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Timing and Pulse Shape Discrimination Comparison Against Legacy TDC & QDC and the JLab F250 FADC[1] TYLER MILKERIS-ZELLAR, University of West Florida, BRAD SAWATZKY, Jefferson Lab — The F250 Flash Analog to Digital Convertor (FADC) is a relatively new module used in Data Acquisition Systems (DAQ) at Jefferson Lab. The FADC will replace or supplement older DAQ modules like Time to Digital Converters (TDCs) and Charge Analog to Digital Converters (QDCs). The TDC has a certain known timing resolution and the QDC can integrate a pulse's charge, a feature which can also be used for particle identification between photons and neutrons using pulse shape discrimination (PSD). The focus of this project is developing a test stand to study timing and PSD performance of legacy modules TDC and QDC, and the new F250 FADC. A cosmic telescope was used to extract timing resolution from the TDC and FADC. Through PSD with the QDC and FADC, using a liquid scintillator, we plan to identify photons and neutrons from an americium-beryllium (AmBe) source. Through PSD, we found that the FADC allows for flexible data analysis compared to the QDC. The results indicate that the TDC provides a more accurate measurement of timing resolution than the FADC. This improvement allows for a clear distinction of what module to use when wanting precision of measurement in a DAQ for a cosmic ray telescope.

[1]NSF

Tyler Milkeris-Zellar
University of West Florida

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