Ultrafast Photoexcitation Dynamics of Low Dimensional PbSe Nanostructures

Multiple exciton generation (MEG) in PbSe quantum dots opens up new opportunities to improve the power conversion efficiency of the solar cell beyond the Shockley-Queisser limit. However, strong Auger recombination rate of MEG is the limitation to extract the advantage of the MEG in solar cells. Auger recombination rate can be low in elongated nanostructures such as nanowires (1D) and nanosheets (2D). Efficient MEG can be achieved along the confined directions of nanostructures and charges can be move along the elongated direction. To optimize the quantization, Auger recombination, charge extraction and transport properties of nanodevices, a detailed understanding of photoexcitation dynamics of carriers on the femtosecond scale is needed. In the present work, low dimensional PbSe nanostructures are synthesized and their photoexcitation dynamics are explored by studying the transient absorption spectra and dynamics. To our best knowledge, this is the first report for the synthesis of quantum confined PbSe NSs.

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Time: 10am
Venue: PAP Hilbert Space PAP-02-02
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