

# RAD LAB SEMINAR

## Low-Temperature Photoluminescence of Cesium Lead Bromide Nanostructures

### WHEN

Monday, Feb 24, 2020

2:00 PM

### WHERE

Rad Lab Auditorium



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#### Abstract

Semiconductor perovskite  $\text{CsPbBr}_3$  and a wide-gap zero-dimensional  $\text{Cs}_4\text{PbBr}_6$  are two cesium lead bromides that have recently attracted attention due to their light-emitting properties. When sized down to the nanoscale, these compounds are promising for applications such as solution-processed lasers and sources of single photons. Despite the hype, the understanding of their photophysics and its relation to materials structure and stability remains rudimental. At room temperature, light emission of Cs-Pb-Br nanostructures suffers from thermal effects such as broadening and quenching, requiring low-temperature studies. In this talk, I will discuss how the steady-state and time-resolved low-temperature photoluminescence enables to elucidate contributions from quantum confinement, electronic coupling, and energy transfer into the light-emission of three materials:  $\text{Cs}_4\text{PbBr}_6$  nanocrystals,  $\text{Cs}_4\text{PbBr}_6$ - $\text{CsPbBr}_3$  nanocrystal heterostructures, and ordered arrays of  $\text{CsPbBr}_3$  nanocubes. The findings also highlight that the control over the chemical reactivity and stability of Cs-Pb-Br nanostructures is imperative for a rational design of new single nanocrystal emitters as well as collective phenomena