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Comb Spectroscopy of Laser-Induced Plasma

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Dual-comb spectroscopy has become a powerful spectroscopic technique in applications that rely on its broad spectral coverage combined with high accuracy and high frequency resolution capabilities. Experiments have primarily focused on high-sensitivity detection and analysis of gas samples under semi-static conditions, with applications ranging from environmental monitoring of greenhouse gases to high-resolution molecular spectroscopy. Here, we utilize its ability for rapid detection of transient phenomena to demonstrate broadband, high-resolution, and time-resolved spectroscopy in laser-induced plasmas. Laser-induced plasmas provide a versatile and non-contact means to apply the powerful tools of optical spectroscopy in the analysis of solid materials. This new spectroscopic approach offers the broad spectral coverage found in the powerful techniques of laser-induced breakdown spectroscopy while providing the high-resolution and accuracy of cw laser-based spectroscopies.