

QM4: **Vidya Madhavan** (University of Illinois Urbana-Champaign) 2h

“Obtaining momentum- and time- resolution with a spatially resolved probe”

Scanning tunneling microscopy is a powerful technique that allows us to measure topography and density of states with sub-angstrom and sub-meV resolution. Through the last three decades, STM based technology has been further developed to obtain spin, momentum, as well as time-resolution. Over the course of the two lectures, I will use our studies on topological insulators, charge density wave systems and superconductors to introduce the techniques of quasiparticle interference and Landau level spectroscopy. I will further describe the latest advance in STM technology i.e., ultrafast STM. I will show how one can obtain femto-second time resolution from a probe that typically takes seconds to days to obtain data. I will describe our recent studies on Kagome materials as well as a Weyl charge density wave system to illustrate the capabilities of this laser coupled ultrafast scanning tunneling microscope.