

Abstract Submitted
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Application of a high speed digitizer to high-precision nuclear β -decay lifetime measurements LIXIN CHEN, JOHN HARDY, Cyclotron Institute, Texas A&M University, College Station, TX 77843, USA — The objective of this study is to probe the feasibility of applying a high-speed digitizer to precise lifetime measurements of super-allowed nuclear β -emitters in order to improve the achievable precision. Instead of using analog modules to discriminate and count decay events, we have developed a digital counting method based on an 8-bit digitizer with a 1 GS/s sampling rate, which records the waveforms from our gas proportional counter for later software analysis. The digitizer and our analysis software have been extensively tested on the saved waveforms from off-line radioactive-source measurements as well as from on-line experiments. A software filter has been designed, tested and applied successfully to separate true β events from spurious signals by pulse-shape analysis. The methods used for, and the results obtained from, our first two on-line test experiments in 2010 will be described in detail. This work demonstrates the first successful application of a high-speed digitizer and off-line digital signal processing techniques to high precision nuclear β -decay lifetime measurements.

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