Study of Few-Body Nuclei by Feynman’s Continual Integrals and Hyperspherical Functions

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The probability densities for the ground states of $^3$H, $^3$, $^4$, $^6$He, $^9$Be nuclei were calculated in Refs. [1, 2] by Feynman’s continual integrals method in imaginary (Euclidean) time [3, 4]. The present work is devoted to studying other light nuclei $^6$, $^7$, $^9$, $^{11}$Li, $^6$, $^{10}$Be using the same approach. For example, the probability density for the $^6$Li nucleus is shown in Figure. The correctness of calculations was checked by comparison with the results of the expansion in hyperspherical functions (K-harmonics) [5] using new effective method for the solution of the system of hyperradial equations using cubic splines [6].

Figure. The probability density for the $^6$Li nucleus and the vectors in the Jacobi coordinates; neutrons are denoted as small empty circles, protons and alpha-clusters are denoted as small filled circles and large filled circles, respectively. The only one possible configuration is alpha-cluster + deuteron-cluster.

References

Selected session

Few body systems

Primary author: Prof. SAMARIN, Viacheslav (Flerov Laboratory of Nuclear Reactions, the Joint Institute for Nuclear Research)

Co-author: Mr NAUMENKO, Mikhail (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research)

Presenter: Prof. SAMARIN, Viacheslav (Flerov Laboratory of Nuclear Reactions, the Joint Institute for Nuclear Research)

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