

Nonlinear optical effects when femtosecond pulses spreading in crystals with domain-sectional structure

Diploma work of Shumitskiy Alexander Vladimirovich,
the 6th-year student of General Physics and Wave Processes department

ANNOTATION

In this diploma work such nonlinear optical properties, as collinear and non collinear Second Harmonic Generation(SHG), parametric frequency conversion by lowfrequency pumping, was experimentally investigated, induced absorption in LiNbO₃ RDS crystals, KDP crystals and KDP crystals with TiO₂ nanoparticles.

Radiation, which is a result of parametric conversion by lowfrequency pumping, was obtained in PPLN(Periodically Polled Lithium Niobat). It's spectrum was investigated. The polarization of obtained radiation, restructuring and energy dependence was measured and researched, the process efficiency was calculated. The angle dependence of second harmonic was measured in new geometry – Laue scheme. The polarization of second harmonic was investigated and the efficiency of SHG was calculated.

KDP and KDP with TiO₂ crystals was observed in other part of this work. Influence of TiO₂ nanoparticles on domain-sectional forming under temperature of phase transition was experimentally shown, sizes of domains and sections was defined. Effective collinear and noncollinear SHG was registered under $T_K=122K$. Angle dependence of second harmonic was obtained, the order of quasi phase matching was evaluating, influence of nanoparticles on these properties was researched. The experiments on studying induced absorption in KDP and KDP with TiO₂ crystals have been made.

Scientific adviser,

c.p.-m.s.

Ozheredov I.A.