# Photocurrent Measurements Using Precision LED Excitation Systems Across a Broad Spectral Range

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Photocurrent spectroscopy is a powerful technique for investigating charge generation, carrier transport, and photoresponse mechanisms in optically active materials. The accuracy and reproducibility of such measurements strongly depend on the precise control of excitation conditions, particularly when studying wavelength-dependent phenomena or transient photoelectric processes.

In this work, we present dedicated LED excitation systems designed for photocurrent characterization over a broad spectral range extending from the ultraviolet to the near-infrared. The developed drivers provide accurate control of excitation parameters, including optical intensity, pulse duration, and repetition rate, enabling both steady-state and time-resolved photocurrent measurements. Stable operation with well-defined temporal profiles allows the investigation of dynamic processes such as carrier trapping, recombination, and transport kinetics in a wide variety of photoactive materials.

The flexibility of the platform enables straightforward implementation of spectrally resolved photocurrent experiments using interchangeable LEDs covering different wavelength ranges. This approach offers a compact, energy-efficient, and cost-effective alternative to conventional monochromator-based excitation systems while maintaining high experimental reproducibility. The capability to perform pulsed excitation further extends the applicability of the system to transient photocurrent studies and the determination of characteristic response times.

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