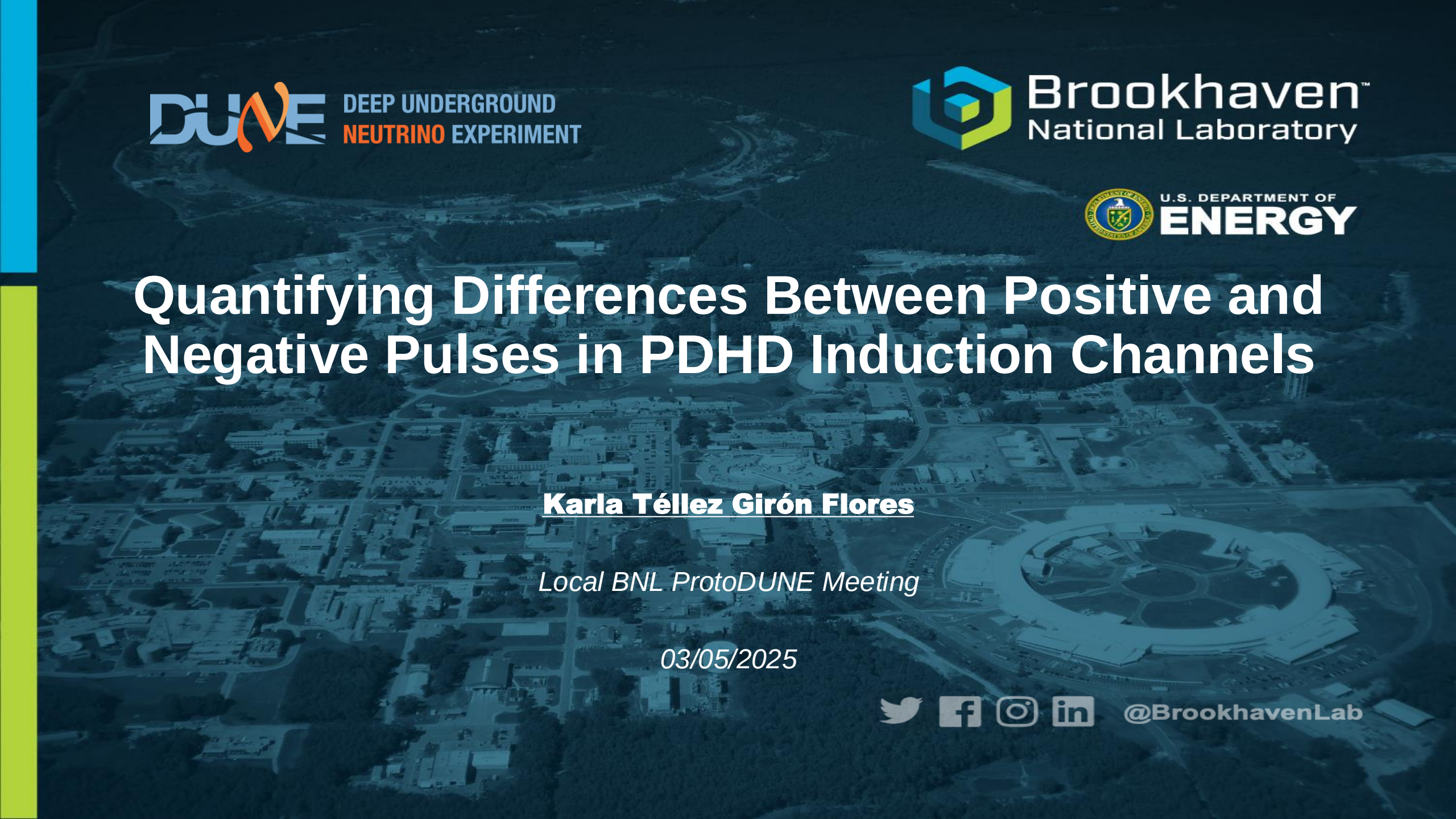

Quantifying Differences Between Positive and Negative Pulses in PDHD Induction Channels

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Local BNL ProtoDUNE Meeting

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New Metrics

Peak Height Ratio (PHR)

$$\mathbf{PHR} = \frac{|Max_{\ Tail}|}{|Max_{\ Main\ Peak}|}$$

- If PHR is Large ➡ Significant Tail (relative to main peak).
- If PHR is Small ➡ Weak Tail (relative to main peak).

Tail Area Contribution (TAC)

$$\mathbf{TAC} = \frac{|Area_{\ Tail}|}{|Area_{\ Main\ Peak}|}$$

- If TAC is Large ➡ Tail contributes significantly to signal.
- If TAC is Small ➡ Tail is a minor contribution to waveform.

Baseline RMS (B_{rms})

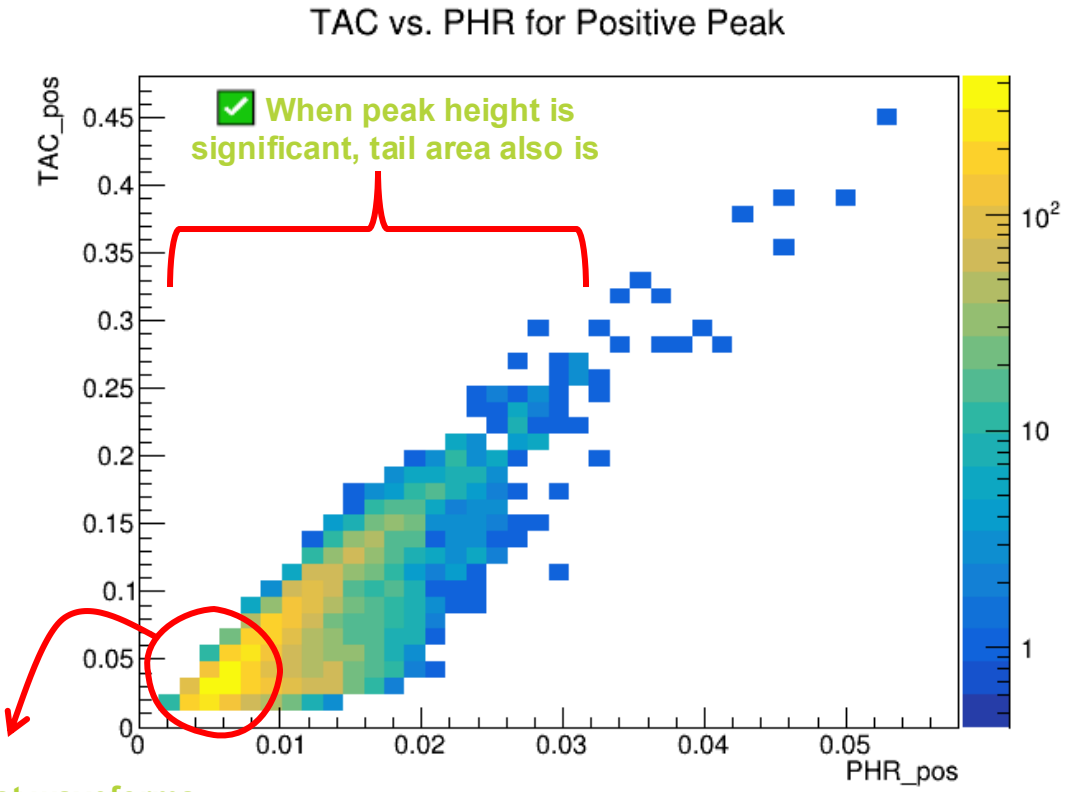
$$B_{rms} = \sqrt{\frac{1}{N}\sum_{i}(A_i - \overline{A})^2}$$

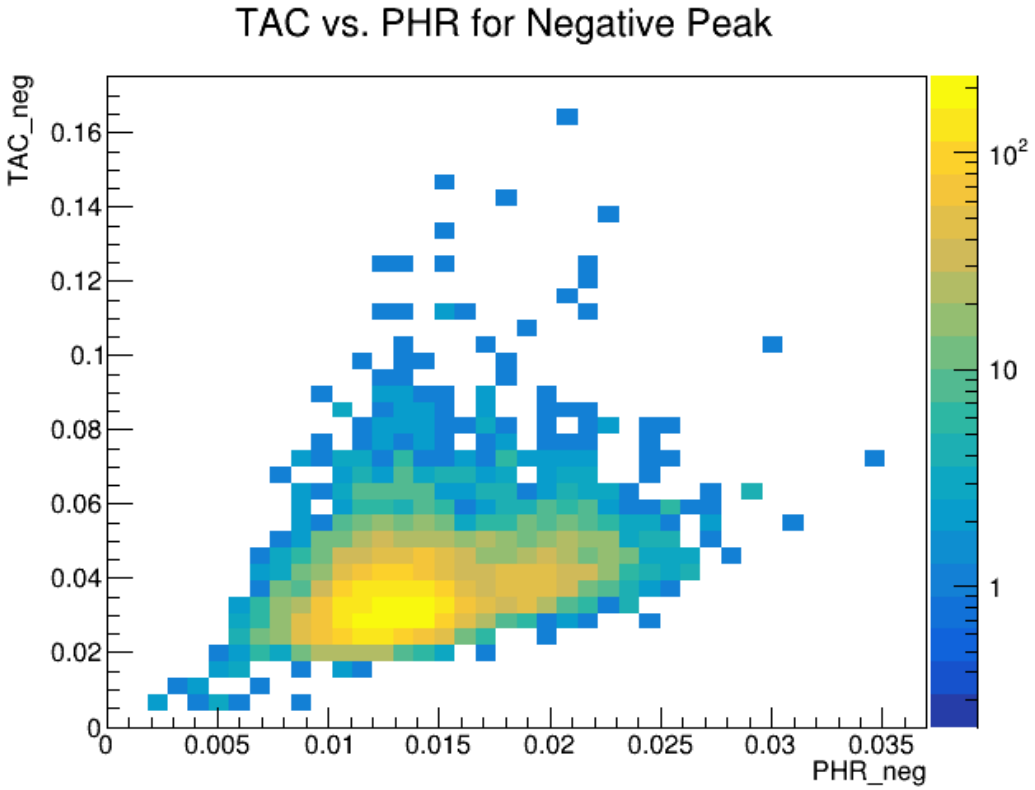
- A_i = Bins before the main peak.
- $\overline{A}$ = Mean baseline ADC value.

The higher B_{rms}, the noisier the channel.

Implementing these metrics on our data (single run)

Looking for correlations amongst these metrics





Most waveforms have small tails relative to their peaks

Wider spread but same positive correlation.