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## Measurement of Th-229 low lying isomeric state with MRTOF+TES system at RIKEN-RIBF

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Th-229 is famous nucleus as the unique candidate of nucleus which can be utilized for realizing nuclear clock. Historically Th-229 is expected to have very low lying isomeric state of less than 10 eV. Existence of 10 eV excited state means the nucleus can be excited by the 124 nm UV LASER. Once the energy level of such isomeric state can be determined precisely by the order of 0.1~0.01 eV, it is realistic to measure the excited state of Th-229 by using LASER Comm technique.

Previously large amount of experimental efforts were made to search for such low lying isomeric state of Th-229 for a long time. Finally, Wense et. al, succeeded to detect the internal conversion electron coming from the Th-229 isomeric state. Later they measured the decay time of Th-229 isomeric state (7  $\mu$  sec).

In this presentation, we present the experimental project to search for the low lying Th-229 isomeric state through the calorimetric measurement of IC electron from Th-229m and/or X-ray from Th-229 29.2 keV state. In order to realize above measurements, we plan to utilize online RI beam so that we can search for the 1st excited state under the clean background condition. The RI beams of Th-229 and Ac-229 are produced with fragmentation separation facility of RIKEN-RIBF. Those beams are degraded, trapped with gas catcher, separated with multi-reflection time-of-flight (MRTOF), and doped in fast TES where X-ray TES is located closely for the measurement of IC decay electron and 29.2keV X-ray from 2nd excited state of Th-229 isomer. This work is supported by The Japanese MEXT KAKENHI grant No. 18H03713.

### Less than 5 years of experience since completion of Ph.D

N

### Student (Ph.D., M.Sc. or B.Sc.)

N

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