



## Time Resolution of Collapse Events during the Propagation of Ultraviolet Light Filaments

By Teresa J. Fondren

Biblioscholar Nov 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x7 mm. This item is printed on demand - Print on Demand Neuware - Long distance propagation, or filamentation, of short, intense laser pulses is possible through the balance of two effects: self-focusing, when a nonlinear index of refraction of air is induced by high intensities, and defocusing, due to the plasma created by the pulse. Applications for filamentation include areas such as remote sensing and directed energy. A split-step spectral propagation simulation is used to model the behavior of a high intensity ultraviolet laser pulse propagating through air. Convergence of femtocecond duration collapses that form on the leading edge of the pulse in the time domain is achieved with an increase in the multiphoton ionization coefficient. Through an analysis of the relative sizes of each term in the propagation equation, a lack of plasma present at the leading edge of the pulse is found to cause these collapses. Results for a more recent value of the electron--positive ion recombination rate are compared to results from a higher value used in previous work. A linear stability analysis shows inherent instability of the pulses in all cases. The inclusion of group velocity dispersion...



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