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From gammas to neutrons: the briken project

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After decommissioning of the EURICA Array, F11 area at RIKEN will host another –hopefully similarly successful –detection system (BRIKEN) which will be used to study the beta delayed neutron emission.

Beta-delayed neutron emission probabilities (P_n values) of exotic nuclei on the one hand side are key parameters for understanding the formation of the heavy elements in the universe. It has been known that P_n values are responsible for redistributing the initial isotopic distribution of matter and thus smoothing the final abundance pattern as observed in the solar system. Recent studies have also highlighted that freeze-out is not instantaneous and neutron capture during this phase is responsible for some of the main features of the r-process abundance pattern.

On the other hand, beta-delayed neutron emission is important for nuclear physics, too since it provides unique information about the nuclear structure of most neutron-rich nuclei. The P_n values are one of the fundamental gross properties of neutron-rich nuclei that reflect the beta-feeding of excited states above neutron separation energy. The study of neutron gated gamma rays can provide detailed spectroscopic information about the nuclear structure of daughter nuclei, that can be used for example to test the persistence of shell gaps and to discover changes in nuclear structure.

The aim of the present talk is to introduce the setup and the research program.

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