



Contribution ID: 159

Type: **Contributed Talk**

Investigation of two-body system by using of a quasi exactly solvable method for a harmonic oscillator

Monday, 31 July 2023 18:10 (15 minutes)

In this paper, we investigated the behavior of non-relativistic particles of two-body system by considering the Dunkl operator and reached two second-order differential equations about even and odd parities. We expressed the even cases and obtained the wave function in terms of the generalized Laguerre polynomials and normed constant. Also, we solved the odd term of Hamiltonian with the QES method and we came directly to a general equation for energy. Also, we determined the exact solutions for arbitrary n through $sl(2)$ algebra and reached to wave functions of the system. We have considered the harmonic oscillator and we separate the energy for singlet and triplet cases.

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Session Classification: Monday Parallel Session: Few-Nucleon Systems (AudiMax)