FIBER MEGAHERZ-REPETITION RATE TUNABLE SOURCE OF BROADBAND NEAR INFRARED RADIATION

Anntotation

The scheme of tunable broadband source of near infra-red region radiation based on femtosecond Yb-doped laser and anisotropic microstructured fiber has been proposed and realized. The fiber source of parabolic pulses operating in positive dispersion regime has been created. This source was made on the basis of single-mode Yb-doped fiber, mode-locking based on the effect of nonlinear polarization rotation. The program package for numerical simulation of the process of laser generation in the fiber ring-cavity resonator based on numerical solving of nonlinear Schrödinger equation has been created. The physical factors that limit the energy of pulses and their length in such systems were detected. The spectral and time profiles of pulses for different pump power and filter width were calculated. It has been shown that pump power increasing causes the shorting of uncompressed pulses. The possibility of time compression up to 180 fs has been shown. It has been shown that in the investigation of the short pulse propagation in the anisotropic microstructured fibers it is essential to take into account the vectorial character of nonlinear-optical interactions, as it leads to different scenarios of spectral and time transformation of short pulse. It has been shown in the work that solitons of different orders form stable interferential figure on the output of the microstructured fiber. It can be essential for such applications like ultrashort pulse generation in the near infrared region, creation of multiwavelength sources for spectroscopy, creation of optimal pulse trains generators for quantum control, creation of vectorial fields synthesizer.