Contribution ID: **16** Type: **not specified**

DETERMINATION OF THE ASYMPTOTIC NORMALIZATION COEFFICIENT FOR THE ^{15}N+n$\longrightarrow$^{16}N FROM THE ^{15}N(d,p)^{16}N REACTION

The differential cross sections (DCs) of the neutron transfer ^{15}N(d,p)^{16}N reaction leading to the ground and first three excited states of the ^{16}N nucleus were measured at energy of 15 MeV and they used to extract the spectroscopic factors for the ^{15}N+n$\longrightarrow$^{16}N vertex [1]. In the present work, the analysis of the experimental DCs of the ^{15}N(d,p)^{16}N reaction has been performed within the modified distorted wave Born approximation (MDWBA) [2] to obtain the values of the asymptotic normalization coefficients (ANC) for the ground and first three excited states of the ^{16}N nucleus. To determine the values of the ANCs in ^{16}N nucleus, the ANC for the d$\longrightarrow$p+n vertex was taken from the value of the nuclear vertex constant, G^2=0.43±0.01 fm, which extracted in Ref. [3]. All calculations were performed using the DWUCK5 code [4].

It was shown that the neutron transfer ^{15}N(d,p)^{16}N reaction at the projectile energy of 15 MeV was peripheral. The weighted mean values of the ANCs of the ^{16}N ground, 0.120, 0.298 and 0.397 MeV states were extracted to be 0.307±0.011 fm^{-1}, 10.65±0.51 fm^{-1}, 0.186±0.0068 fm^{-1} and 7.778±0.362 fm^{-1}, respectively. The different parameters of the optical potentials also were used in the calculation for estimation of the sensitivity of the values of ANCs for the ground and for the first three excited states of the ^{16}N nucleus.

The extracted ANCs are used for the calculation of the cross section of the ^{15}N(n,γ)^{16}N reaction leading to the ground and first three excited states of the ^{16}N nucleus. The calculation of the cross section of the ^{15}N(n,γ)^{16}N reaction at low energies have been performed within the modified two body potential approach [5]. The work is in progress now.

References

1. X.Y.Li, B. Guo, Z.H. Li et al. Phys. Rev. C 106. 025807 (2022).
2. A.M. Mukhamedzhanov et al., Phys. Rev. C 56 (1997) 3.
3. L.D. Blokhintsevet al., Fiz. Elem. Chast. Atom. Yad. 8 (1977) 6.
4. P.D. Kunz, Computer code DWUCK5.http://spot.colorado.edu/kunz /DWBA.html
5. S.B. Igamov, R. Yarmukhamedov, Nucl. Phys. A 781 (2007) 781.

Section

Nuclear physics (Section 1)

Primary authors: IKROMKHONOV, Erkinjon (Institute of Nuclear Physics Academy of Sciences of the Republic of Uzbekistan); TURSUNMAKHATOV, Kahramon (Gulistan state University, 120100 Gulistan, Syrdaryo, Uzbekistan)

Presenter: IKROMKHONOV, Erkinjon (Institute of Nuclear Physics Academy of Sciences of the Republic of Uzbekistan)

Track Classification: The V International Scientific Forum "Nuclear Science and Technologies": Nuclear physics (Section 1)