Contribution ID: **85** Type: **Invited Talk**

# Charge localization through symmetry breaking in doped perovskite nanocrystals for fast and efficient luminescence

*Friday, 25 November 2022 18:15 (30 minutes)*

Lead-halide perovskite nanocrystals have emerged as high-performance semiconductors for efficient optoelectronic devices, especially in light-emitting diodes (LEDs) for bright and flexible displays. Atomic doping with transition metals other than lead has been shown to dramatically boost the luminescence of these nanocrystals. Yet, we still do not fully understand why these materials work so efficiently.
In this talk, I will give an overview of our recent work on understanding the high luminescence yields observed in a variety of doped nanocrystals, including Mn, Ni, and Zn.
We find that the dopant-induced lattice periodicity breaking results in transient charge localization, increasing the overlap of electron and hole wavefunctions. This leads to increased radiative recombination rates – a property that is typically intrinsic to a semiconductor and hard to change – and an overall higher luminescence yield. Our results pave the way to highly efficient displays and quantum emitters.

## Topics

Session A. Physics of condensed matter and spectroscopy

## Contact Email address

sfeldmann@fas.harvard.edu

**Primary author:** Dr FELDMANN, Sascha (Harvard University)

**Presenter:** Dr FELDMANN, Sascha (Harvard University)

**Session Classification:** Ultrafast phenomena II