ALPIDE

Threshold Scans and Noise Occupancy

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Threshold Scan

Inject well-defined amount of charge in a number of pixels
$\rightarrow$ Then read out hits and repeat

- Inject charge in several pixels simultaneously
- Use only a representative fraction of the Chip (~1-5%)

Parameters used:

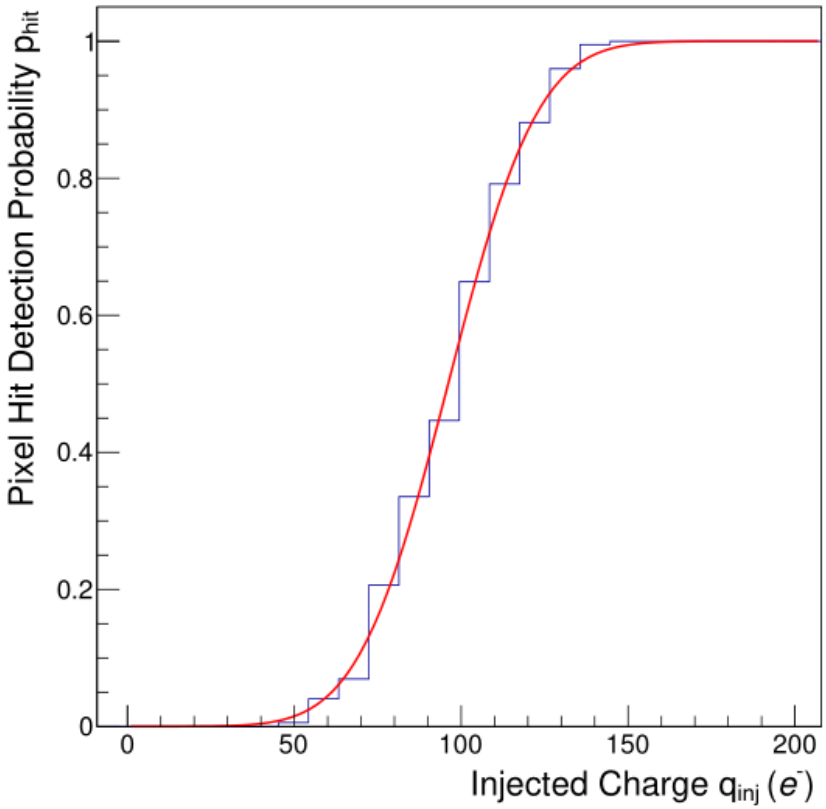
- `PIXPERREGION 1`
- `NMASKSTAGES 164`

} Corresponds to $32 \cdot 164 = 5248$ Pixels (1% of the chip)

Threshold Scan

50 Injections per charge point, then plot hit probability. (S-Curve scan)

Example:

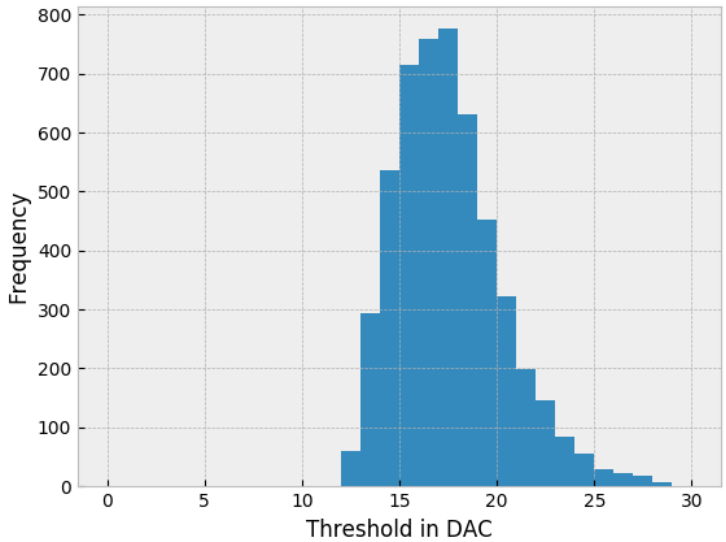


$$p_{\text{Hit}}(q_{\text{inj}}) = \frac{1}{2}\left(1 + \text{Erf}\left[\frac{q_{\text{inj}} - \mu}{\sqrt{2}\sigma}\right]\right)$$

Threshold Scan

- Extract mean

Distribution of Thresholds:



Threshold Scan

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- Repeat with different settings and compare the runs

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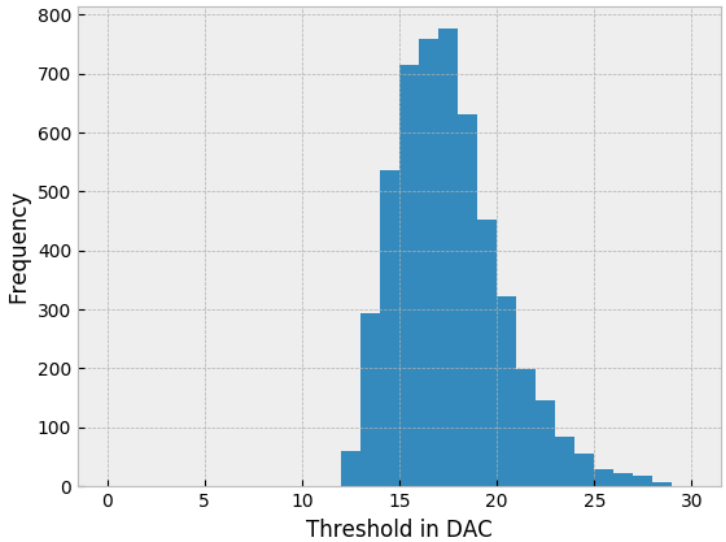

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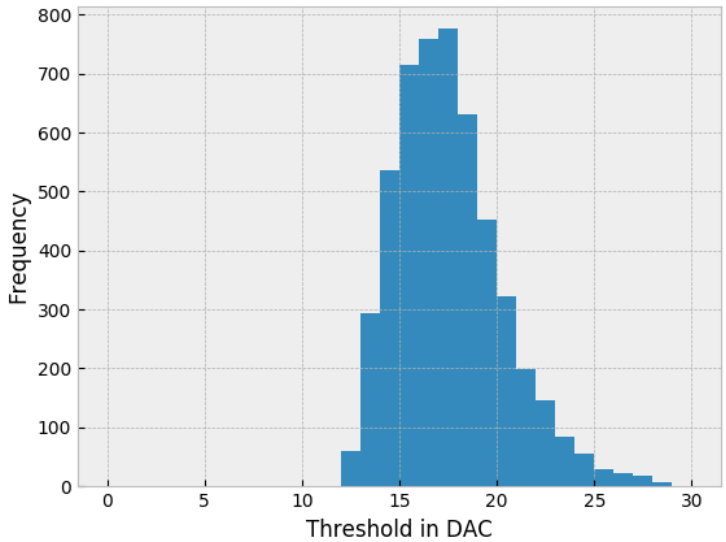

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For cosmic muons at 50 GeV: Energy Deposit ~0.0286 MeV

Noiseoccupancy Scan

Gives a selectable number of triggers and returns the number of hits.

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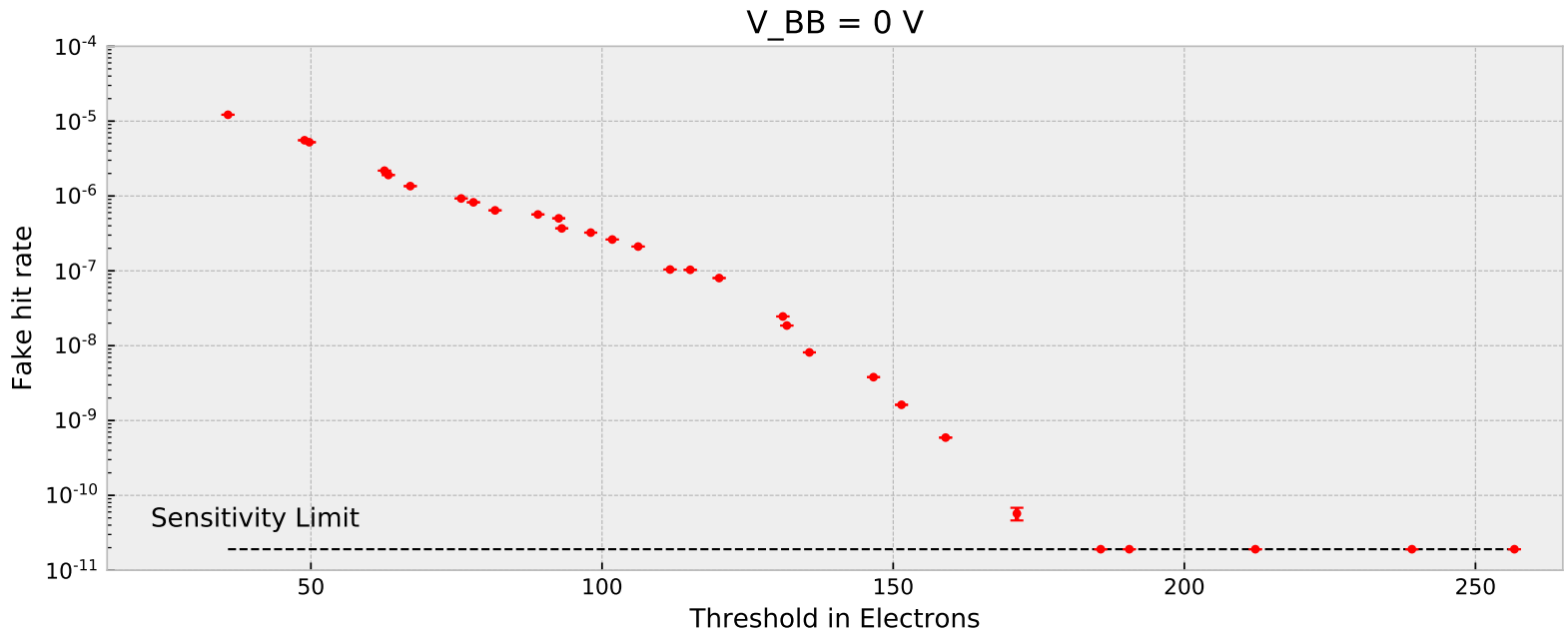

Noiseoccupancy Scan

Gives a selectable number of random triggers and returns the number of hits.

- If Threshold is low enough for electronic noise to produce a hit, measurements taken will be affected by a fake hit rate.