# Ultrafast Spectra for Low-Dimensional Interface Detection

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Based on ultrafast spectroscopy, such as time-resolved photoluminescence or pump-probe technology, we comprehensively monitored the ultra-fast PL decay and the wide-field/in-situ photo-carrier dynamics to reveal the surface electron transfer or diffusion behavior and realized spatiotemporal resolution imaging. The researched process involved defect distribution in perovskite quantum dots, and metal surface plasmon coupling with wide-bandgap semiconductors and two-dimensional layer materials. Furthermore, we established optical-inspired ultrafast acoustic pulses to achieve higher longitudinal resolution for heterojunction interface detection, and demonstrated the correlation process of carriers, and interfaces mechanical parameters as Young's modulus collected from the frequency oscillation. It provided an ultrafast, accurate, and non-destructive evaluation technology for complex interface systems such as optoelectronic/biological devices.

**Short Bio:**

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