

Investigating the lightest double- Λ hypernuclei structure using Gaussian bases expansion method

Jafar Esmaili*, Safiye Gholamrezaei

Department of Physics, Shahrekord University, Shahrekord, 115 Iran

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Abstract

In the present study, to improve the knowledge of $\Lambda\Lambda$ and ΛN interactions, the existence possibility of a bound state for the double-hyperonic three-body $\Lambda\Lambda N$ system ($\Lambda\Lambda n, \Lambda\Lambda p$) was investigated from the computational point of view. To study the structure of these three-body systems, Nijmegen group ND, NF, NS models and Julich group JA, JB interactions, explicitly considering $\Lambda N - \Sigma N$ coupling effect for ΛN potential, have been used. Furthermore, the $\Lambda\Lambda$ interaction is considered in the three-body calculation by using a pseudo-OBE model. Minimum energy value of $\Lambda\Lambda N$ system for the seven interaction models is obtained within the range of 1.6 to 1.8 MeV and therefore no bound state is found for these systems.

Keywords: $\Lambda\Lambda N$ three-body system, ΛN Nijmegen and Julich potentials, Gaussian basis expansion

* Corresponding Author: jesmaili@iut.ac.ir