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Infrared second-order nonlinear optical effect in $\text{Sb}_2\text{Te}_3\text{-SrBr}_2\text{-PbCl}_2$ glass

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Keywords

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Abstract

A phenomenological and microscopic theory of IR picosecond nonlinear optical response in glass is developed for the middle IR spectral range (5-15 μm). Both IR-induced second harmonic generation (SHG) as well as linear electrooptic effect (LEOE) were observed. The observed effects are explained within a framework of fifth-order nonlinear optical susceptibilities. A model that reproduces the basic features of the experimental data, in which are discovered the optical nonlinearities caused by photoinduced electron-phonon anharmonic interactions, is proposed. The role of the IR induced phase matching conditions in the observed phenomena is discussed.



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