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Optimization of the NSCL Digital Data Acquisition System For Use With Fast Scintillator Detectors CHRISTOPHER PROKOP, SEAN LIDDICK, NICOLE LARSON, SCOTT SUCHYTA, JEROMY TOMPKINS, MSU/NSCL — The Digital Data Acquisition System (DDAS) at the National Superconducting Cyclotron Laboratory is composed of several XIA Pixie-16 modules utilizing 12-bit digitizers sampling at 100 Mega-Samples-Per-Second. DDAS has been applied to fast organic and inorganic scintillator detectors intended for level lifetime and neutron time-of-flight studies, for which the time resolution is critical. Simultaneous high-resolution time and energy determination using online digital CFD and trapezoidal filtering algorithms is non-intuitive due to the short characteristic rise and decay times of the signals with respect to the sampling time of the digitizers. A new technique has been developed to identify the optimum filter parameters to maximize the time and energy resolution of each detector signal in an offline analysis. The parameters were subsequently verified online and have resulted in a 30% improvement in the measured time resolution between two LaBr3 detectors. Additional results and applications of the technique will be presented.

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