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The Photophysics of Perovskite Solar Cells

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Solution processed organic-inorganic lead halide perovskite solar cells, with power conversion efficiencies approaching 20%, are presently the forerunner amongst the next generation photovoltaic technologies. These remarkable performances can be attributed to their large absorption coefficients, long charge carrier diffusion lengths and low non-radiative recombination rates. In addition, these materials also possess excellent light emission and optical gain properties. In this talk, I will review the developmental milestones in this field and distil the recent findings on the photophysical mechanisms of this remarkable material. I will also highlight some of our latest charge dynamics studies and other investigations on the novel properties of this amazing material system.