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Investigating Meson Mass Spectrum and Decay Branching Ratios Utilizing the Variational Method with Cornell Interaction

In this paper we are going to intend to study the mass spectrum of heavy mesons, for this we consider the Cornell potential as the interaction between quark and antiquark and choose the Variational method to solve the Schrödinger equation. This method defines the wave function as a linear combination of test functions. We can optimize coefficients of the obtained meson mass function using the Fitting method, utilizing both programming and experimental data. After that we will calculate the decay constant of the meson, the root mean square radius and the momentum width for a system of quark-antiquark bound state and finally, we will obtain the branching ratios in the decay of mesons.

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