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Simulation of coherent responses of resonant media excited by a series of ultrashort laser pulses

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Abstract

A technique for the numerical simulation of coherent optical responses of the photon echo type formed in resonance media with strong inhomogeneous broadening under the action of femtosecond laser pulses is developed. This approach is based on solving the Maxwell-Bloch equations using the finite-difference time-domain (FDTD) method without application of a fast rotating field and slowly varying envelope approximations. The method can be used to simulate coherent responses in different resonance media with a complex structure of energy levels. The technique was validated using the example of describing experiments on narrowing a photon echo pulse and femtosecond echo processing. © Allerton Press, Inc., 2012.

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