Study of the β-decay of ^{70}Kr

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In this contribution, we present the preliminary results of the analysis of the experiment NP1112-RIBF93 related to our study of the β-decay of ^{70}Kr. The main goal of the experiment was to study p-n pairing and isospin-related effects in the structure of ^{70,71}Kr using their β-decays as a probe.

^{70}Kr nuclei were produced employing the fragmentation of a ^{78}Kr primary beam with an energy of 345 MeV/nucleon and average beam currents around 40 pnA. The primary beam impinged on a 5 mm thick Be target to produce a cocktail radioactive beam. The nuclear species of interest were then separated and selected using the BigRIPS separator. The nuclei were then implanted in the WAS3ABi active stopper, surrounded by the EURICA γ-ray spectrometer[1] for the study of their beta decay.

The level scheme of states in ^{70}Br populated in the beta decay of ^{70}Kr has been deduced recently. Gamma rays associated to the decay were identified using conventional β-γ and β-γ-γ coincidence techniques similarly to the procedure followed in Ref. 2). A primary assignment of gamma rays was based on the determination of the half-lives obtained from implant-β-γ correlations and their comparison with the half-life deduced from with implant-β correlations for the decay. Then γ-γ coincidences and gamma intensities were employed to fix their position in the decay level scheme. Previous to our work, only the half-life of the decay was known with lower precision and no gamma rays were associated to the decay.[3] From the result of our analysis fifteen gamma rays were identified for the first time and placed in the decay level scheme.[4] In Fig. 1 we present the gamma spectrum generated in coincidence with beta transitions correlated to ^{70}Kr implants (in blue), that shows the most intense gamma rays. Also for comparison, the gamma spectrum generated in coincidence with background implant-beta correlations is given (in red). Presently, a comparison of the experimental results with theoretical calculations[5] is performed in preparation for a publication.[6]

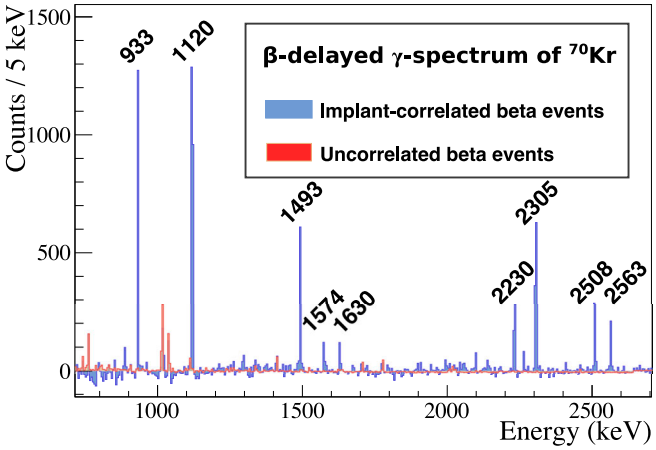

Fig. 1. Strongest identified gamma rays in the beta decay of ^{70}Kr. The spectrum is generated by requesting a condition of gamma coincidences with beta transitions correlated to ^{70}Kr implants in the analysis. Transitions tagged with negative implant-β time correlations are shown in red.

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