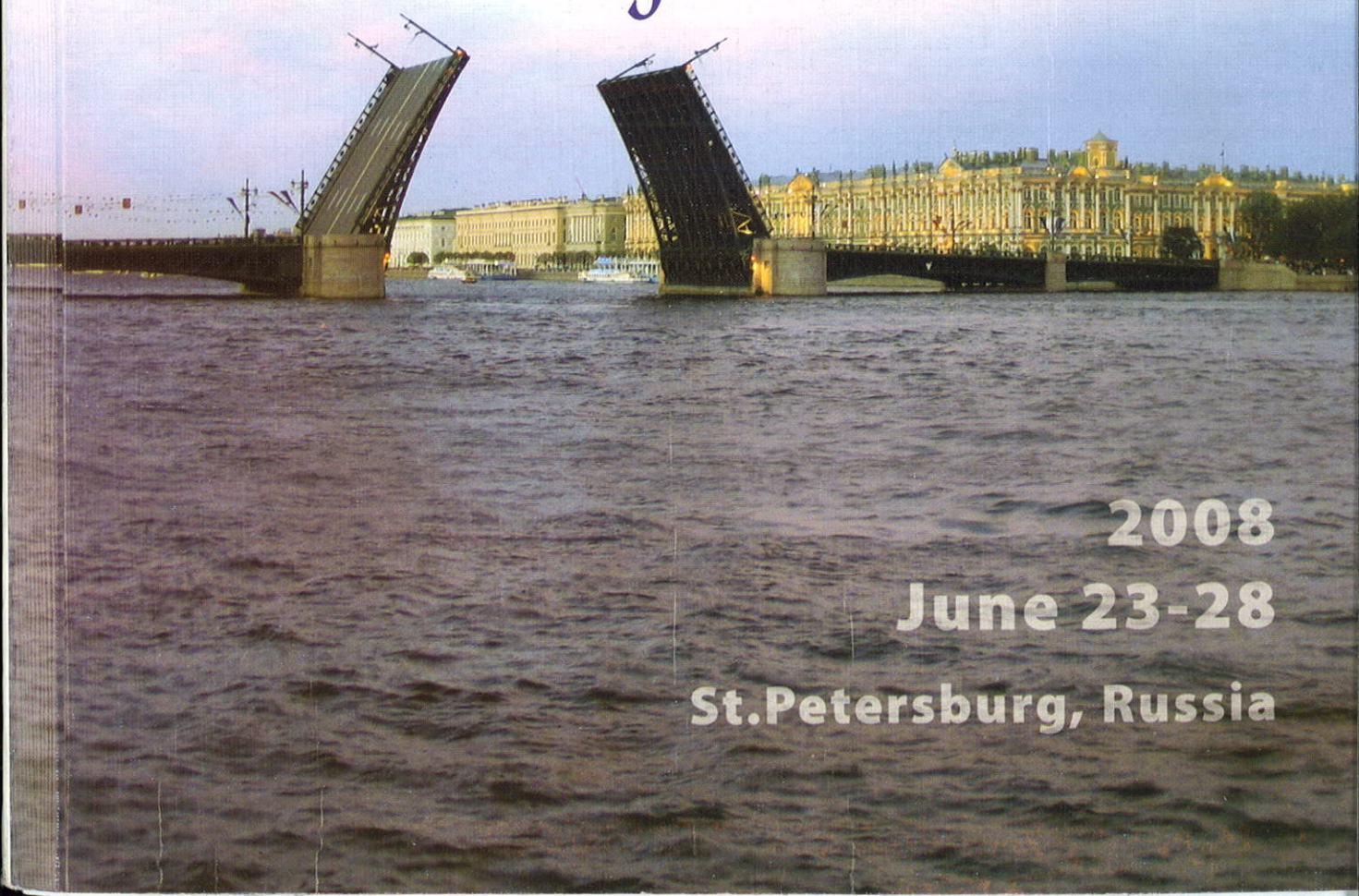
LASER OPTICS
ОПТИКА ЛАЗЕРОВ
2008

International Conference

«Laser Optics 2008»

Technical program



2008
June 23-28
St.Petersburg, Russia

ThR5-30 12:00-12:15

Features of Supercontinuum Generation and Spatiotemporal Reshaping in the Double Pulses Filament

V. I. Trunov, E. V. Pestryakov, V. V. Petrov, A. V. Kirpichnikov, S. A. Frolov, S. N. Bagayev
Inst. of Laser Physics SB RAS, Russia

Supercontinuum generation in rare gases in the double pulses filament and their spatiotemporal reshaping at different pressures have been investigated. It was shown experimentally that twin-pulses and dual-wavelength pumping (800 nm and 400 nm) can produce stronger and wider supercontinuum and have great potentials for increasing the supercontinuum generation efficiency and maximum energy of compressed pulse in single filament regime.

ThR5-31 12:15-12:30

Self-compression in a Filament Down to Few Cycle Pulses: Search for Optimized Conditions with SubTW Pulses

Maria V. Kurilova
International Laser Center and Lomonosov Moscow State Univ., Russia

We traced changes in temporal and spectral shapes of 50 fs laser pulses undergone self-compression during filamentation in gases. By comparison with numerical modeling we proposed optimal conditions for high-energy few cycle optical pulse production.

ThR5-32 12:30-12:45

Multiple Filament Plasma Channels as Guiding System for Microwave Radiation

**Valuev V. V., **Dormidonov A. E., ***Kornienko V. N., ***Cherepenin V. A., **Kandidov V. P., **Shlenov S. A.*
*State Scientific Research Test Laser Center «Raduga»; **Faculty of Physics and International Laser Center of M. V. Lomonosov Moscow State Univ.;***Institute of Radio-engineering and Electronics of RAS, Moscow, Russia

Bunch of plasma channels of femtosecond high-power laser pulse is considered as a virtual cylindrical and single-wire line for directional transfer of microwave radiation. Estimations for average conductivity and energy losses in plasma waveguide are given.

ThR5-33 12:45-13:00

Nonlinear Frequency Conversion of a Femtosecond Laser Pulse in a Filament

R. V. Volkov and A. B. Savel'ev
Physical Department & International Laser Centre of M. V. Lomonosov Moscow State Univ., Russia

The nonlinear conversion of 50 fs laser pulse inside a filament, generated in a solid target by another femtosecond pulse is accomplished. New multicolor components with the bandwidth of hundreds of nanometers are observed. Their spectral properties and angular distribution can be explained by four-wave parametric coupling in the filament. The efficiency of the conversion is high.

ThR5-34 13:00-13:15

Electromagnetic Waves Guiding by Plasma Filament Generated b Femtosecond Laser Pulses: from Dc to Microwave.

Alexandrov N. L.[1], Bazeljan E. M.[2], Bogatov N. A.[3], Eremin V. I.[3], Karpov M. A.[4], Kuznetsov A. I.[3], Smirnov A. I.[3], Stepanov A. N.[3],
[1]Moscow Inst. of Physics and Technology; [2]Moscow Power Engineering Inst., Moscow; [3]Inst. of Applied Physics, Nizhny Novgorod; [4]BIFO company, Moscow, Russia

We investigated both experimentally and theoretically the initiation and guiding of high voltage dc discharge between electrodes by plasma filament generated by intense femtosecond laser pulse likewise the transportation of microwave radiation along a double transmission line in which a role of one wire played such a plasma filament.

ThR5-35 13:15-13:30

Prediction of Parameters of High-Power Femtosecond Laser Radiation in the Air Based on Numerical Models and Laboratory Data

Alexander A. Zemlyanov
Inst. of Atmospheric Optics SB RAS, Russia

The results of numerical simulation of propagation of high-power femtosecond laser pulses in the air based on numerical solution of Schrцdinger equation are presented in the report. A behavior of root-mean-square radius of light beam along propagation path and limiting angular beam divergence were investigated by the example of light beams of Gaussian and Super-Gaussian transverse intensity profiles. These results show that it is possible to describe uniformly an evolution of femtosecond pulse effective parameters and to make a forecast about propagation of such radiation in atmosphere at insertion of new spatial scales depending on beam type, radius, and initial power. The conclusions are illustrated by interpretation of laboratory experiments results.

— lunch —

ThR5-36 *Invited* 15:00-15:30

Petawatt and multi-petawatt OPCPA lasers: results, projects, and applications

Efim A. Khazanov
Inst. of Applied Physics of RAS, N.Novgorod, Russia

We review the progress in the high power lasers based on optical parametrical chirped pulse amplification (OPCPA). Detailed study of physical and technical aspects of OPCPA setups and traditional CPA ones is given. Future perspectives and applications are discussed including two 100PW-level pan-European projects started in 2008.

ThR5-37 15:30-15:45

Chirped-pulse Oscillators: an Impact of the Dynamic Gain Saturation

V. L. Kalashnikov, A. Apolonski***
*Institut fuer Photonik, Vienna, Austria; **Department fuer Physik der Ludwig-Maximilians-Universitaet Muenchen, Germany.

An effect of the dynamic gain saturation on chirped-pulse oscillator was investigated. It was found, that the dynamic gain saturation causes strong perturbations of the pulse front that destabilizes an oscillator. As a result, the chirped-pulse exists only within some limited range of dispersions and there is a limit of energy growth for a given resonator period.

ThR5-38 15:45-16:00

Contrast Degradation in a Chirped-Pulse Amplifier Due to Generation of Prepulses by Postpulses

*N. V. Didenko**, A. V. Konyashchenko*, A. P. Lutsenko*, S. Yu. Tenyakov***
*P. N. Lebedev Physical Inst., Moscow; **Avesta Project Ltd., Troitsk, Moscow region, Russia

Experiment and modeling show that the refractive index nonlinearity can significantly degrade the contrast of a chirped-pulse amplifier seeded with a pulse and a single postpulse. Multiple powerful non-equidistant pre- and postpulses are generated. For a Gaussian pulse and a hat-top beam, an incident postpulse of energy W results in a prepulse of energy $0.58*B^2*W$, where B is the nonlinear phase (B-integral) of the main pulse. Experimental results for Ti:Sapphire regenerative and multipass amplifiers and prepulse generation in fused silica agree well with the theory.