

Optimization of a digital measurement system for PALS

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We present a new digital positron annihilation lifetime spectrometer basically consisting of two BaF₂-detectors (38/20 x 30mm) read out by a digital oscilloscope (bandwidth 1 GHz, sampling rate 40 Gs/s). The main goal of the present work was to optimize the digital readout routine for achieving high time resolution at high count rate. Various numerical methods have been applied for determining the energy of the γ -quanta and optimizing the positron lifetime. The data analysis code written in python, was improved by comparing the experimental results of energy- and time resolution. Finally, a time resolution of 208ps was achieved.