

New perspectives in environmental analysis by means of Femtosecond Lidar

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Abstract:

Interaction of the terawatt laser pulses with air is accompanied by various non-linear effects, among them Kerr focusing and multi-photon-ionization, leading to beam defocusing. As a result the light is self-guided into conductive plasma channels (filaments), which emit white light. This phenomenon can be explained by significant self-phase modulation inside the filament. Highly collimated, coherent and spectrally broad light creates an ideal opportunity for the wavelength-resolved lidar measurements. The non-linear interaction between micro-droplets and intense light can be applied for remote analysis of aerosol chemical constitution. The ionizing properties of the terawatt beam can be used for experiments on water droplet formation in the atmosphere.