FEATURES OF THE PROTON SINGLE-PARTICLE SPECTRA OF Ni, Zn, AND Ge ISOTOPES NEAR THE PROTON DRIP-LINE

Bespalova O.V., Ermakova T.A., Klimochkina A.A.,
Romanovsky E.A., Spasskaya T.I.
Scobeltsyn Institute of Nuclear Physics, Lomonosov State University, Russia
E-mail: besp@sinp.msu.ru

The proton single-particle energies of Ni, Zn, and Ge isotopic chains were calculated from the stable isotopes to the near proton drip-line isotopes ^{50,52}Ni, ^{56,56}Zn, and ^{60,62}Ge experiencing delayed proton decay. Calculations were carried out using dispersive optical model [1] with the parameters physically reasonably extrapolated by the method [2, 3] from ones obtained from the analysis of the experimental data for stable isotopes.

In the proton single-particle spectra of Ni isotopes, there are evidences of the Z=28 and N=28 shell closures in $^{56}_{28}Ni_{28}$. Spectrum of $^{58}_{30}Zn_{28}$ isotope with N=28 demonstrates features characteristic for the near magic nucleus. The results of calculations predicts the proximity to closure of $2p_{3/2}$ subshell in $^{64}_{32}Ge_{32}$ isotope with N=Z=32 indicating probable submagic properties of this nuclide. It was obtained, that closeness of the Fermi energy to half the sum of the last mostly occupied proton subshell and the first mostly unoccupied proton subshell is a common feature of $^{56}_{28}Ni_{28}$, $^{58}_{30}Zn_{28}$, and $^{64}_{32}Ge_{32}$ nuclei (see Fig.1).

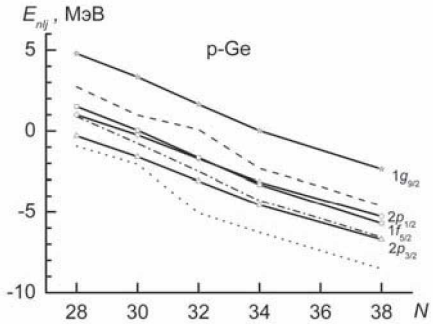

Fig. 1. Evolution of the proton single-particle energies of the neutron deficient Ge isotopes. Solid lines – calculation with DOP, dashed line – proton separation energy (with the opposite sign) from (N,Z+1) nuclei, dotted line – the same from (N,Z) nuclei, dashed-dotted line – the Fermi energy.

1. C.Mahaux, R.Sartor // Adv. Nucl. Phys. 1991. V.20. P.1.
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3. O.V.Bespalova, T.A.Ermakova, A.A.Klimochkina *et al.* // Bull. RAS. Phys. 2014. To be published.