Thesis abstract

«High-power soliton generation in crystal fibers with large effective mode area»

Author
Khakhalov D.S.

Scientific adviser:
Professor, Doctor of Science
Zheltikov A.M.

Current graduate work contains results of numerical simulation of ultrashort laser pulses propagation in crystal fibers with core made from pure silica and large effective mode area. The propagation model takes account of Raman scattering, high order dispersion and losses of crystal fiber. Due to this model solitonic regimes were investigated under various parameters of input pulse. The possibility of megawatt soliton formation was proved under specific conditions which were discussed in detail. Solitonic evolution was investigated and the following effects were observed: dispersive wave generation, soliton self-frequency shift, supercontinuum generation.

Also numerical simulation of ultrashort laser pulse parameters measurement was made using XFROG technique. Propagation dynamics of soliton can be observed well in XFROG spectrogram. Such representation of numerical results allows comparing it with experimental data. Theoretical results appeared in a good agreement with experiment which is evidence of our model accuracy.