Abstract Submitted
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Applied Optimization on Mixed Mode Systems for Pulse Shape Discrimination[1] BRYAN ORABUTT, ROGER CHAMBERLAIN, JONATHAN ELSON, Washington University, St. Louis, GEORGE ENGEL, Southern Illinois University Edwardsville, LEE SOBOTKA, Washington University, St. Louis — Pulse-shape discrimination (PSD) is a technique that has long been used for n/γ discrimination. Traditionally PSD capable systems are designed using pure analog techniques, or pure digital-signal processing (DSP). Pure analog designs reduce system complexity allowing for higher detector channel counts. These pure analog systems are algorithm locked however, generally using fixed integration gates to do PSD giving minimal flexibility. Pure DSP systems allow for more advanced algorithms to be employed but suffer from linear time logic due to fixed frequency clock sampling. This poses a problem since pulse information is nonlinear in time. We are investigating mixed-mode systems that act as a middle ground between these two extremes. We will optimize this design topology to minimize system complexity, maximize detector channel counts, and maximize dynamic range. We will use test cases including liquid organic scintillators and plastic scintillators with n/γ PSD.

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