

# *Chez Pierre*

Presents ...

**Monday, February 14, 2022**

**12:00pm Noon**

**Broadcast via Zoom**



## **Chez Pierre Seminar**

**N. P. Ong, Princeton University**

**" Oscillations of thermal conductivity and evidence for the planar thermal Hall conductivity in the Kitaev Magnet  $\alpha$ - $\text{RuCl}_3$ "**

I will describe recent experiments (led by Peter Czajka) on the thermal conductivity  $K_{xx}$  and thermal Hall conductivity  $K_{xy}$  in the Kitaev magnet  $\alpha$ - $\text{RuCl}_3$ . Below 4 K, we observe the emergence of oscillations in the diagonal thermal conductivity  $K_{xx}$  which bear a strong resemblance to Landau oscillations in a semimetal (there are no free electrons in the magnetic insulator). The oscillations are periodic in  $1/H_a$ , where  $H_a$  is the component of the field along the zig-zag axis of the honeycomb lattice. The planar thermal Hall conductivity  $K_{xy}$  (which has attracted strong interest) actually occupies a different temperature interval. It is vanishingly small below 3 K and increases rapidly from 3 to 10 K. We show that the strong temperature dependence is consistent with bosonic excitations that occupy chiral edge states, and a Berry curvature that changes sign with  $B \parallel a$ , as calculated by Y. B. Kim's group. No evidence of half quantization (which requires fermionic excitations) is observed. I will discuss connections to other experiments and review various theoretical views of our results.