February 26, 2015**

**12:00pm**

**MIT Room 4-331**



## **Special Chez Pierre Seminar**

**Riccardo Comin**

University of Toronto

### ***“Resonant x-ray scattering studies of ordering phenomena in solids”***

New phases of matter can be found or engineered in the so-called correlated electron systems thanks to the strong interplay between the charge, orbital, spin, and lattice degrees of freedom. Broken symmetries and resulting order parameters are the hallmarks of these new electronic phases, raising an important experimental challenge: how do we identify and study ordered states in correlated materials?

Resonant x-ray scattering (RXS) is an increasingly popular and powerful tool for the study of ordering phenomena in solids thanks to its ability to selectively capture the fingerprints of various types of electronic orders associated to specific degrees of freedom. After introducing the technique, I will show a few examples of our RXS studies of charge-density-waves, which occur when electrons self-organize into periodic, wave-like patterns in a solid. In particular, I will discuss our recent results in the cuprate superconductors – revealing the universality and resolving the symmetry of charge-density-waves across the phase diagram – and in the iridium tellurides – shedding new light on the role of ligand orbitals in the stripe-ordered phase. I will conclude by offering a few insights and perspectives for RXS explorations of molecular ordering in organometallic perovskites – a rising class of versatile, hybrid materials which is attracting tremendous interest in the context of photovoltaic technologies, and might represent a novel and alternative platform for correlated states of matter.