estimated on difference of proton and neutron separation energies. In [2] a phenomenological formula for calculation of binding energy of alpha- cluster nuclei was found.

Present work is devoted to developing the nuclear structure model. Coulomb energy of nuclei with N=Z has been found from sum of differences of separation energies of protons and neutrons belonging to one pairs. From analysis of nuclei ^{12}C and ^{16}O the value of energy of Coulomb repulsion between 2 α -clusters has been estimated equal to ε^{C}_{α}=1.925 MeV [3], which means that value of nuclear (meson) interaction between 2 α -clusters is expected to be $\varepsilon^{m}_{\alpha\alpha} = \varepsilon^{cov}_{\alpha\alpha} + \varepsilon^{C}_{\alpha}$=4.350 MэB. From suggestion that energy of long range Coulomb repulsion is compensated by surface tension energy an equation has been found to calculate radius of position of last proton on value of Z. Charge radii of nuclei from ^{58}Ni to ^{208}Bi and further have been calculated with difference from experimental ones in several hundredths of fm. In the approach binding energy of excess neutrons stays beyond the consideration. Therefore, in calculation of binding energies of nuclei the experimental values of separation energies of excess neutrons are used. There is a good agreement between calculated values of binding energies of some isotopes of all known elements as well as separation energies of alpha particle and deutron and experimental data. The difference from experimental binding energy in most of the cases is about 0.5% and less.

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THE SEARCH FOR A MAIN CAUSE OF UNCERTAINTY OF THE CALCULATED ASTROPHYSICAL *S* FACTOR FOR THE DIRECT RADIATIVE CAPTURE $d(\alpha,\gamma)^6Li$ REACTION AT STELLAR ENERGIES

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It is well known that the $d(\alpha,\gamma)^6Li$ reaction is one of the sources of the ^6Li production in the Big Bang nucleosynthesis. At the present time rather large uncertainties exist in the prediction of the rate of this reaction, which are mainly due to the absence both of the reliable experimental cross section (or the astrophysical S factor, $S(E)$) and of the theoretical calculations at extremely low energies E ($E\leq$ 600 keV) (see [1] and references therein).

The aim of our work is to find out the principal cause of the existing large spread of the calculated values of $S(E)$ at extremely low energies obtained by different authors, including the results of the present work. The basic idea of our consideration is that the $d(\alpha,\gamma)^6$Li reaction at such energies is predominantly peripheral [2]-[4]. Therefore the values of $S(E)$ at extremely low energies are mainly determined by the nuclear vertex constant (NVC) (or by the asymptotic normalization constant (ANC)) for the virtual decay ^{6}Li$\to\alpha + d$. Taking this circumstance into account, we calculated the NVC for the virtual decay ^{6}Li$\to\alpha + d$ in the framework of three- body (αnp) Faddeev equations in the momentum space. The Malfliet–Tjon and Graz potentials for NN interaction and the Sack-Biedenharn-Breit and Yamaguchi type potentials for αN interaction were used. The results of our calculations show that the obtained values of the NVC (or the ANC) are sensitive to the form of NN and αN potentials. This result is also corroborated by the values of the NVC calculated within the microscopic model using the Minnesota and Volkov potentials for NN- interaction [5]. The values of the NVC obtained in the present work were used to determine the values of the astrophysical S factor for the direct radiative capture $d(\alpha,\gamma)^6$Li reaction at extremely low energies. It is shown that the values of the NVC corresponding to the different forms of NN and αN potentials lead to the different values of the astrophysical factor $S(E)$ at extremely low energies, including E=0. It is concluded that the uncertainty in the calculated values of the astrophysical factor $S(E)$ at extremely low energies, including E=0, is mainly related to the degree of sensitivity of the calculated values of the NVC (ANC) to the form of NN and αN potentials used.

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ANALYSIS OF THE ^{7}Be(P,γ)^{8}B REACTION AT EXTREMELY LOW ENERGIES WITHIN THE MODIFIED TWO-BODY POTENTIAL APPROACH

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Obtaining the extremely low energy cross sections for the reaction ^{7}Be(p,γ) ^{8}B is of great interest for a reliable estimation of the rate of this reaction, which is crucial for an accurate