Decay study of ^{11}Be

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In the decay of ^{11}Be, which is a one-neutron halo nucleus [1], a few channels for β-delayed particle emission are open, including the proton branch, with the decay energy $Q_{\beta p} \sim 280$ keV. Since recently, this latter channel attracts a lot of interest. The branching ratio (BR) for the this process is important for the determination of the Gamow-Teller strength at high excitation energy and for testing models that predict a direct relation between βp emission and the halo structure. Indirect observations based on accelerator mass spectrometry (AMS) resulted in an upper limit for this branching of 2.2×10^{-6} [2]. In contrast, the evidence for βp emission from ^{11}Be with the probability of $1.3(3) \times 10^{-5}$ was reported by Ayyad et al. [3]. Moreover, it was suggested that a narrow resonance in ^{11}B is responsible for this process.

We made an attempt to observe directly β-delayed protons from ^{11}Be, using the *Warsaw Optical Time Projection Chamber* [4]. The main experiment was performed in 2018 at HIE-ISOLDE facility at CERN. A large amount of ^{11}Be ions ($\sim$ 50 mln) was implanted into the OTPC detector. A complementary measurement was performed at the LNS laboratory in Catania in order to measure the branching ratio for the β-delayed α emission channel in the same experimental conditions, which is needed for the normalisation purpose. The final results of the data analysis will be presented.

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[3] A. Ayyad et al., Phys. Rev. Lett. 13, 082501 (2019)
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