

High performance digital electronics set-up for internal contamination monitoring gamma-ray system

The development of digital electronics focused on fast and high-precision analog to digital converters and optimal pulse filtering and shaping has led to improved gamma-ray spectrometer parameters regarding the high resolution and high throughput.

A high performance gamma-ray spectrometer based on digital electronics is successfully integrated in a state-of-art installation dedicated to internal contamination monitoring in IFIN-HH. Its complex set-up was performed taking into account the specificity of the application being used a High Purity Germanium detector with a design appropriate for internal contamination measurements. The set of optimal values presented in the paper was decided analyzing the results of measurements looking for the sensitivity of the resolution and throughput when pulse shape parameters as the pulse rise time, flattop, and tilt and incoming count rate are varied being taking into account the optimization of pole-zero and baseline restoration through digital pulse processing methods.

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