

Abstract for the 2016 Sanibel Symposium

Generalized response theory for a photoexcited many-atom system^a

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Abstract

The response of an electronically excited system to external perturbations differs from the more usual case where the system is initially at thermal equilibrium. A new treatment is presented for the generalized response of a physical system in a non-equilibrium state resulting from photoexcitation, using reduced density operators to account for dissipative dynamics, and developed so that it can be applied to physical systems starting from their atomic composition and their electronic structure, obtained by *ab initio* calculations. This requires generation of a steady state density operator and a perturbation treatment for driving force effects. [1] Expressions are presented for the density and flux in terms of a generalized response function. A generalized fluctuation-dissipation relation is also given. This presentation also describes some general results on the dielectric function and on electronic relaxation of excited nanostructured silicon slabs, [2,3] from our recent work.

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