

Seminar

Ultrafast optical probes of lead halide perovskites

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Lead halide perovskites have re-emerged in the last few years as promising materials for the next generation, efficient opto-electronic technologies. Due to the “soft” fluctuating nature of their crystal lattice[1], electronic properties and lattice vibrations are strongly correlated in these materials. Here we use various ultrafast optical techniques to investigate such correlations and their consequences on the carrier dynamics in both 2D and 3D lead halide perovskites. We provide evidence of ultrafast lattice re-organization in about 80 fs upon photo-excitation driven by a specific phonon mode[2]. Independently, employing two-dimensional coherent spectroscopy, we observe formation of new electronic transitions in the same timescale. We propose that such photo-induced states are a consequence of Rashba splitting of the carrier bands induced by the large spin-orbit coupling in the system combined with the ultrafast lattice deformations.

References:

[1] A. R. S. Kandada and A. Petrozza, *Acc. Chem. Res.* 49, 536 (2016).

[2] G. Batignani et al, *ArXiv ID: 1705.08687* (2017).

Monday, Aug 28th 2017

11:30 AM (Tea/Coffee at 11:15 AM)

Auditorium, TIFR (FReT-B)