

Information coding of exciting laser pulses in an optical echo-processor

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Abstract

We report the possibility of controlling the distribution of quantum bits within an inhomogeneously broadened line of a resonant transition in recording and transforming information in optical echo-processors. We consider the efficiency of realisation of the elementary logic XOR gate based on a two-pulse excitation of a resonant medium with phase memory. The encoded information is incorporated into the temporal shape of laser pulses in the form of amplitude modulation of an 'echelon' of present ('1') and absent ('0') pulse-codes for obtaining more efficient logic elements that reduce the noise in a quantum communication channel. © 2013 Kvantovaya Elektronika and Turpion Ltd.

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Keywords

Echo-holography, Logic gate, Optical echo-processing, Optical information processing, Photon echo, Quantum information, Qubit, XOR