

Using Air to Characterize Laser Pulses

A traveling light wave can be characterized by its amplitude, frequency, and phase. The amplitude is related to its intensity, the frequency tells its color, and the phase tells information about the speed of travel for each color in a medium. For high light intensities, matter responds to light in a nonlinear fashion, typically moving energy from one color to another, revealing vital information about the medium. The spectral phase of these high intensity light pulses determines the efficiency of these nonlinear effects. Therefore, characterization of the spectral phase of a laser pulse becomes paramount. We have discovered a novel method to characterize and compensate the spectral phase of a laser pulse that utilizes third harmonic generation in air, removing the need for costly and restrictive nonlinear crystals previously required for such a measurement.

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