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## DETERMINATION OF ZERO ENERGY ASTROPHYSICAL S-FACTOR OF THE 16O(p,γ)17F CAPTURE REACTION

Model-independent determination of the astrophysical S-factor value at zero energy for reactions involving light nuclei is very important in nuclear astrophysics [1,2]. The radiative capture  $16O(p,\gamma)17F$  reaction is one of the key sequence in the carbon-nitrogen-oxygen (CNO) cycle of the evolution in the stellar nucleosynthesis. The aim of this work is to determine the zero energy value of the S(0)-factor of direct nuclear capture  $16O(p,\gamma)17F$  reaction within the framework of the two-body potential model in the single channel approach. In Table 1 we demonstrate the obtained values of the astrophysical S(0)-factor of the direct  $16O(p,\gamma)17F$  capture process at the zero energy and asymptotical normalization coefficients (ANCs) for the ground 17F(5/2+) and first excited 17F(1/2+) bound states. The zero-energy astrophysical S(0)-factor was estimated by using the asymptotic expansion method [1, 2]. As can be seen from the table, the result of the VM2 model is in very good agreement with the result of the ANC method of Ref.[3] S(0) =  $9.45 \pm 0.40$  keV b and with the NACRE compilation data S(0) =  $9.3 \pm 2.8$  keV b [4].

Table 1. Values of ANC for the ground 17F(5/2+) and first excited 17F(1/2+) bound states and S(0)-factor for the supposed potentials VMi in Ref.[5].

Model 2S+1LJ C, fm-1/2 S(0), keV b VM1 2S1/2 2D5/2 73.404 1.012 8.809 VM2 2S1/2 2D5/2 75.484 1.043 9.321 VM3 2S1/2 2D5/2 80.450 1.038 10.521 VM4 2S1/2 2D5/2 84.025 1.056 11.461

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## Section

Nuclear physics (Section 1)

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