

UNIVERSITY OF CALIFORNIA, IRVINE

THE DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING



Is Proud to Host a Seminar by:

ASSISTANT PROFESSOR BOLIN LIAO

Dept. of Mechanical Engineering

University of California, Santa Barbara

Thursday, September 29, 2022

2:00-3:20 PM

Zoom Meeting ID: 928 5767 0106, Passcode: 541893

MICROSCOPIC ENERGY TRANSPORT IN EMERGING QUANTUM MATERIALS

Abstract: The emergence of quantum materials has provided new opportunities to realize unique functionalities in energy harvesting and transport applications, while the understanding of microscopic energy transport and conversion processes in these materials is still limited. In this talk, I will discuss our recent computational and experimental efforts to probe microscopic energy transport processes in quantum materials. Firstly, I will discuss our recent understanding of the anomalous phonon softening in topological Dirac and Weyl semimetals due to singular electron-phonon coupling and their potential use for thermoelectric energy conversion and solid state thermal switching. Secondly, I will describe our development of a scanning ultrafast electron microscope (SUEM) that can directly image microscopic energy transport processes with combined high spatial and temporal resolutions. In particular, I will describe our discovery of unusually long hot photocarrier transport in cubic boron arsenide using SUEM that can be potentially applied in hot-carrier solar cells.

Bio: Bolin Liao is an assistant professor of mechanical engineering at UCSB. He received his Ph.D. in mechanical engineering from MIT in 2016 and was a Kavli postdoc scholar at Caltech from 2016 to 2017. His current research focuses on the fundamental understanding of microscopic energy transport in emerging quantum materials and their potential application in next-generation energy systems. His research has been recognized by an outstanding Ph.D. thesis award from MIT, a Kavli prize postdoctoral fellowship in nanoscience from Caltech and several young investigator awards from federal agencies.