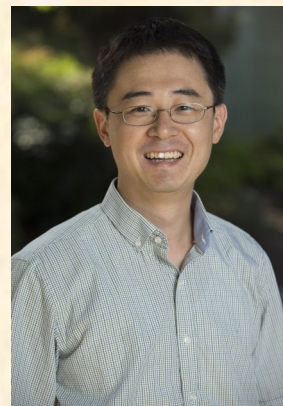


Materials Science & Engineering Program

Peng Wei, PhD

Assistant Professor in the Department of Physics and
Astronomy
University of California, Riverside



Topological order in low-dimensional heterostructures

Proximity effect at heterostructure interfaces can give rise to quasiparticles with mixed physical characters that are usually impossible to be obtained in a compound material. For example, it allows electrons demonstrating the combined characters of superconductivity, ferromagnetism, and spin-orbit coupling etc. As a result, unconventional physics phenomena are expected. In this talk, I will first present our approach in building novel 2D material heterostructures using molecular beam epitaxy based on our previous work on the ferromagnetic ground states of Dirac electrons in graphene. Secondly, I will present our results of two dimensional superconductivity induced onto the surface state of epitaxy gold layer in the presence of strong spin-orbit coupling and induced exchange interaction. Such heterostructure systems host novel topological orders and could be potential candidates for quantum computing that are immune from decoherence.

Biosketch

Peng Wei is an assistant professor in the Department of Physics and Astronomy at UCR, and is also a joint faculty in the Department of Materials Science and Engineering, UCR. Before joining UCR, he was a postdoc at the Department Physics and Francis Bitter Magnet Lab at Massachusetts Institute of Technology from 2011 to 2016. He earned his Ph.D. in physics at UCR in 2011. His research interests are in the areas of topological materials, low-dimensional heterostructures, and new quasiparticle ground states for quantum information technology including fault tolerant quantum computations. He works on synthesizing atomically controlled thin film layers via molecular beam epitaxy (MBE) and producing the associated low-dimensional devices via nanofabrication techniques. He investigates such low dimensional devices by utilizing spin dependent electrical transport, quantum coherent quasiparticle tunneling spectroscopy, and Josephson tunneling etc. at ultra-low temperature.

Wednesday, October 10th, 2018 • WCH 205/206 • 1:10pm