UTC Research Institute

"Correlated Topological Quantum Materials: Design and Realization"

given by **Dr. Chandan Setty**

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Thursday, January 11, 1:30 p.m., ECS 426 (Maytag Room)*

Public Invited

Quantum material design serves as a bridge between quantum science and quantum technologies. Over the last few years, several new conceptual paradigms that drive novel quantum phases of matter have come into prominence. They provide rich platforms to predict, design and test unusual materials in the lab for quantum technology applications. In this talk, I will argue that the intersection of strong electron correlations and electronic topology offers one such paradigm. More specifically, I will present a general approach in which strong correlations cooperate with crystalline symmetry to drive gapless topological states [1,2]. I will validate this approach by exploring Kondo lattice models and materials whose space group symmetries may promote different kinds of electronic degeneracies. Finally, I will outline a generic procedure to identify materials for the realization of these correlation-driven topological semimetal phases [1]. The findings presented in this talk will illustrate the potential of the proposed materials design principle to guide the search for novel quantum materials toward emerging quantum technology applications.

[1] Chen, CS et al Nature Physics 18, 1341 (2022)
[2] Huang, CS* et al Nature Physics (to appear) (2024)

Funding:
Air Force Office of Scientific Research under Grant No. FA9550-21-1-0356
U.S. Department of Energy, Office of Science, Basic Energy Sciences, under Award No. DE-SC0018197
Robert A. Welch Foundation Grant No. C-1411.

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