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Dynamics of spectral transformation of ultrashort laser impulses in the quartz microstructured fibres with the varied size of a core.

In this work a new technique of formation reconstructed on frequency megawatt femtosecond impulses of an infra-red range on the basis of generation of radiation of a supercontinuum in multisoliton mode realised in microstructured (MS) light guide with the big area of a mode, and the subsequent compression of impulses of this radiation is realised. By means of the MS-light guide with the core area nearby 710 square micrometer the transformation of micro joule femtosecond laser impulses with the central length of a wave 1.39 microns in impulses of radiation with the central length of a wave 1520 nanometers, duration 210 fs and peak capacity nearby 1 MW is carried out.

The possibility of compression of soliton part of micro joule energy level supercontinuum in an impulse by duration not exceeding duration of the pump pulse and with efficiency of 20 %, with the help of tellurium glasses is experimentally shown. Possibility of uses of this material for generation of wide spectrum IR - radiations (1500 – 3000 nanometers) is shown.

By the method of registration of radiation, scattered through the MS-fiber cladding, dynamics of spectral transformation ultrashort laser impulses on its length was investigated. The integrated spectrum of radiation in the MS-fiber with diameter of a core 1,6 microns (radiation "forward" and "sideways" through a fibre cladding was fixed) is investigated. On the basis of experimental data the estimations of spectral losses in a fibre on radiation sideways are received. The estimation of quality of chip and a fiber bend influence on character of a radiated spectrum is spent. Comparison of the received results with theoretical calculations is spent.