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ASYMPTOTIC NORMALIZATION COEFFICIENTS FOR ^{16}O+n$\longrightarrow^{17}$O FROM THE ^{16}O(d,p)^{17}O REACTION

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emphasized textThe differential cross sections (DCs) of theneutron transfer ^{16}O(*d,p*)^{17}O reaction leading to the ground and first excited states of the ^{17}O nucleus were measured at deuteron energies of 36 MeV and they used to extract the spectroscopic factors for the ^{16}O+*n*$\longrightarrow^{17}$O vertex[1]. In the present work, the analysis of the experimental DCs of the above mentioned reaction has been performed within the modified distorted wave Born approximation (MDWBA) [2] to obtain the "indirectly determined"values of the asymptotic normalization coefficients for the ^{16}O+*n*$\longrightarrow^{17}O_{g.s.}$ and ^{16}O+*n*$\longrightarrow^{17}$O (0.87 MeV) vertexes. To determine the absolute values of the ANCs in ^{17}O nucleus, the ANC forthe *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 ^{16}O(*d,p*)^{17}O reaction at the projectile energyof 36MeV was peripheral and the weighted mean value of the extracted ANCs were found to be $C^2_{16_{On}}$=0.855±0.068 fm^{-1} for the ^{16}O+*n*$\longrightarrow^{17}O_{g.s.}$ vertex and $C^2_{16_{On}}$=10.765±0.345 fm^{-1} for the ^{16}O+*n*$\longrightarrow^{17}$O(0.87 MeV) vertex. The different parameters of the optical potential also were used in the calculation for estimation of the values of ANCs for the ^{16}O+*n*$\longrightarrow^{17}O_{g.s.}$ vertex and the ^{16}O+*n*$\longrightarrow^{17}$O (0.87 MeV) vertex and their uncertainties.

The weighted mean values of the extracted asymptotic normalization coefficients are used for the calculation of the astrophysical S-factors of the ^{16}O(*n*,γ)^{17}O reaction at low energies. The work is in progress now.

References

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Section

Experimental and theoretical studies of nuclear reactions

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