

Magnetism and superconductivity in quantum materials

Quantum materials are drawing much attention as a backbone of quantum science and technology. Strongly interaction between electrons is the source of exotic physical properties exhibited by quantum materials, and there are active research efforts to harness such “quantum” properties in technological applications. Two of the most widely studied behaviors are quantum magnetism and superconductivity. For example, a new magnetic phase called quantum spin liquid is expected to host a collection of highly entangled spins that can be used in a new scheme to build quantum computers, while a circuit built with superconductors is at the center of current quantum computing technology.

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 with the goal of discovering 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/>