Study of β-decay of ^{71}Kr

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In this paper, we present the preliminary results of the analysis of the experiment NP1112-RIBF93, in particular, the ones related to our study of the β-decay of ^{71}Kr. The main objective of the NP1112-RIBF93 experiment is to study p-n pairing and isospin-related features in the structure of ^{70,71}Kr through their β-decays.

^{71}Kr nuclei were produced in the fragmentation of a ^{78}Kr primary beam with an energy of 345 MeV/nucleon. The high intensity beam provided by the accelerator complex of the RI Beam Factory (RIBF) enabled us to achive primary beam currents around 40 pnA. The primary beam impinged on a 5 mm thick Be target to produce a cocktail beam. After the separation and selection in the BigRIPS separator (see Fig. 1), the nuclei were implanted in the WAS3ABi active stopper, surrounded by the EURICA γ-ray spectrometer.[1)]

Standard β-γ and β-γ-γ coincidence techniques were applied to study the β-decay of ^{71}Kr. New γ transitions have been identified based on the comparisons between the half-lives obtained from implant-β-γ correlations and the half-life values determined from the corresponding correlations of previously identified γ-rays that belong to the ^{71}Kr decay (198, 207 and 397-keV transitions). In total, 4 new γ transitions have been identified. After the identification of all γ-rays that belong to this decay, γ-γ coincidences were also studied. A new half-life value was determined using the implant-β-γ time correlations with coincidence conditions on the strongest identified γ-rays of the decay. Several factors

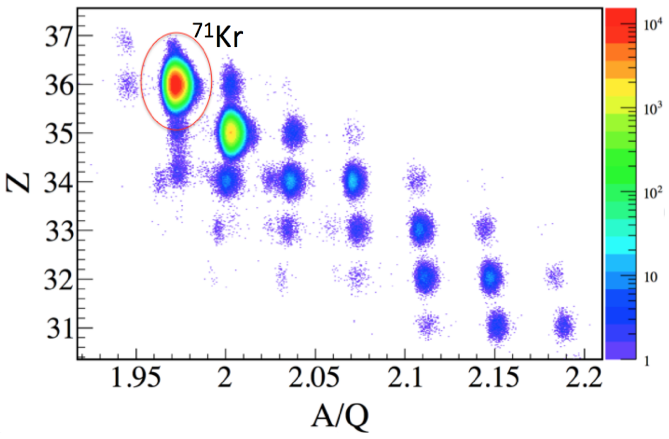

Fig. 1. Identification plot for the isotopes produced in ^{78}Kr fragmentation for the ^{71}Kr setting.

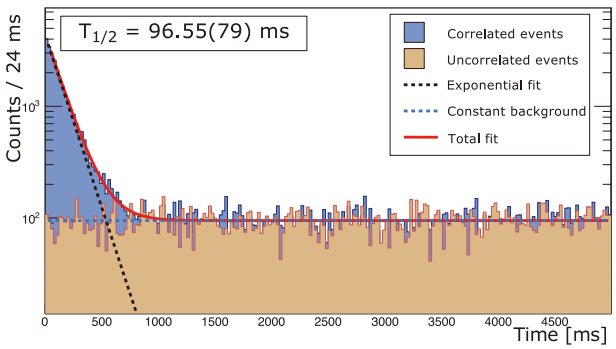

Fig. 2. Half-life of ^{71}Kr determined in this work.

that can influence the quality of the fit and the final value were taken into account as in our previous ^{70}Br study.[2)] Figure 2 shows the half-life of the ^{71}Kr decay obtained with this method. The half-life obtained of $T_{1/2}$ = 96.55(79) ms for this decay was significantly consistent with the previous measurements and it is the most precise value reported until now in the literature. Presently, a new decay scheme is being constructed. The analyses of the ^{70,71}Kr β and the possible ^{71}Kr isomer decays are still in progress.

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