

Terahertz transmission spectroscopy of femtosecond laser filaments

Thursday, 24 November 2022 16:30 (30 minutes)

We investigate the relaxation dynamics of a plasma channel, called *filament*, produced in air by an intense femtosecond laser pulse. A single-cycle terahertz pulse, generated by a secondary air-plasma, probes the filament at its near-critical plasma density.

We investigate essential parameters of the plasma filament, especially the electron density, in the particular regime of high repetition rate (>kHz) lasers. In the latter, the fast accumulation of laser pulses drastically modifies the formation of filaments and their characterization with standard techniques. The results are compared with measurements of optical interferometry performed at lower laser repetition rate.

Through this experiment, we more generally demonstrate the reliability of our THz source for investigating ultrafast phenomena with similar pump-probe schemes.

Topics

Session B. Laser physics and modern optoelectronics

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Session Classification: Light-matter interactions