MODELING OF PASSIVELY Q-SWITCHED SOLID-STATE MICROCHIP-LASERS

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Investigation and optimization of Q-switched solid-state lasers has been developed on the basis of the generalized model. The model self-consistently takes into account: I) spatial lateral distribution of a pump beam and laser mode, II) recombination and thermalization within laser manifolds of activators in active medium, III) features of absorber saturation in inhomogeneous optical field and absorber recovering. For microchip-lasers with different saturable absorbers and output couplers the proposed numerical theory describes well wide set of experimental data devoted to sub-nanosecond pulse dynamics. The model explains the role of pump and laser mode spatial inhomogeneity and thermalization within laser manifolds in pulse build-up and its temporal and power characteristics, and makes it possible to determine and optimize pulse parameters. It has been shown that lasing of pulses with minimal duration and maximal energy is determined by the specific interplay between pump-and-mode overlapping, temporal characteristics of thermalization and absorber saturation, and cavity design.

MODELING OF RAMAN MICROCHIP-LASER DYNAMICS

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Pulse dynamics of Q-switched Raman solid-state lasers has been investigated on the basis of the generalized model and compared with experimental data. The model is based on self-consistent consideration of effects of spatial