

Parameterize PMT Single Photoelectron Response Shape Variance with linear models

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PMT is widely used in high energy physics experiments to detect single photons. The PMT single photoelectron (PE) response (SER) is a template function describing the pulse shape of single PE. In PMT waveform simulation and analysis, the shape of SER are usually fixed among different pulses from the same PMT. This work proposes a linear model using multiple Gaussian parameters and multiple basis, which allows SER to adjust its shape without introducing much complexity such as non-linear and empirical SER formula. This model provides an easy extension to PMT electronics simulation and waveform analysis. The corresponding calibration algorithm is also developed and applied on real data, which demonstrates the shape variance of PMT PE pulses.

Alternate track

1. Detectors for Future Facilities, R&D, Novel Techniques

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Yes

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