

Relativistic Treatment of Spin-zero Particles Subjected to the Shifted Tietz-Wei Potential Model

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Abstract

The approximate solutions of the Klein-Gordon equation with the shifted Tietz-Wei potential function are thoroughly studied for Klein-Gordon equation with both $2V$ and V potentials by using a suitable approximation scheme for the centrifugal term in the framework of the supersymmetric approach. The non-relativistic limits in both cases are obtained, and the numerical results are computed. We have equally investigated the Fisher information on the shifted Tietz-Wei potential function in the case of the non-relativistic limit of the Klein-Gordon equation with potential V because this is only possible in the non-relativistic regime. The Fisher information is observed to be inversely proportional to both Ch and bh , where Ch is the optimization parameter and $bh = \beta(1 - Ch)$, with β being the Morse constant.

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