Examining the β-decay of ^{70,71}Kr via implantation-beta-gamma–coincidences

András Sveiczer[1], Alejandro Algora[2,3], Ana Isabel Morales Lopez[2]

[1] *Eötvös Loránd Tudományegyetem, Budapest*
[2] *Institut de Física Corpuscular, Valencia*
[3] *ATOMKI, Debrecen, Hungary*

In this work, we have used data from heavy ion collision experiments carried out in RIKEN (Japan), by the EURICA collaboration, to determine the lifetime of ^{70,71}Kr. The main goal of these kinds of experiments is correcting the model of *rp*-process, by measuring its parameters more precisely, such as the lifetime of the participating elements. During the experiment ^{78}Kr ions were collided on a ^{9}Be fix target at 345 MeV/nucleon (accelerated by a superconducting cyclotron) to produce various fragments, including ^{70,71}Kr, which then were separated and identified by in-flight method, using time of flight, ΔE, and Bρ (the separator is called BigRIPS). At last the fragments were implanted in an active silicon strip stopper array (WAS3ABi), where both the implantation and the following β-decay of the fragments was detected. In order to detect the following eventual γ-decays of the daughter nuclei, the stopper was surrounded by germanium gamma-detectors (EURICA). Thus we were able to use implantation-beta-gamma–coincidences instead of implantation-beta–coincidences, giving us much more reliable results, but lower statistics. It was necessary because of the low intensity of these exotic nuclei near to proton drip line, giving high rate of background events when examining only the β-decays. From these data it is possible to calculate the lifetime of the fragments very precisely, and one can also construct its decay scheme, giving important information about both the daughter and mother nuclide. Latter may be important in testing the effective models of nuclei, and also the fundamental properties of the residual strong interaction itself.