ASYMPTOTICAL NORMALIZATION COEFFICIENTS FOR MIRROR NUCLEI ^{27}Al, ^{27}Si AND NUCLEUS ^{28}Si FROM ANALYSIS OF ONE NUCLEON TRANSFER REACTIONS

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The experimental differential cross sections of one nucleon transfer reactions ^{26}Mg(^{3}He,d)^{27}Al, ^{27}Al(d,t)^{26}Al, ^{27}Al(^{3}He,d)^{28}Si, ^{28}Si(d,t)^{27}Si at beam energy about several MeV/nucleon have been analyzed by method combining DWBA and Dispersion theory[1,2]. It was found there that the process is mostly peripheral with domination of pole mechanism of nucleon transfer. For low excitation states ^{27}Al→^{26}Mg+p, ^{27}Al→^{26}Al+n, ^{28}Si→^{27}Al+p, ^{28}Si→^{27}Si+n some empirical values of Asymptotical Normalization Coefficients (ANC) of the overlapping functions were obtained.

By method using a principle of equivalence of bound state nuclear potentials of proton and neutron with the same quantum numbers [3] a set of proper potentials in Woods-Saxon form for the bound states (^{26}Al+n), (^{26}Al+p), (^{27}Al+p) и (^{27}Si+n) has been found. The corresponding values of asymptotical coefficients b of bound state function obtained at the potentials are varied within 3%. With using values b and ANC some empirical values of spectroscopic factors of the aforesaid bound states have been found.

The importance of spectroscopic information obtained for estimation of destruction of ^{27}Al in Mg-Al cycle of hydrogen burning in red giants and novas is discussed.

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ROLE OF pn-PAIRS INTERACTION IN NUCLEAR STRUCTURE

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The nuclear structure approach is based on theory of interaction of pn-pairs with suggestion that proton and neutron of one pair have the same nuclear potential. In frame of this model nuclei with N=Z were analyzed in [1,2]. In [1] radii of position of last proton were

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 МэВ. 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 $d(\alpha,\gamma)^6$Li REACTION AT STELLAR ENERGIES

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It is well known that the $d(\alpha,\gamma)^6$Li reaction is one of the sources of the ^{6}Li 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