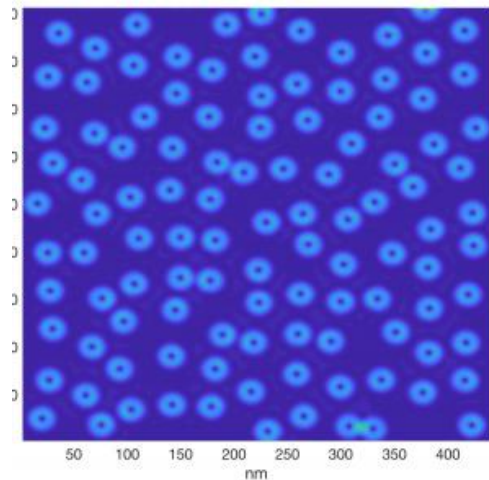


Joint Quantum Information Science Seminar

Thursday, February 28th , 2019
PHYS 242, 11:00 am

Refreshments served at 10:45am

Dr. Ching-Kai Chiu
Kavli Institute for Theoretical Sciences



Majorana vortex modes in iron-based superconductors

Recent scanning tunneling spectroscopy measurement observed the zero-bias conductance peaks at the vortex cores of the topological superconductor candidates, being consistent with Majorana tunneling interpretation. Hence, the observation of the zero bias peak is a strong clue of multiple Majorana zero modes trapped in vortices on the surface of the iron-based superconductor ($\text{FeTe}_x\text{Se}_{1-x}$), which is a potential ideal platform for scalable quantum computing. In the current experiment, the most controllable parameter is magnetic field strength adjusting the intervortex distance. The change of the magnetic field strongly affects Majorana physics near the vortex cores. In this talk, we theoretically study the Majorana vortex lattice with and without disorder as a function of the magnetic field and further propose the readout of Majorana qubits in this platform toward quantum computing processing.