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Estimation of waveform deformation with the matched filter

Pulse shape analysis is a key tool for signal/background discrimination although its effectiveness tends to decrease considerably while approaching the detector's energy threshold. A new pulse shape variable, arising from a mathematical extension of the matched filter, is presented in this work. It is intended to measure the deformation of a waveform with respect to a template signal in order to perform background rejection. Besides the consistency of the mathematical formulation, an application of this new method to simulated data shows a strong discrimination capability that exceeds the one of more common pulse shape parameters both at low and high signal-to-noise ratios.

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