Abstract Submitted
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Exciton-Polariton Dynamics in Carbon Nanotubes[1] IGOR BONDAREV, North Carolina Central University — This work addresses theoretically the nonlinear response of phonon-coupled excitons[1] in carbon nanotubes to an external electromagnetic field. The photon Green's function approach developed recently to quantize the electromagnetic field in the presence of quasi-1D absorbing bodies[2],[3] is being used to study the dynamics of phonon-coupled excitonic states interacting with the surface photonic modes excited by the external electromagnetic field in semiconductor carbon nanotubes. The formation of the new elementary excitations, exciton-polaritons, representing the eigen states of the full photon-matter Hamiltonian has been studied for small-diameter nanotubes under strong exciton-photon coupling. Time-resolved simulations have been performed of the coherent exciton- polariton dynamics with the exciton-phonon interactions taken into account. The criteria for the coherent control of the excitonic states population in optically excited carbon nanotubes have been formulated.
[1]F.Plentz et al, Phys. Rev. Lett. 95, 247401 (2005).
[2]I.V.Bondarev and Ph.Lambin, Phys. Rev. B 72, 035451 (2005).
[3]I.V.Bondarev and Ph.Lambin, in: Trends in Nanotubes Reasearch (NovaScience, New York, 2006), p.139.

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