Building pulse shape

Dec 10 (Tue)
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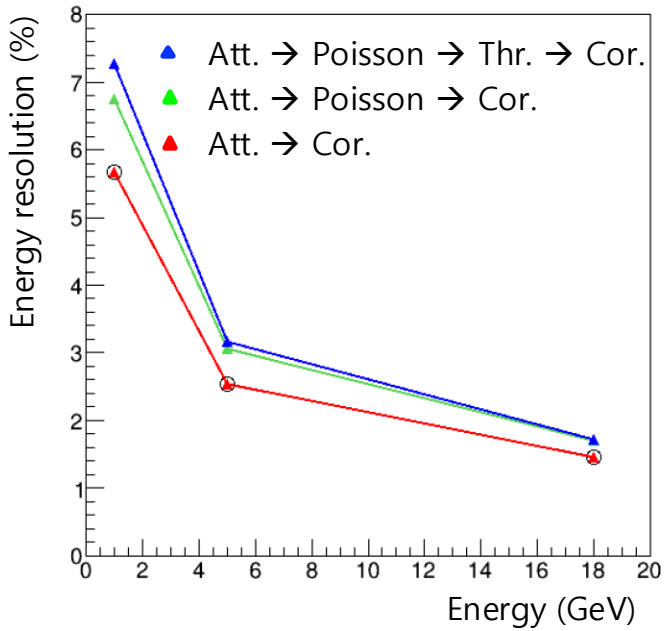
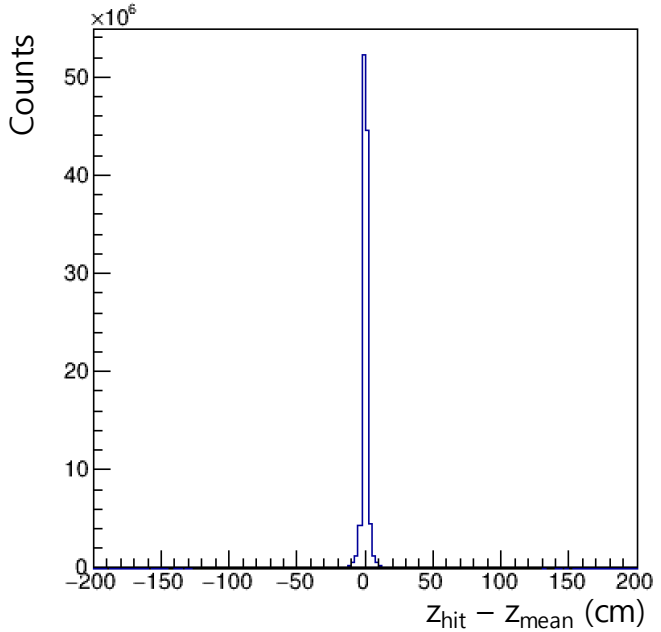
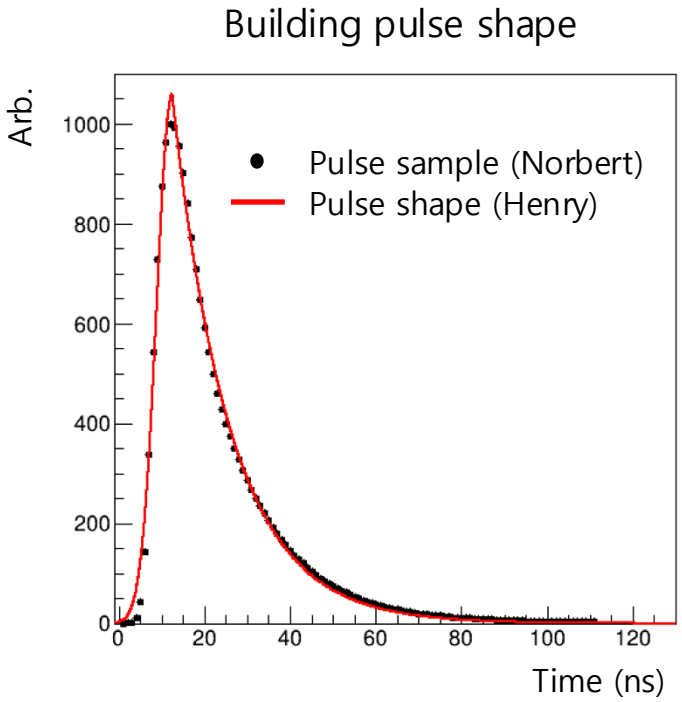
A cross-check and a correction

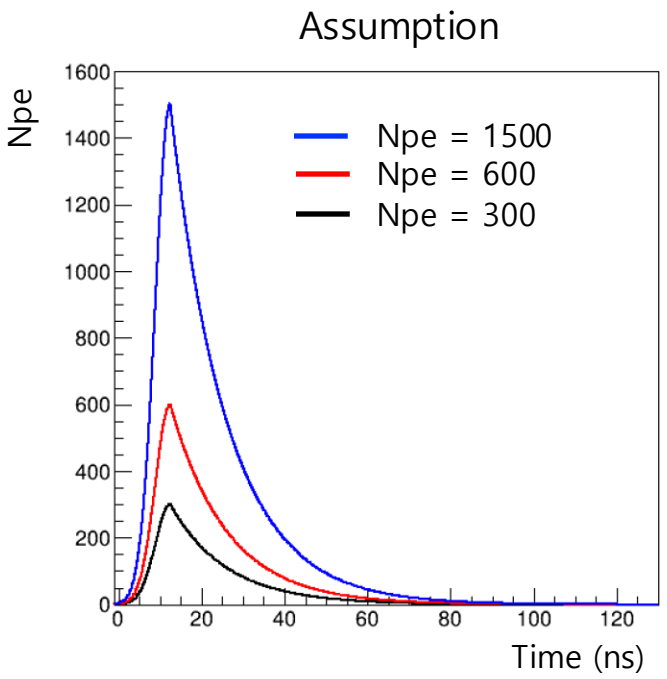




- There was no difference between when using z_{hit}s and using z_{mean}s for attenuation correction because $|z_{hit} - z_{mean}|$ is negligible compared to the length of the BIC.
- The order of the realistic factor application has been corrected: Threshold → Poisson to Poisson → Threshold.

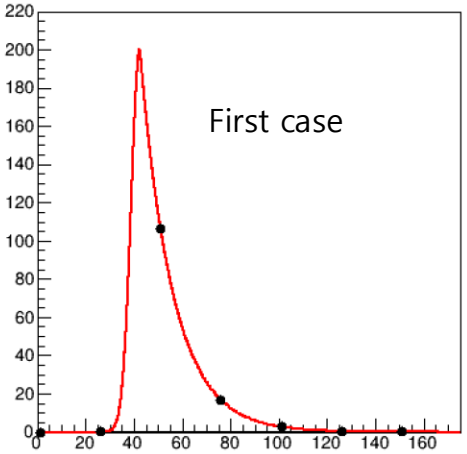
Building pulse shape

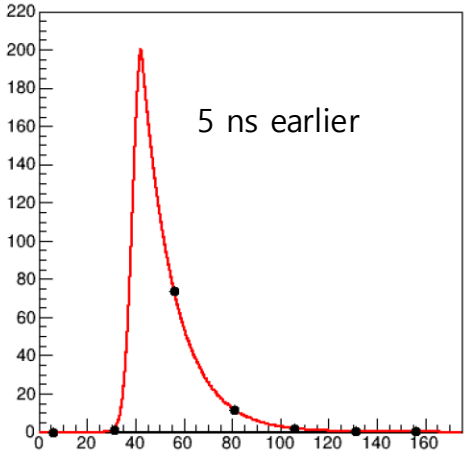


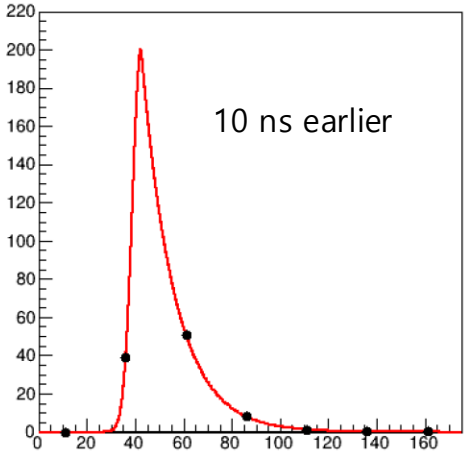


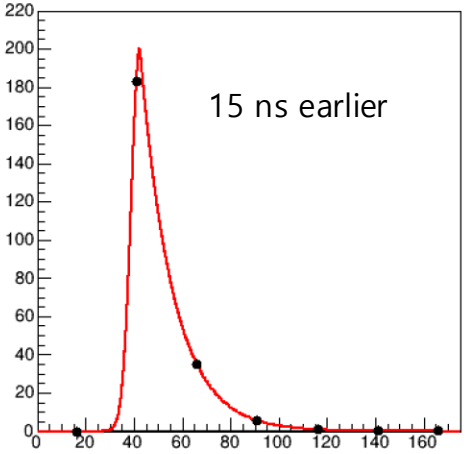
- A double exponential function (rising by Exp(x^2) and falling by Exp(-x)) was fitted to the sample Norbert provided and used as a pulse shape.
- It was assumed that: (1) The rising and falling curves are preserved regardless of the pulse height and (2) the pulse height is proportional to Npe.

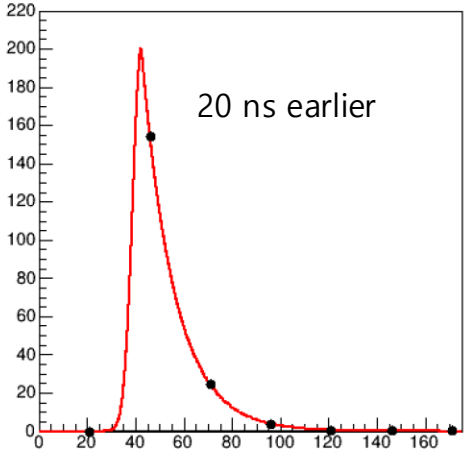
Can we reproduce the pulse shape using the ADC only?

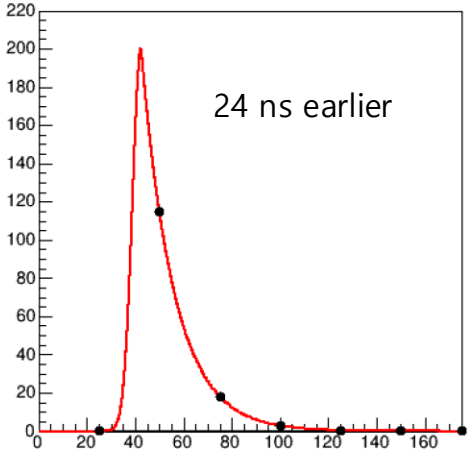






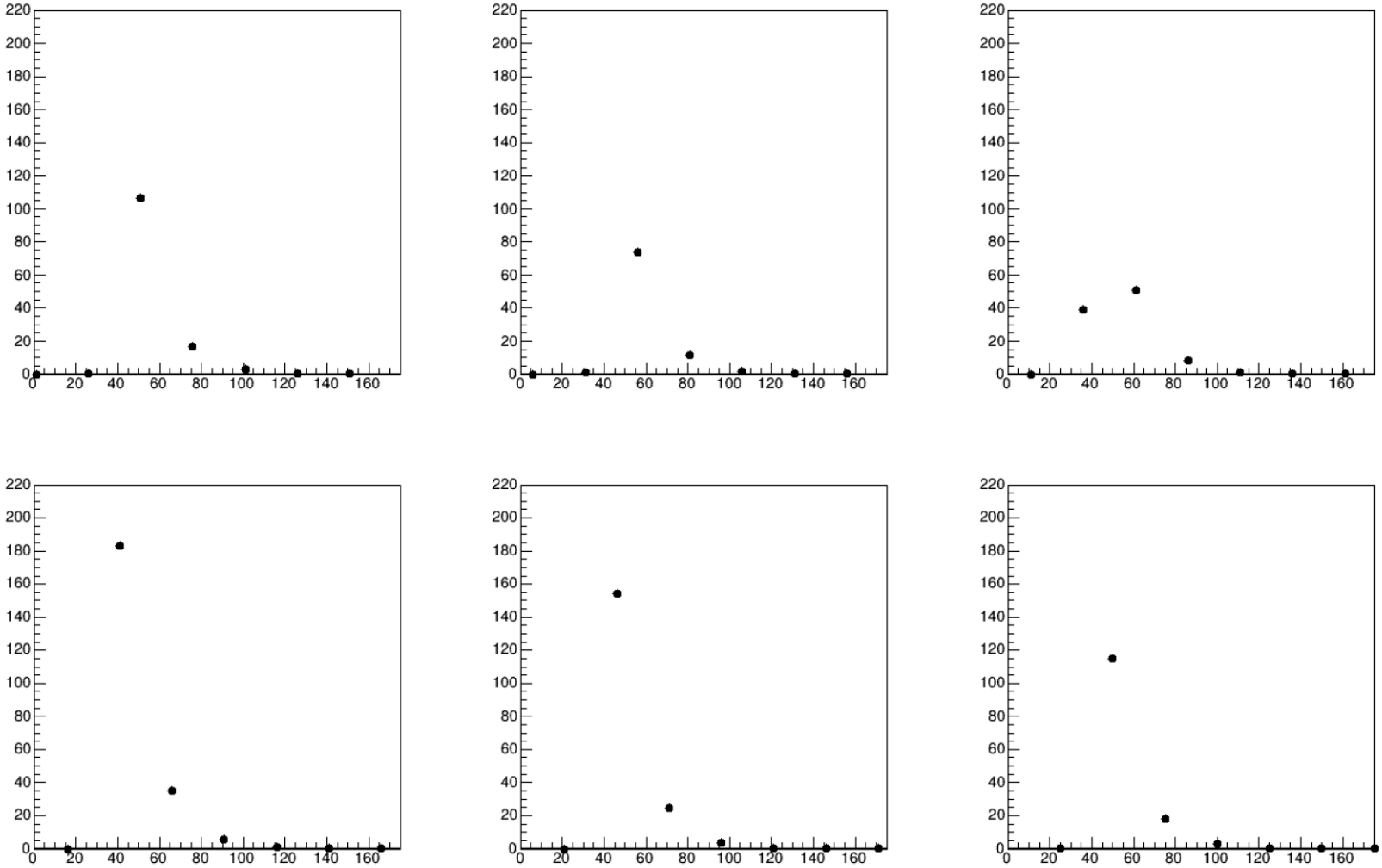






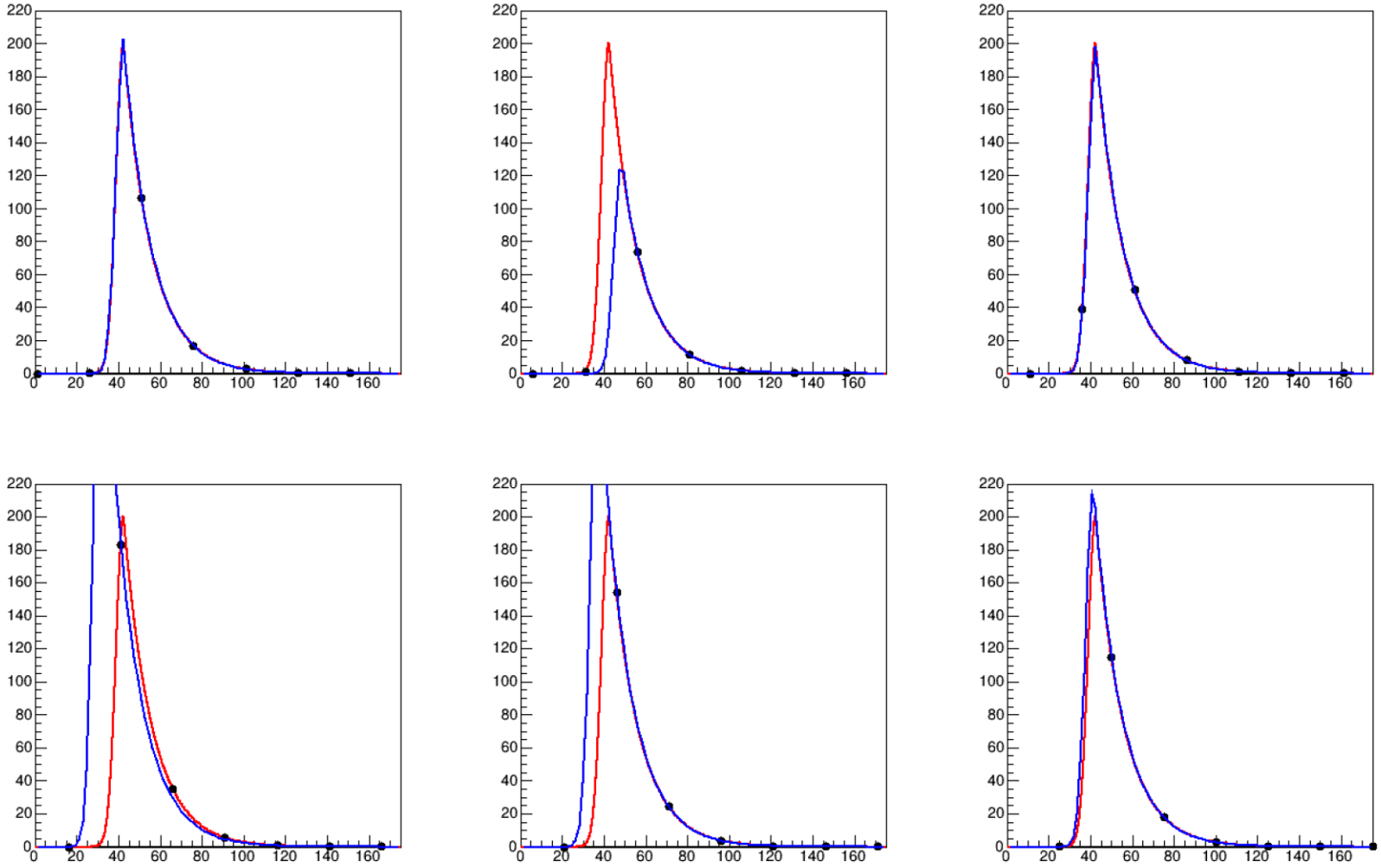
- The ADCs were measured assuming the signals arrived 1, 2, ..., and 24 ns earlier than the first case.

Can we reproduce the pulse shape using the ADC only?



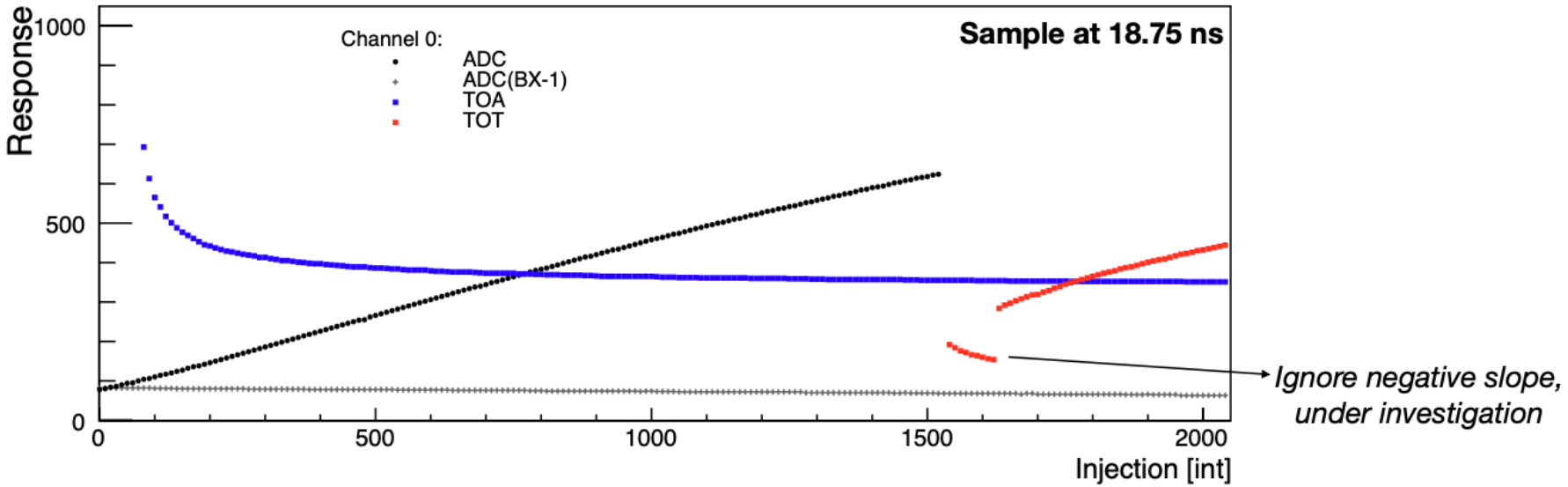
- The pulse shape was reproduced using the measured data points.

Can we reproduce the pulse shape using the ADC only?



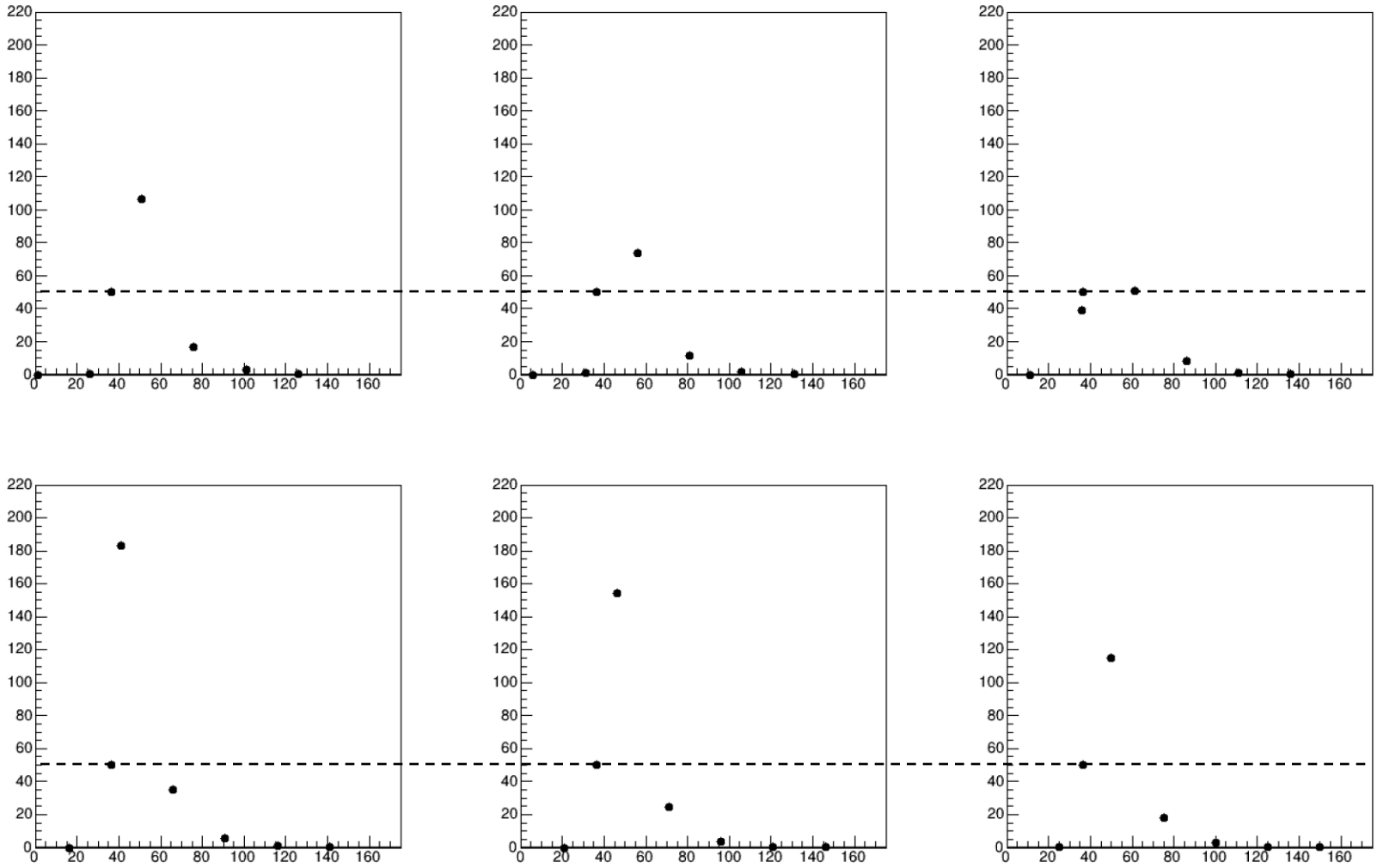
- If we have the ADC information only, it is hard to reproduce the pulse shape.

TOA



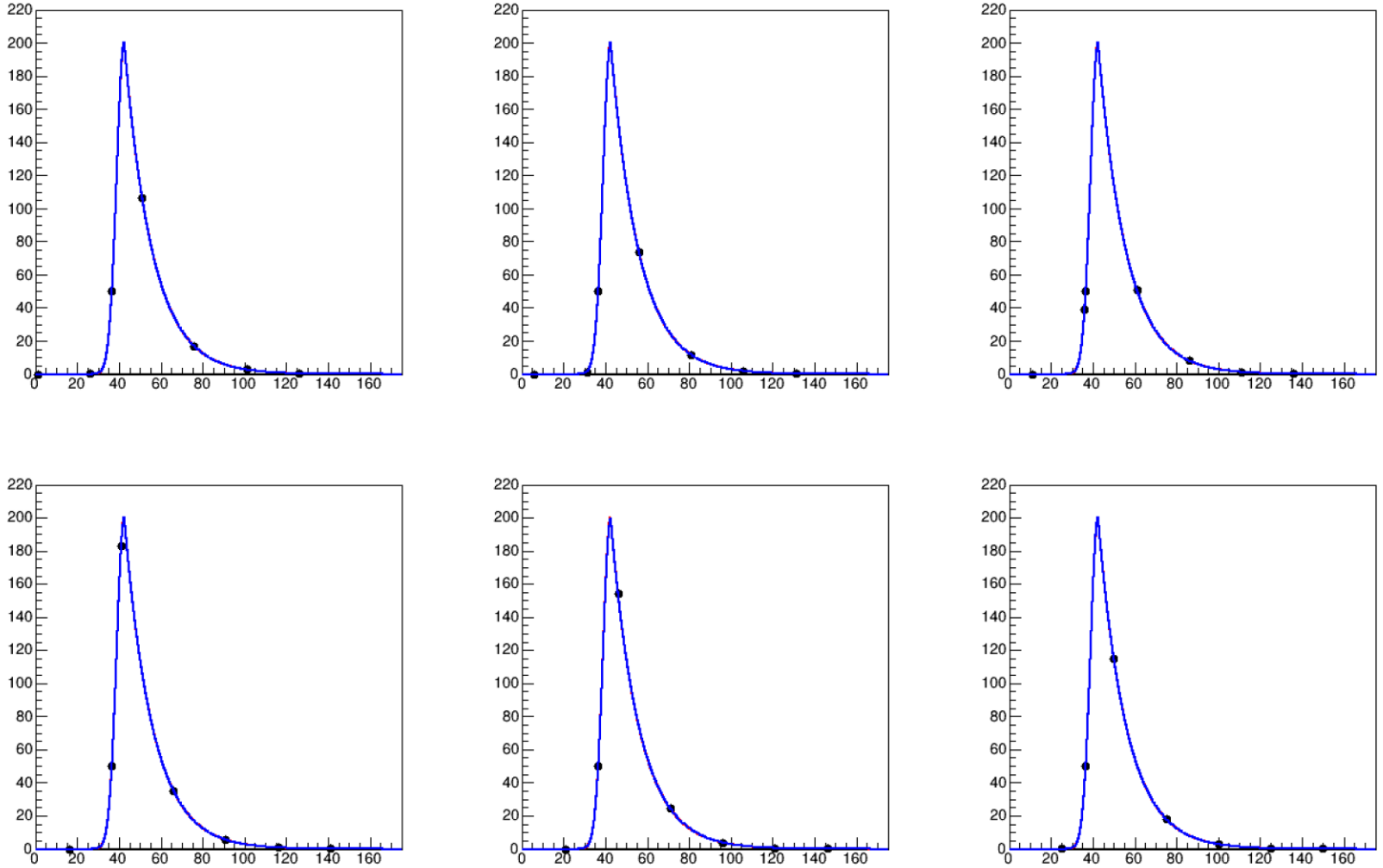
- Because the TOA threshold is lower than the TOT, we may have it when we have the ADC.
- It was assumed that the TOA threshold was 50 Npe equivalent.

Additional TOA data points



- The TOA data points were added before fitting.

Pulse shape reproduction using both ADC and TOA



- If we use both ADC and TOA, we can reproduce the pulse shape well. For the lower pulse height where the TOA is not fired, it would be OK if the pulse height is estimated approximately.