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STUDY OF THE STRUCTURE OF 12C AND 6Li NUCLEI IN THE ALPHA-CLUSTER MODEL BY HYPERSPHERICAL FUNCTIONS

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The light nuclei 12C and 6Li used as target and projectile nuclei in the many experimental studies of the nuclear reactions, including Flerov Laboratory of Nuclear Reaction (JINR). The study of the structure of these nuclei is necessary for theoretical description of such reactions. Wave functions of the ground state of the 12C and 6Li nuclei in the alpha-cluster model are calculated using hyperspherical functions [1]. Cubic spline interpolation is applied for solving hyperradial equations [1]. The alpha-alpha interaction in the 12C nucleus is changed in comparison with well-known Ali-Bodmer potential [2]. As a result, the energy of separation to alpha-particles and the charge distributions were calculated and agreement with experimental data [3–5] was obtained (Fig. 1). The alpha-cluster model may explain the strong oblate deformation of the 12C nucleus (with $\beta 2 = -0.59$ [6]). In addition, the shell model of the deformed nuclei is used to calculate the nucleon states in the 12C nucleus for comparison against alpha-cluster model.

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