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Effect of intense laser and electric fields on nonlinear optical properties of cylindrical quantum dot with Morse potential

By: [Ungan, F](#) (Ungan, F.) ^[1]; [Bahar, MK](#) (Bahar, M. K.) ^[2]; [Barseghyan, MG](#) (Barseghyan, M. G.) ^[3]; [Perez, LM](#) (Perez, L. M.) ^[4]; [Laroze, D](#) (Laroze, D.) ^[4]

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Abstract

In this study, the influence of the external electric field on the nonlinear optical properties of a laser dressed cylindrical quantum dot with axial Morse potential are theoretically investigated using the total optical absorption coefficient as well as relative refractive index changes. The effect of the structural parameters on the structure's intraband optical properties is analyzed, optimizing the quantum dot in terms of the total optical absorption coefficient and the relative refractive index. Single-electron energies and wave functions of the system have been determined using analytical methods and the exact diagonalization technique. The quantities above mentioned are examined with the compact-density-matrix approach. The obtained results demonstrated that the system's intraband optical properties closely depend on both the applied external fields and the structural parameters. Such adequate tuning of the laser-dressed cylindrical quantum dots' intraband optical properties gives us new possibilities in the regions of interest for optoelectronic device applications.

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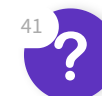
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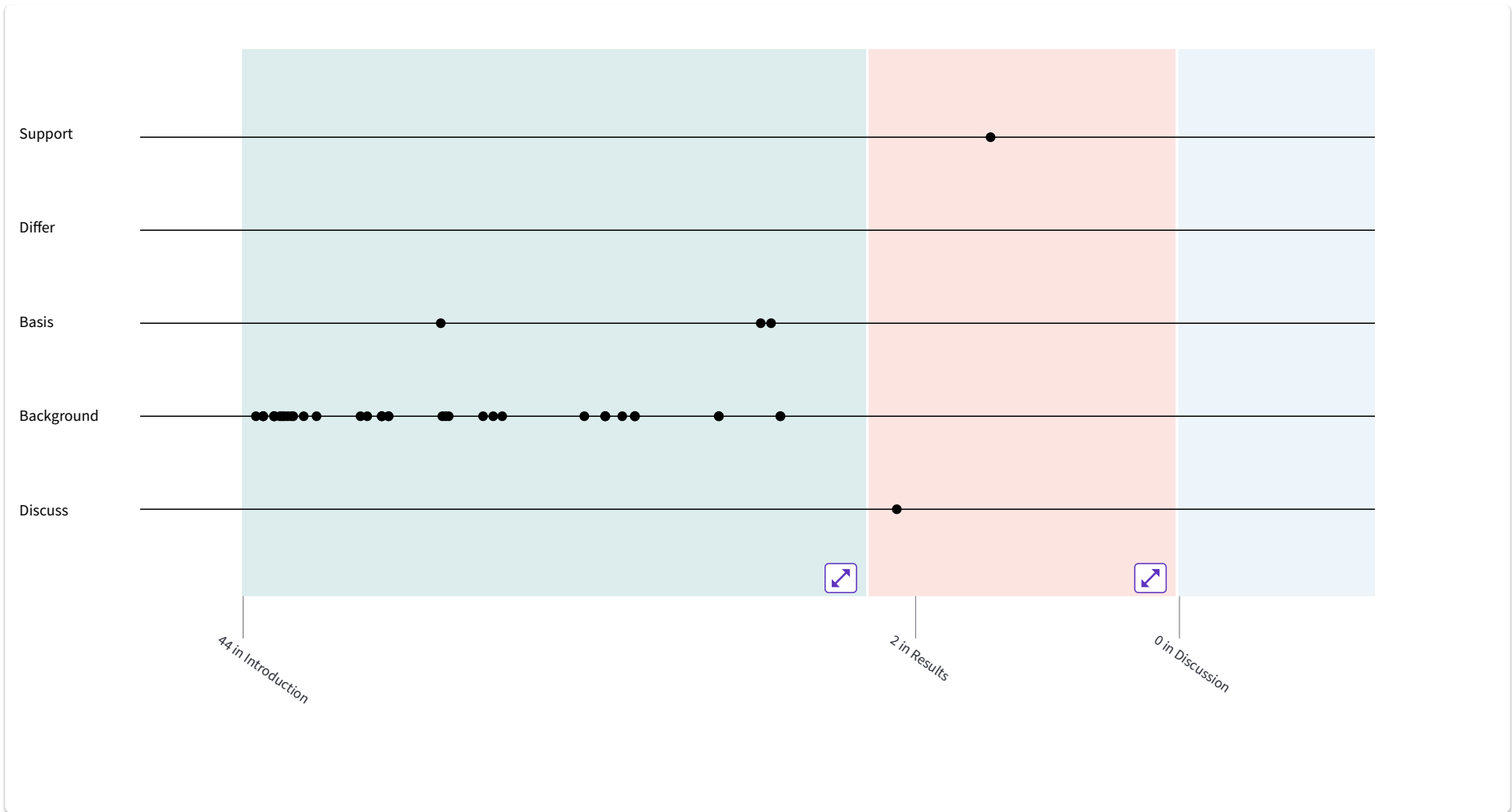
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