

Abstract Submitted
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Ultrafast Carrier Dynamics in GaAs(110) Studied by Time- and Angle-Resolved Photoelectron Spectroscopy SHUOLONG YANG, JONATHAN SOBOTA, Stanford University, PATRICK KIRCHMANN, Fritz Haber Institute of the Max Planck Society, ZHI-XUN SHEN, Stanford University — Ultrafast carrier dynamics in GaAs is of particular importance to optoelectronic devices and solar cell technologies. We employ Time- and Angle-Resolved Photoelectron Spectroscopy to elucidate the dynamics of both the occupied and unoccupied states of GaAs(110) upon femtosecond infrared laser excitation. We observe in the conduction band an optically excited population and energy shift, which both decay in ~ 10 ps. The valence band also exhibits energy shifting dynamics which encompasses multiple temporal regimes. More intriguingly, valence band dynamics are also observed for negative pump-probe delays. We explain these observations by a carrier-transport-induced electrostatic potential change within a Drude-like picture.

Shuolong Yang
Stanford University

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