Vikram Deshpande

University of Utah

Engineering Topological Materials: The Case of Topological Insulators and Carbon Nanotubes

Abstract: The field of topological materials has burgeoned of late due to its tantalizing implications for areas such as dissipationless electronics and decoherence-free quantum computing, among others. However, progress toward applications has been complicated by effects of disorder and competing orders. In my lab at the University of Utah, we are working with simpler, cleaner materials such as three-dimensional topological insulators, two-dimensional graphene and one-dimensional carbon nanotubes to engineer topological effects and to engineer devices to detect these effects. I will describe examples of such experiments in my lab including our recent realization of the quantum spin Hall state in hybridized 3D topological insulators and our efforts to study correlated and topological states in ultraclean carbon nanotubes. If time permits, I will briefly talk about our experiments probing graphene heterostructures electromechanically.

Bio: Vikram started as Assistant Professor in the Department of Physics and Astronomy in 2014. Prior to that, he was a Nanoelectronics Research Initiative postdoctoral fellow at Columbia University in the Physics Department working in the groups of Profs. Philip Kim and James Hone. He obtained his PhD in Applied Physics in 2009 at Caltech, where he was a Gordon and Betty Moore graduate fellow for four years, working with Prof. Marc Bockrath. His undergraduate degree is from the Indian Institute of Technology (IIT) Bombay.