

The scientific and technological interest in resistivity transitions in solids is enormous. Indeed, the switching of the electrical properties of a material is the very basis of the electronics industry. These transitions can be driven by numerous external and internal mechanisms, including, but not limited to, applied electric and magnetic fields, chemical doping, defects, pressure and temperature. While the technological applications of such transitions are myriad, these transitions are also the focus of significant fundamental physical and chemical interest, and a substantial fraction of all research in solid state physics and chemistry is directed at understanding such transitions in some form or another. Given that the transitions are primarily of interest owing to their effect on the electrical properties of solids, experimental techniques that probe electronic states are most useful in this endeavor.

In this presentation, I will discuss metal insulator transitions, and how to study electronic structure in solids using synchrotron radiation-based spectroscopic techniques.