

You are cordially invited to attend this seminar to be held on

Thursday, March 15th, 15:00

Room 008, Engineering Class (Kitot) Building

Low Dimensional Perovskite Nanocrystals Not Your Usual Quantum Dots

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The soaring global demand for energy calls for out of the box thinking in development of energy solutions, including materials with performance far beyond that achievable today.

A new class of materials the lead-halide perovskites show enigmatic high efficiencies in both photovoltaic and light-emitting applications. Thermodynamic consideration demand imperfection free material for such performance. However, in perovskite these restriction seem to be relaxed. I study perovskite nanocrystals as a model system for understanding the origin of these properties.

Low-dimensional colloidal nano-crystals of cesium lead halide demonstrate exceptionally bright emission without shelling and unusual room temperature transformations not common to other semiconductors nanocrystals, suggesting a near equilibrium nanocrystal system. We demonstrate how quantum confinement and dimensionality dictate the exciton behavior and anisotropic emission In the case of two dimensional nanoplates and one dimensional nanowires. These nanowires can be further utilized through 3D printing and alignment to fabricate highly polarized functional metamaterials including memory devices and sensors. The "softness" of the perovskite crystal allows post synthetic room temperature transformations that tune the material band-gap values throughout the visible spectrum. The resulting high quantum yield, combined with the synthetic versatility and facile transformations, position colloidal perovskites as a unique model system for the study of charge dynamics and thermodynamic transformations at the nanoscale, contributing to the understanding of these exciting next generation materials for energy.



My undergraduate (exact sciences program) and graduate studies (Joint mentorship with O.Millo & U.Banin) conducted in the Hebrew university. These days, I am a Rothschild fellow with Paul Alivisatos in University of California, Berkeley.