Science at the Edge
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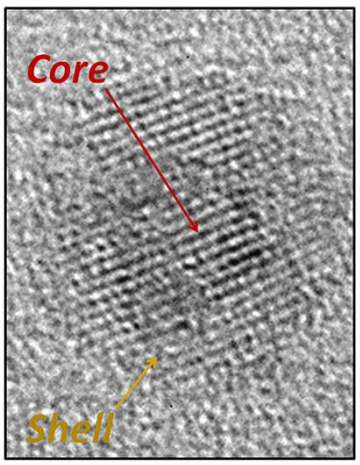
Engineering of semiconductor nanocrystals and nanocrystal solids for renewable energy applications

Mikhail Zamkov
Bowling Green State University
Depts. of Physics

ABSTRACT

In the first part, I will discuss a novel methodology for depositing colloidal semiconductor nanocrystals into all-inorganic solid films with implications both to nanocrystal solar cells and nanocrystal light-emitting devices. The reported strategy utilizes a simple scheme for incorporating PbS or CdSe semiconductor nanocrystals into matrices of a wide-band gap CdS semiconductor for stable and efficient operation of solution-processed devices. The two key benefits of this approach include: (i) all-inorganic architecture promoting superior thermal and chemical stability, and - (ii) a unique film morphology, which offers the possibility of tuning the film properties between conducting (for applications in solar cells) and light-emitting (LEDs, lasers) simply by changing the interparticle distance in the matrix. This approach is universal and can be extended to a large number of nanocrystal/matrix combinations. The second part of the presentation will focus on ultrafast electron processes taking place in photocatalytically active metal-semiconductor nanocrystals. In particular, the key factors affecting the photocatalytic performance of semiconductor nanocrystals will be reviewed.

http://physics.bgsu.edu/~zamkovm/



Please contact ghosh@pa.msu.edu to meet with the speaker