

Ultrashort laser pulse filamentation and applications

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Ultrashort laser pulse filamentation is an intense light propagation phenomenon occurring in air, gases, and glasses. It leads to laser-matter interactions over extended distances which enable the remote generation of plasma channels and secondary radiation, such as super-continuum spectra and THz radiation. Numerous applications have been proposed based on the potential of filamentation to generate remote sources of electrons and secondary radiation. In this presentation, I will discuss the key mechanisms that sustain light filaments over long distances. Then, I will present several applications that have been investigated experimentally and through simulations, including laser-guided discharges, femtosecond laser micro-machining of glasses, filament-based detection of atmospheric pollutants, and the generation of underwater acoustic signals by femtosecond lasers.

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