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BRIKEN Beta-delayed Neutron Detector Array at RIKEN*

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Beta-delayed neutron emission (βn) points to the structure of involved nuclei and helps to understand the competition of allowed and first forbidden β-transition during the decay process. The resulting β1n and βxn branching ratios affect the nucleosynthesis pattern in the r-process [1].
BRIKEN array has been assembled by a multinational collaboration at the BigRIPS separator at RIKEN laboratory (Wako, Japan) to study the decay properties of the most neutron-nuclei produced through the fragmentation of high intensity 238U beam. BRIKEN includes the world-largest array of 3He counters, highly segmented silicon detectors AIDA [2] and Ge clovers. 3He tubes and Ge signals are analyzed using Struck digital modules.
The efficiency of present hybrid BRIKEN configuration at BigRIPS, with 140 3He tubes and 2 clovers, is over 60% over a wide βn energy range up to few MeV [3]. Four accepted experiments aim in a large number of βn-emitters to be studied for the first time. The proposed studies cover the regions of nuclei from 76Co to 167Eu.
In particular, it is intended to measure new beta-delayed neutron (βn) emission properties for nuclei near doubly-magic 78Ni. The first direct measurement of 20 P1n values for nuclei between 76Co and 92Se including that one of the doubly-magic 78Ni as well as the discovery of 14 β2n emitters between 80Cu and 91As and the determination of their P2n values is expected.
BRIKEN was partially commissioned in 2016 during parasitic studies with 238U and 48Ca fragments. The main experiments are likely to be performed in early May 2017.
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References:
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[2] C. Griffin et al., in Proc. of NIC XIII Conf., 7-11 July 2014, Debrecen, Hungary, http://www.nic2014.org, Proceeding of Science (PoS NIC 097 (2014).
[3] A. Tarifeno-Saldivia et al., https://arxiv.org/abs/1606.05544, IOP Journal of Instrumentation, 2016.
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