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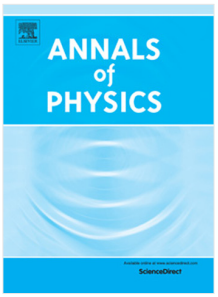

Analysis of N-dimensional Klein-Gordon equation for hydrogen molecule in the non-central potential field

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Analysis of N-dimensional Klein-Gordon equation for hydrogen molecule in the non-central potential field

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Abstract

We investigate a complete normalized relativistic solutions for N-dimensional Hartmann potential and relativistic effects of non-central potential field for hydrogen molecule within the framework of asymptotic iteration approach. We also discuss in detail the influence of dimensions on the angular probability distribution of hydrogen molecule. N-dimensional bound state wavefunction solutions including angular and radial solutions are expressed in terms of the Jacobi and Laguerre polynomials, respectively. N-dimensional angular wavefunctions of hydrogen molecule were visualized with Matlab software. In hyperspherical coordinates, the recurrence relations between diagonal matrix elements have been derived for N-dimensional Hartmann potential in relativistic theory. We also obtain analytical expressions of diagonal matrix elements and the recurrence formula between off-diagonal matrix elements in N-dimensions.

Keywords: Asymptotic iteration method, hydrogen molecule, hyperspherical coordinates, Klein-Gordon equation, Hartmann potential

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