

Abstract Submitted
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A Low-Cost High-Performance Digital Signal Processing System for Nuclear Spectroscopy¹ YUKE WANG, CHRISTOPHER CRAWFORD, University of Kentucky, NDTGAMMA COLLABORATION — The NDTGamma experiment aims to measure hadronic parity violation in neutron capture on the deuteron, for which the capture cross section is 10^3 times smaller than capture on hydrogen. We must count individual gammas to spectroscopically filter out background events. Advancement in computing has allowed the use of field programmable gate arrays to perform digital filtering to obtain high energy resolution in real time. We have implemented a recursive piecewise polynomial convolution filter on the Red Pitaya—a low-cost data acquisition platform with two analog to digital converters and a field programmable gate array. The system is able to detect events and record full waveforms with performance comparable to standard commercial systems available for nuclear physics.

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