Condensed Matter Physics Seminar Series

Unconventional charge correlations in new classes of kagome metals

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In this talk, I will discuss interesting new inroads in the study of electronic order within classes of metals built from kagome structural motifs (networks of corner sharing triangles). Kagome lattice-derived band structures are known to host a series of features such as Dirac crossings, saddle points, and flat bands at select carrier fillings. Tuning the Fermi level about these features has long been predicted to stabilize a variety of unusual types of order, such as orbital antiferromagnetism, bond density wave order, and unconventional forms of superconductivity. A number of new types of metals built from kagome lattices with band fillings near their Dirac points and Van Hove singularities have recently been identified, and I will focus on progress in studying these materials and their electronic phase transitions. Particular focus will be given to the charge density wave state in the AV_3Sb_5 (A=K, Rb, Cs) class of kagome superconductors and comparison given to their structural cousins.

Stephen Wilson currently serves as a Professor in the Materials Department at the University of California, Santa Barbara, where he also co-directs the National Science Foundation's Quantum Foundry on campus. He received his Ph.D. in Physics from the University of Tennessee, Knoxville in 2007, followed by a postdoctoral fellowship at Lawrence Berkeley National Lab in Berkeley, California. Prof. Wilson's research group focuses on the synthesis and characterization of a variety of quantum materials, with particular emphasis given to unconventional superconductors, correlated metals, and quantum magnets. His group also works to develop new single crystal growth methods and employs advanced neutron and synchrotron x-ray scattering techniques/spectroscopies for the study of quantum materials.

Friday, November 17th, 2023 at 4:00PM
4-330 PAB