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Photoionization cross sections of atomic impurities in spherical quantum dots[1] CHIH-YUAN LIN, Y.K. HO, Institute of Atomic and Molecular Sciences — Quantum dots with atomic impurities have attracted considerable attention due to not only its theoretical but also practical significance. The confinement potentials associated with the structure of quantum dots are often described by the rectangular potential well or harmonic oscillator potential. However, the non-parabolic shape at the center for the rectangular well and the infinite depth for the harmonic oscillator potential make the models unrealistic in practical applications. Recently, the finite oscillator and Gaussian potentials are proposed to mimic the spherical quantum dots, which are defined respectively as $V_{FO}(r) = -A(1 + Br/\sqrt{A})\exp(-Br/\sqrt{A})$ and $V_G(r) = -C\exp(-r^2/D^2)$ with the confining strengths A and C, and the radii of quantum dots 1/B and D. In this work, the method of complex-coordinate rotation in the finite-element discrete variable representation is implemented to study the photoionization of atomic impurities in spherical quantum dots. We explore the energy spectra and photoionization of atomic impurities influenced by the quantum confinement. The shifting of Cooper minima caused by the quantum confinement is observed.

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