STUDY OF GROUND STATES OF ^{6,7,9,10}Be NUCLEI BY FEYNMAN'S CONTINUAL INTEGRALS METHOD

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The wave functions of the ground states of few-body nuclei ^{6,7,9,10}Be are calculated by Feynman's continual integrals method in Euclidean time [1–3]. The algorithm of parallel calculations was implemented in C++ programming language using NVIDIA CUDA technology [4]. Calculations were performed on the NVIDIA Tesla K40 accelerator installed within the heterogeneous cluster of the Laboratory of Information Technologies, Joint Institute for Nuclear Research, Dubna.

The studied isotopes are considered as cluster nuclei with the following configurations: ^{6}Be ($\alpha + p + p$), ^{7}Be ($\alpha + n + p + p$) ^{9}Be ($\alpha + n + \alpha$), and ^{10}Be ($\alpha + n + n + \alpha$) The probability density distribution for ^{9}Be ($\alpha + n + \alpha$) nucleus in the Jacobi coordinates with the vectors **x**, **y**, and the angle θ between them is shown in Fig. 1. This distribution is used for interpretation of experimental data for reaction ^{9}Be(d, ^{4}He)^{7}Li [5].

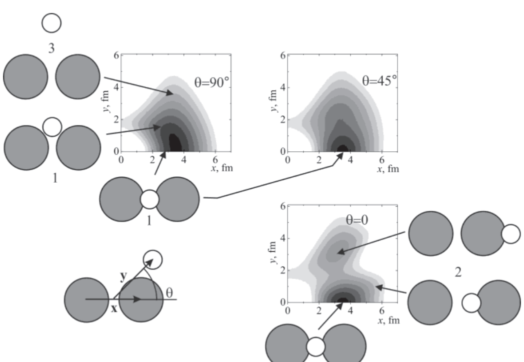

Fig. 1. The probability density for the ^{9}Bei nucleus and the vectors in the Jacobi coordinates; neutrons and α-clusters are denoted as small empty circles and large filled circles. The most probable configuration is $\alpha + n + \alpha$ (1). The configurations $\alpha+$ ^{5}He (2) and $n +$ ^{8}Be (3) are less probable.

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