Contribution ID: **163**   Type: **Oral presentation**

Study of Dynamic Time Over Threshold (DTOT) method for application in spectroscopy signal analysis toward a low complexity front-end electronics with high spectroscopy resolution and wide energy range for use with scintillation gamma detectors

Thursday 25 April 2024 14:30 (20 minutes)

Traditional approach of spectroscopy signals acquisition and analysis comprises digitization performed ideally by a high bit resolution and short sampling period flash ADC, followed by a subsequent digital processing requiring a high computational performance. However, some particular applications cannot implement that traditional approach while demanding comparable high spectroscopic performance due to hardware limitations mainly given by operational conditions, availability of qualified electronic components, power consumption limit, etc. The Dynamic Time Over Threshold (DTOT) conversion method based processing of spectroscopy signals represents an undemanding alternative in contrary to that traditional approach. The detailed study of different profiles of the dynamic threshold signal was performed in order to reveal their impact on performance of the DTOT conversion and to maximize dynamic range and to extend an acceptable span of input spectroscopy signals. The contribution also presents practical implementation of front-end electronics integrating DTOT converter dedicated for SiPM based gamma detectors while test measurements with common reference radiation sources was performed in order to provide comparative results.

Minioral

No

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No

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No

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Session Classification: Oral Presentations

Track Classification: Front-End Electronics, Fast Digitizers, Fast Transfer Links & Networks