Physics Colloquium

Monday

January 15

4:00 P.M.

Rm 118 NSH

Optoelectronics of Hybrid Metal Halide Perovskites for Photovoltaics

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Hybrid metal halide perovskites have shown extraordinary success as active layers in solar cells, with power conversion efficiencies rivalling existing silicon technologies. A benefit of perovskites is that they are comprised of low-cost, earth abundant materials, and perovskite thin films are easily synthesized with simple starting materials. Additionally, they exhibit exceptional optoelectronic properties, which include strong absorption across the entire visible spectrum, long charge-carrier lifetimes, and high charge-carrier mobilities. Optical-pump/THz-probe (OPTP) spectroscopy has proven to be an essential technique for studying the charge-carrier dynamics and charge-carrier mobility in many of these materials including lead-based, tin-based, two-dimensional, and mixed-halide/mixed-cation perovskites. These studies have determined that the charge-carrier mobility and charge-carrier recombination dynamics are strongly dependent on chemical composition, defect density, band structure, and crystallinity.

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