Magnetism and superconductivity in quantum materials

Quantum materials are drawing much attention as the backbone of quantum science and technology. Strong electron-electron interactions are the source of exotic physical properties exhibited by quantum materials, and there are active research efforts to harness such “quantum” properties for technological applications. Two of the most widely studied behaviours are quantum magnetism and superconductivity. For example, a new quantum phase, such as a quantum spin liquid or a topological superconductor, is expected to host exotic quasiparticles called anyons that could be used in a new scheme to build quantum computers.

The summer student will participate in our ongoing research program to discover quantum materials with novel magnetic and/or superconducting properties. In this project, we will systematically investigate various materials to discover a new superconductor or other exotic quantum magnets. This project is an opportunity to learn about sophisticated techniques for synthesizing high-purity quantum materials and measuring their magnetic susceptibility, heat capacity, and crystal structure. This project is suitable for a student with a strong interest in the physics and chemistry of new materials.

For more information, see the Kim group website at
https://youngjunekim.physics.utoronto.ca/