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(G*) POS-E29 – Simple Measurement for Field Reconstruction

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Simple Measurement for Field Reconstruction

The temporal resolution of pump-probe experiments is determined by the duration of the excitation and measurement pulses. A major constraint on femtosecond (1 fs = 10^{-15} s) and attosecond (1 as = 10^{-18} s) science is how well we can control and compress these pulses. However, such ultrashort pulses require a broad spectrum with careful phase control across its bandwidth to minimize the duration. The temporal characterization of these pulses is crucial in establishing ultrafast experiments. For this reason, several pulse characterizing techniques have been developed, each with their own strengths and weaknesses [1].

In this paper, we discuss a new optical measurement technique that can directly measure the electric field that constitutes the laser pulse. We find that compared to other techniques for electric field measurements, our method is relatively inexpensive and robust in characterizing pulses up to 100 fs in duration. This method requires only a commercially available CCD camera as opposed to spectrometers or other expensive instruments and provides the ability to reconstruct the field without ambiguities [2]. In this way, we can directly measure the temporal evolution of the field amplitude and phase [3]. We find that the measurement is in good agreement with established characterization techniques.

References

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