

Ultrawideband dissipative optical solitons

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Abstract:

In this talk we present the study on generation of few-cycle dissipative solitons in the semiconductor host material doped with amplifying and absorbing two-level quantum dots. Solitons down to one cycle in duration are demonstrated. The response of free electrons of the host semiconductor is described by the Drude equation, while the interaction of the electric field with bound electrons of both types of quantum dots is governed by two sets of Bloch equations. We present linear stability analysis of the Maxwell-Drude-Bloch problem as well as full-scale numerical nonlinear study of formation of the few-cycle dissipative solitons from incident femtosecond pulse, based on application of the finite-difference time-domain method.