THE UNIVERSITY OF UTAH

CONTROLLING CHARGE, SPIN AND LIGHT IN PB-HALIDE PEROVSKITE POLYCRYSTALLINE FILMS, SINGLE CRYSTALS, NANOCRYSTALS, AND PEROVSKITE LAYERED SYSTEMS

presented by

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TUESDAY, NOVEMBER 12TH
AT 4:00 PM
JFB 334

REFRESHMENTS WILL BE SERVED IN
JFB 334
AT 3:45 PM

PHYSICS & ASTRONOMY DEPARTMENT
CONDENSED MATTER SEMINAR

ABSTRACT

Lead-iodide based perovskite semiconductors are emerging as promising light absorbers for solution-processed thin-film photovoltaic applications. In addition, these materials are also intensively studied for light-emitting diodes, photodetectors, lasers, and recently spintronic applications. Developing design rules that relate their photophysical properties to their structure and composition is crucial for the rational design and utilization of these novel material systems. In addition to the prototypical 3D Pb-halide ABX_3 based systems we are also exploring nanocrystals and 2D layered systems. We are utilizing time-resolved transient spectroscopies to study carrier and spin dynamics in these systems. I will discuss our studies of controlling the charge carrier dynamics, light/matter interactions, and spin populations in these novel systems. Topics may include: maintaining long-lived hot-carrier populations through a phonon bottleneck; electron-phonon interactions, carriers vs. excitons, and carrier transport in 3D perovskite thin films; electro-active ligands in perovskite nanocrystals and their use in photocatalytic reactions; and controlling spin degrees of freedom in 2D perovskite layered systems.