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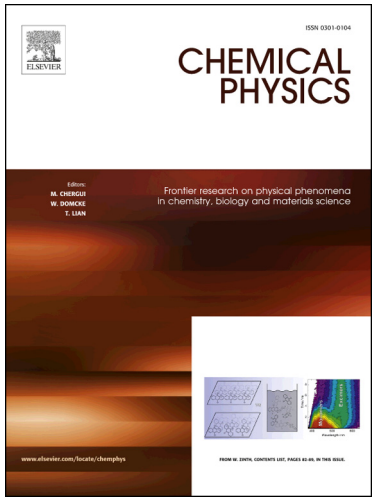


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# Coupled influence of noise and damped propagation of impurity on linear and nonlinear polarizabilities of doped quantum dots

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## Abstract

We investigate the profiles of diagonal components of static and frequency-dependent linear, first, and second nonlinear polarizabilities of repulsive impurity doped quantum dot. We have considered propagation of dopant within an environment that damps the motion. Simultaneous presence of noise inherent to the system has also been considered. The dopant has a Gaussian potential and noise considered is a Gaussian white noise. The doped system is exposed to an external electric field which could be static or time-dependent. Noise undergoes direct coupling with damping and the noise-damping coupling strength appears to be a crucial parameter that designs the profiles of polarizability components. This happens because the coupling strength modulates the dispersive and asymmetric character of the system. The frequency of external field brings about additional features in the profiles of Polarizability components. The present investigation highlights some useful features in the optical properties of doped quantum dots.

Keywords: quantum dot, impurity, Gaussian white noise, damped propagation, polarizability

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