

CONDENSED MATTER COLLOQUIUM SERIES

Ankara

Premala Chandra

Rutgers University

The Inner Universe of Quantum Materials

Historically the study of physics in our local environment has led to an improved understanding of Nature well beyond our planetary bounds. As a physicist who has worked in academia and industry, in this talk I hope to convey my excitement for the study of quantum materials both for their application to the everyday and for their fundamental properties that may help us understand our greater Universe. The combination of quantum mechanics and complexity leads to the emergence of rich, exotic states of matter where the number of constituent electrons is comparable to the number of stars in our observable Universe. In this sense quantum materials can be viewed as tunable Universes where their behaviors under extreme conditions can be probed in the laboratory with far-reaching implications. After discussing some specific examples, I will end with our “Dark Matter” challenges and our many hopes for the future.

Professor **Premala (“Premi”) Chandra** of Rutgers University in New Jersey is a theoretical physicist who has pursued her research in both academic and industrial settings. Premi does “blue sky” research on problems inspired by experimental puzzles observed in materials. In her more applied work, she has designed and patented a long-range superconducting array that realizes a content-addressable Hopfield memory; this simple example of a neural network can be generalized to support fast, efficient and robust learning protocols.

Premi has pursued her studies and her research at Yale, Exxon Research, UC Santa Barbara, Bell Labs, Princeton and NEC Research Institute. In 2003 she joined the Center for Materials Theory at Rutgers University as a Professor. Premi is a Fellow of the Institute of Physics (UK) and of the American Physical Society. Most recently Premi is on sabbatical at the Flatiron Institute in New York City (USA), where she hopes to “contemporize” her computational skills and to develop new collaborations. As an undergraduate, Premi had the honor and the privilege of working with Prof. Feza Gursev; ever since she has had a heartwarming feeling for the people and the culture of Turkey.

Premi is fascinated by rich phases of quantum matter that emerge from the confluence of quantum mechanics and complexity. In “The Inner Universe of Quantum Materials” Premi will present quantum materials as tunable Universes whose behavior can be studied under extreme conditions with far-reaching technological and conceptual implications.

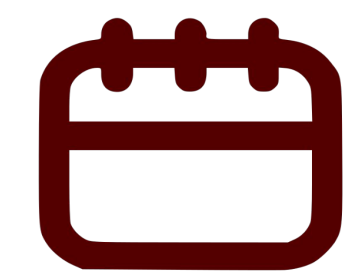
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March 25, 2025
Tuesday



19:00, (Ankara Time)



Click [here](#) for zoom link

Meeting ID: 432 931 6595

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