Time determination method using digital waveform processing with RFSoC for RI beam experiments

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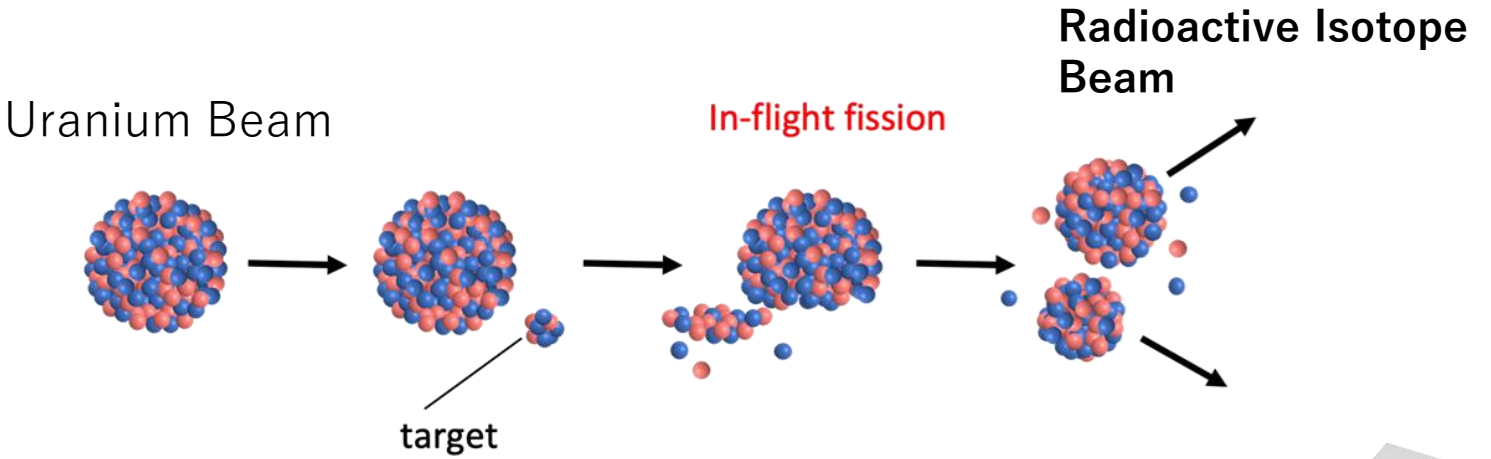
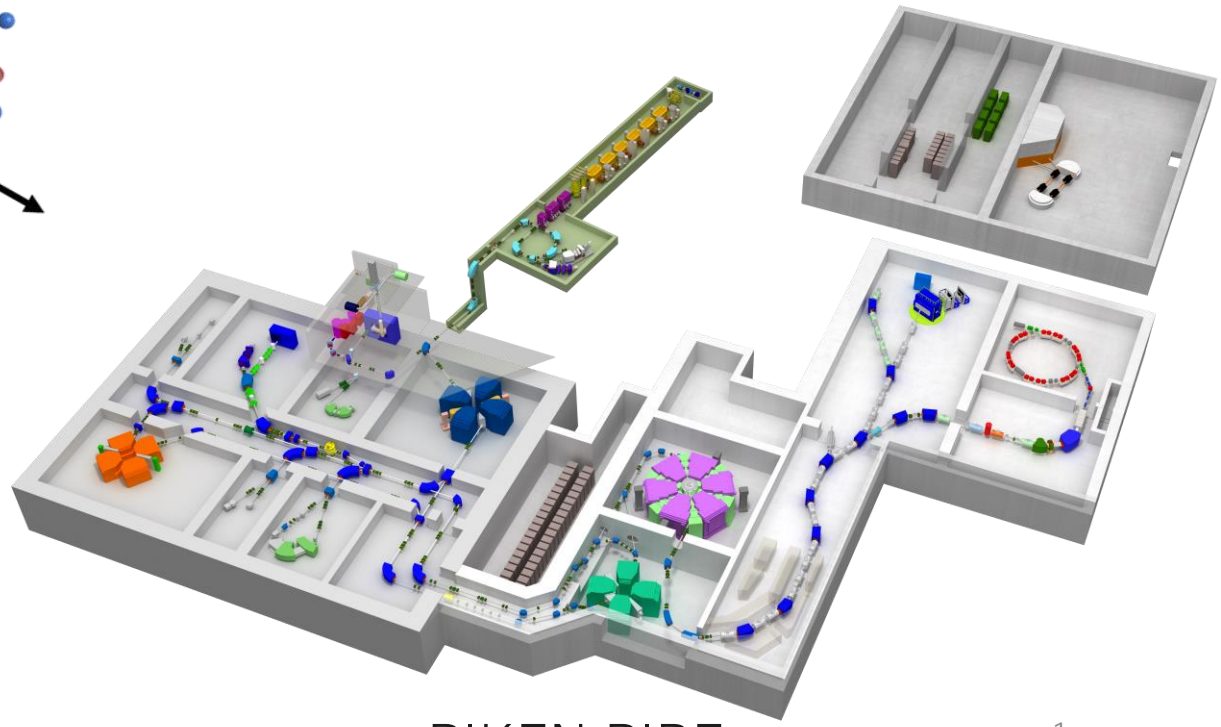
RIKEN RI Beam Factory(RIBF)



We are working on a data acquisition system for RIKEN RIBF that is a RI beam facility in Japan.

Experiments performed at RIBF require TOF measurements with high-rate and high-resolution.

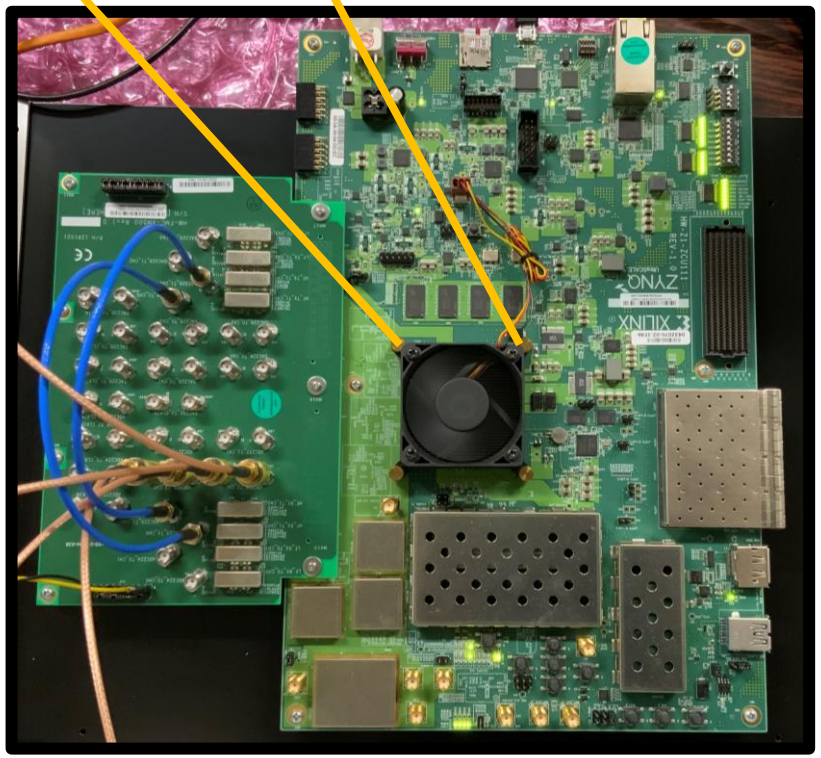


RIKEN RIBF

Xilinx RFSoC

RFSoC

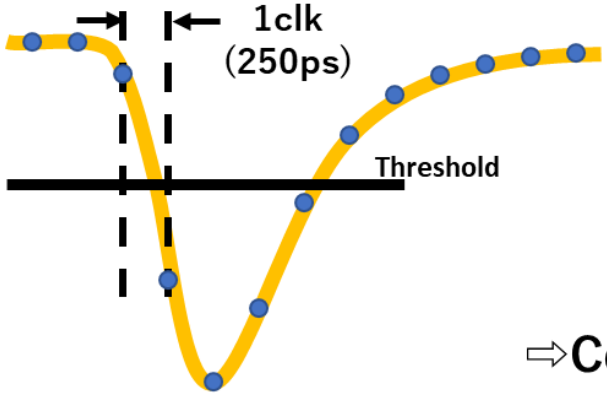
- 4GHz ADC x8
- FPGA
- ARM CPU (Linux OS)



ZCU111
Evaluation kit

Timing Resolution

- In case of FADC, apply waveform processing



$$G = \frac{\sum_i^n v_i \times i}{\sum_i^n v_i}$$

⇨**Centroid Calculation**

We have applied centroid calculation to waveform analysis to achieve the timing resolution of 10 pico seconds in sigma.

In this contribution, we report the method of real-time waveform processing for TOF measurement.