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Title:Analysis of dual frequency interaction in the filament with the purpose of efficiency control of THz pulse generation

Authors:Kosareva, Olga G. (1); Panov, Nikolay A. (1); Volkov, Roman V. (1); Andreeva, Vera A. (1); Borodin, Aleksey V. (1); Esaulkov, Mikhail N. (1); Chen, Yanping (2); Marceau, Claude (2); Makarov, Vladimir A. (1); Shkurinov, Alexander P. (1); Savel'ev, Andrey B. (1); Chin, See Leang (2)

Author affiliation:(1) International Laser Center, Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, 119992, Russia; (2) Département de physique, de génie physique et d'optique, Centre d'Optique, Photonique et Laser (COPL), Université Laval, Québec QC G1V 0A6, Canada

Corresponding author:Kosareva, O.G.(kosareva@physics.msu.ru)

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Abstract:Cross-guiding of the 400 nm second harmonic of the Ti:Sapphire laser in the femtosecond filament produced by an 800 nm pump in argon leads to the efficient terahertz generation along the longitudinally extended high intensity region. Based on the vectorial model of the dual pulse co-propagation we found that terahertz yield due to four-wave mixing in the filament maximizes for the same temporal delay between 400 nm and 800 nm pulses as the 400 nm signal after the analyzer crossed to its initially linear polarization direction. This optimum delay goes up with increasing geometrical focusing distance and leads to the maximum terahertz yield if the initial 800 nm pump and the second harmonic polarization directions are parallel to each other.

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