

Dr. Saurabh Maiti

Associate Professor, Department of Physics, Concordia University

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11:00 a.m. to 11:50 a.m. in ENW 115

Spectroscopy of superconductors: what we thought we could probe, and what we can.

Abstract:

Spectroscopy is an important tool to study properties of materials of all kinds. One kind is a superconductor which is quite a fascinating state of matter, with many current and future technological applications. A lot of this fascination has to do with the fact that this is a purely quantum system with no classical analog. This begs the question: if we shine light on such a quantum system, do we really understand what we measure? What do we know about the interaction of light with a superconductor? And why is answering this question important? These are some questions that we will address in this talk. We will learn that it is the collective coherent behavior of superconductors that responds to light and differently so for different experiments. We will look at electronic Raman scattering and ultrafast THz spectroscopy as examples and see how a well formulated theory can help navigate this challenge and help extract a wealth of information about the properties (symmetry of order parameter, type of electronic correlation, etc.) of these fascinating materials.