

FEMTOSECOND EXTREME ULTRAVIOLET SPECTROSCOPY OF SEMICONDUCTOR CARRIER DYNAMICS

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Extreme ultraviolet (XUV) transient absorption spectroscopy is emerging as a powerful, element-specific tool for measuring femtosecond to attosecond dynamics in molecular and solid-state systems. Tabletop XUV transient absorption spectra retain the element specificity of hard x-ray absorption while providing a straightforward mapping of the unoccupied valence and conduction band density of states. The presence of distinct signals for holes and electrons in the XUV region is especially powerful, as the dynamics of these carriers are often convolved in transient UV/visible measurements. In this work we measure the rate of charge transfer across TiO₂/CH₃NH₃PbI₃ and CH₃NH₃PbI₃/NiO interfaces, and highlight the competition between carrier cooling in the perovskite absorber and charge injection into the electron/hole collection layers