

TO YIELD STUDIES FOR THE REACTIONS $^{13}\text{C}(\gamma, p)$, $^{14}\text{N}(\gamma, 2p)$, $^{14}\text{N}(\gamma, 2n)$ WITH (^{12}B , ^{12}N)- ACTIVITY MEASUREMENTS BY DeltaE- DETECTOR TELESCOPES AT THE PULSED ELECTRON ACCELERATOR

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Studies of yields for photonuclear reactions with production of ^{12}B ($T_{1/2} = 20.2$ ms) and ^{12}N ($T_{1/2} = 11.0$ ms) are interesting both for development of models of nuclear reactions with nuclei-products near the boundaries of stability to nucleon-emission, and for detection of hidden explosives and drugs (see, e.g., [1]) with (^{12}B and ^{12}N)- activity registration.

In [2, 3], there were considered features of emission of gamma- quanta, electrons and positrons from targets at decays of produced in them (^{12}B and ^{12}N)- nuclei.

In [4] for the reactions $^{13}\text{C}(\gamma, p)$, $^{14}\text{N}(\gamma, 2p)$, $^{14}\text{N}(\gamma, 2n)$, there was given analysis of known experimental and model-calculated data (including our own ones calculated by means of the widely used models of nuclear reactions). It was shown that new yield measurements are necessary for these reactions because estimated discrepancies of data are on the level of 1–2 orders of magnitude. In [5], there were briefly considered variants of such measurements with detecting (^{12}B and ^{12}N)- activities by scintillation gamma-spectrometers or telescopes of thin DeltaE- counters. The first variant with NaI- spectrometers was considered in [6].

In the present work we considered measuring of (^{12}B and ^{12}N)- activities at the pulsed electron accelerator based on registration of emitted from the target electrons or positrons by rather thin telescopic plastic counters with usage of the controlled PMT power supply dividers for all these scintillation counters [7].

1. L.Z. Dzhilavyan. Phys. Part. Nucl. No 5, 556 (2019).
2. S.S. Belyshev et al., Bull. Russ. Acad. Sci.: Phys. 80, P. 566 (2016).
3. S.S. Belyshev et al., Bull. Russ. Acad. Sci.: Phys. 83, P. 449 (2019).
4. O.I. Achakovskiy et al., Bull. Russ. Acad. Sci.: Phys. 80, P. 572 (2016).
5. L.Z. Dzhilavyan. About yield measuring for the reactions $^{14}\text{N}(\gamma, 2n)$, ^{12}N and $^{14}\text{N}(\gamma, 2p)$, ^{12}B . Poster Report, 2015, October 5–8, Moscow, Russia). INR RAS, Moscow, 2016, pp. 12–15.
6. S.S. Belyshev et al., Bull. Russ. Acad. Sci.: Phys. 86, No. 4. P. 577 (2022) (in Russian)
7. L.Z. Dzhilavyan et al., Bull. Russ. Acad. Sci.: Phys. 83, P. 474 (2019).

The speaker is a student or young scientist

No

Section

1. Experimental and theoretical studies of nuclear reactions

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