Diploma thesis abstract.

Student: Roman R. Musin.

Scientific adviser: A. M. Zheltikov.

Design of microstructured waveguides with predefined dispersion and nonlinear properties

In this work the results of numerical modeling of microstructured fiber properties are presented. A genetic algorithm combined with full vectorial finite element solver is used for designing microstructured waveguides with predefined dispersion and nonlinear properties.

Microstructured fibers with flat group-velocity dispersion from a wavelength of 0.8 μm to 1.38 μm have been proposed.

It has been shown that holey fibers with triangular lattice and varying hole diameter can be used for dispersion compensation. The structures of fibers for compensating group delay dispersion of ytterbium fiber laser have been designed.

The possibility of tuning confinement loss by varying geometrical parameters of cladding structure has been demonstrated. The impact of the fiber cladding on confinement loss has been analyzed.