GENERATION OF TERAHERTZ RADIATION PULSES WITH HIGH ELECTRIC FIELD STRENGTH AND THEIR APPLICATION IN STUDIES OF RADIATION-MATTER INTERACTION

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The report presents experimental results on the generation of radiation pulses in the terahertz (THz) spectral range by optical rectification of femtosecond pulses of a chromium-forsterite ($Cr:Mg_2SiO_4$) laser system with a radiation wavelength of 1240 nm in nonlinear organic crystals and their application in studies of THz radiation-matter interaction. The generation of THz pulses of picosecond duration with a wide radiation spectrum (0.3–3 THz) with a peak electric field strength of more than 20 MV/cm was achieved. In the mode of generating THz pulses with a narrow spectrum (30–100 GHz) and a tunable central frequency of radiation, the peak electric field strength was up to 10 MV/cm. An overview of the results of experiments on the interaction of THz radiation pulses with various materials is given. The experiments were performed on a unique terawatt chromium:forsterite laser system (UNU “LTFK”) at the center “Laser Femtosecond Complex” of JIHT RAS. The study was funded by the Russian Science Foundation, grant 24-19-00311 https://rscf.ru/en/project/24-19-00311/.