



Contribution ID: 53

Type: **Poster presentation**

## A Calculation Software Based on Pipe-and-Filter Architecture for the $4\pi\beta\text{-}\gamma$ Digital Coincidence Counting Equipment

*Tuesday, June 7, 2016 3:00 PM (1h 30m)*

The  $4\pi\beta - \gamma$  coincidence efficiency extrapolation method is the most popular for the absolute determination of radioactivity. In this paper, a calculation software based on pipe-and-filter architecture for the  $4\pi\beta\text{-}\gamma$  digital coincidence counting (DCC) equipment is presented. The equipment has ability to handle four 500MSPS 8bit resolution channels and four 62.5MSPS 16 bits resolution channels with  $\pm 1\text{ns}$  synchronization accuracy. However, digitizing pulse-trains in high speed and high resolution brings challenges of controlling and processing. In parallel, it allows DCC system digitizing and processing the pre-amplifier pulses themselves, which avoid the associated loss of information inherent in the operation of pulse shaping amplifiers. To meet these new challenges and demands, the software is designed in pipe-and-filter architecture, which support reuse and concurrent execution. Results indicate that this design is effective, easy to implement and extend for real-time acquisition controlling and off-line processing.

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**Session Classification:** Poster session 1

**Track Classification:** Emerging Technologies / Feedback on Experience