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Surface-Plasmon Assisted Exciton Transport in 1D Nanostructures CHARLES CHERQUI, Theoretical Division, Los Alamos National Laboratory, and Department of Physics, University of New Mexico, DAVID DUNLAP, Department of Physics, University of New Mexico, ANDREI PIRYATINSKI, Theoretical Division, Los Alamos National Laboratory — We consider effect of coupling between exciton propagating in a 1D-nanostructure (e.g., carbon nanotube) and localized surface plasmon modes induced by a metal nanoparticle located in close proximity to the nanostructure. Both regimes of weak and strong exciton-plasmon couplings are taken into account leading to the dressed exciton and plasmon states. In this representation, the dynamics of the dressed excitons is mapped on the impurity scattering problem. The analysis of the scattering matrix indicates that the surface-plasmon modes lead to the exciton intraband scattering and possibility to form localized states within the exciton band gap. Surface plasmon induced exciton radiation pattern and the radiative and non-radiative decay rates are calculated and their dependence on the exciton-plasmon coupling is analyzed.

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