

Estimation of nonlinear intracenter absorption coefficients of 1030nm ultrashort laser pulses in natural diamond

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An experimental study of nonlinear absorption process of ultrashort laser pulses in bulk of natural diamond has been carried out. The results of experimental studies on measuring the nonlinear transmission of 1 mm thick plane-parallel plate made of diamond irradiated with focused ($NA=0.55$ with a focal length $f'=5$ mm) 1030 nm laser pulses with 0.3 ps and 10 ps duration are presented. It is shown that in this sample the main mechanism of ultrashort laser pulses attenuation at intensities not exceeding 10 TW/cm^2 is two-photon absorption by color centers and its coefficient $b_2 = 4.1 \cdot 0.3 \text{ cm/TW}$ is determined. This research is supported by Russian Science Fund (project No. 21-79-30063).