



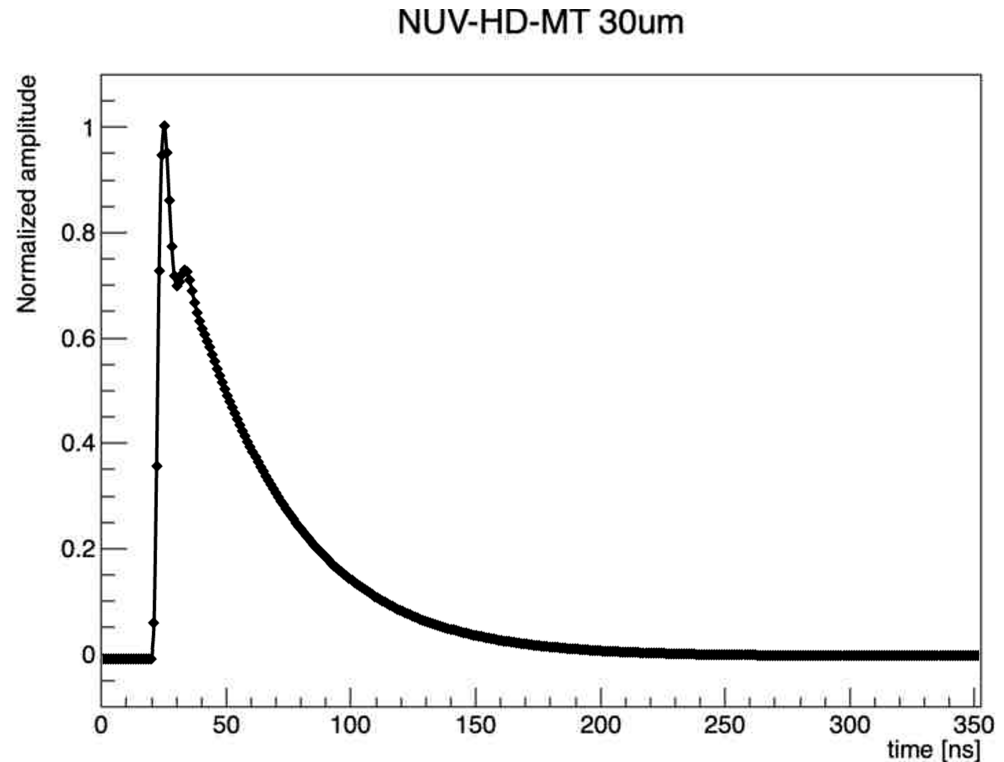
Terzina focal plane simulation



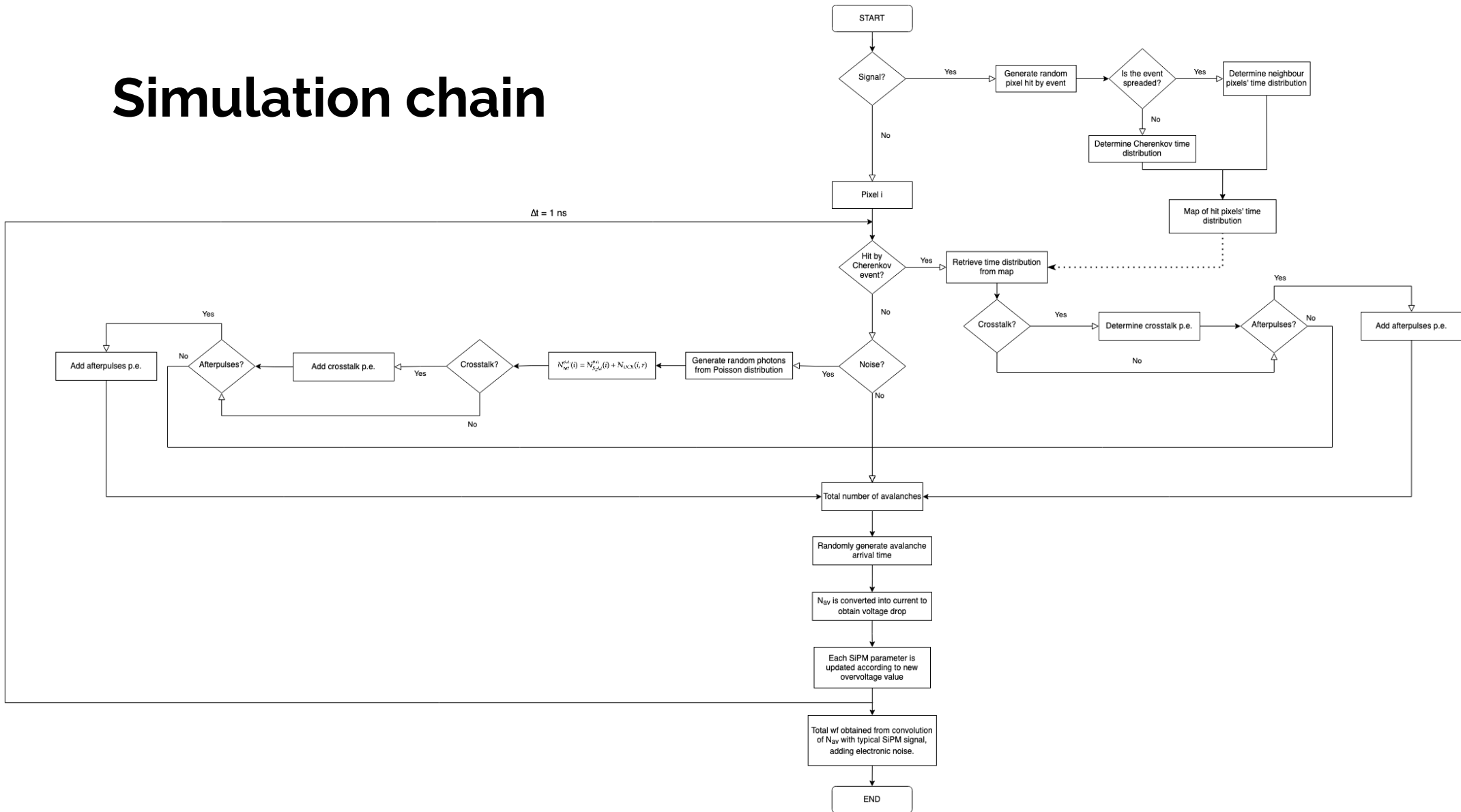
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Simulation parameters

NGB (MHz)	10
DCR (MHz) - BoL	0.315
NGB + DCR (MHz)	10.3
P_{xt}	0.8%
P_{ap}	0.1%
Time frame (ns)	1000
Time window (ns)	20
Total time (ns)	10^7
σ_{gain}	9%
σ_{el}	12%



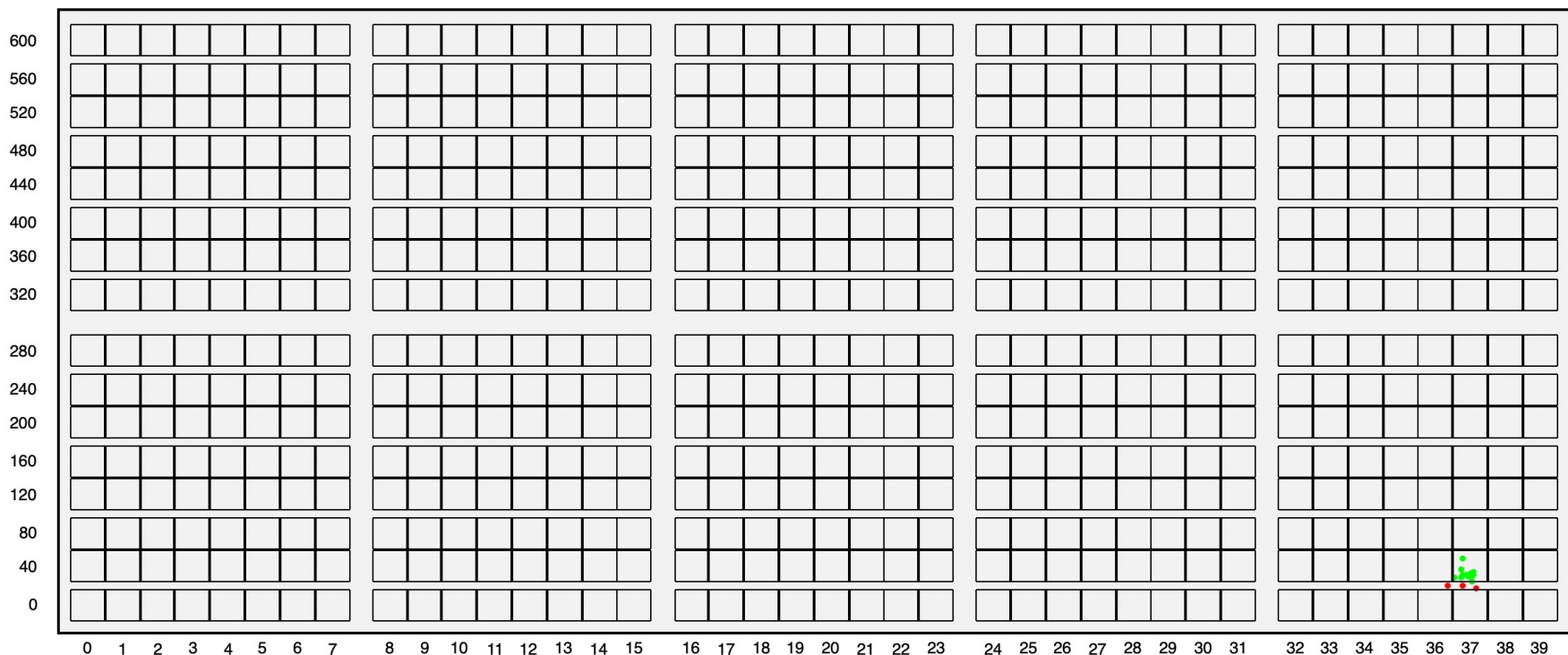
Simulation chain



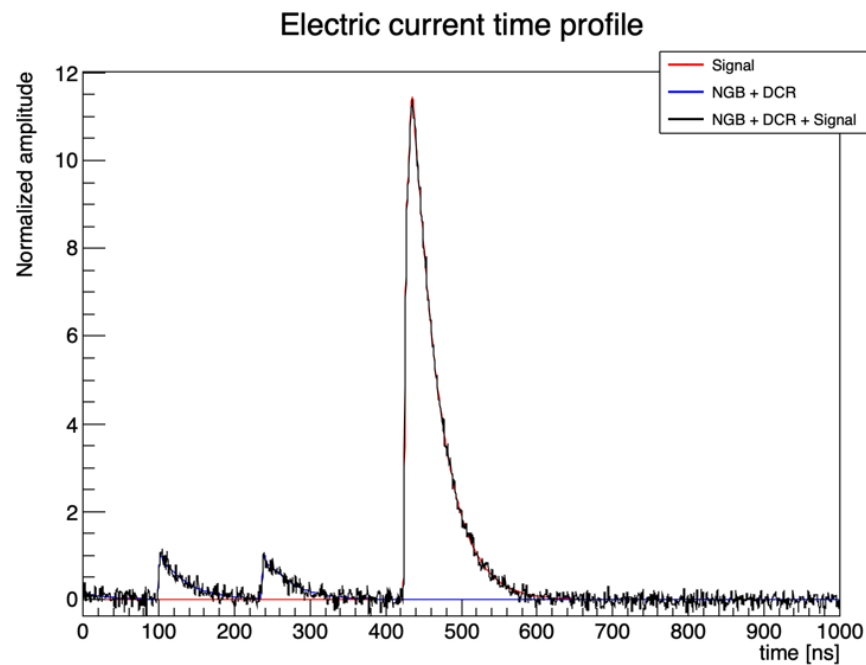
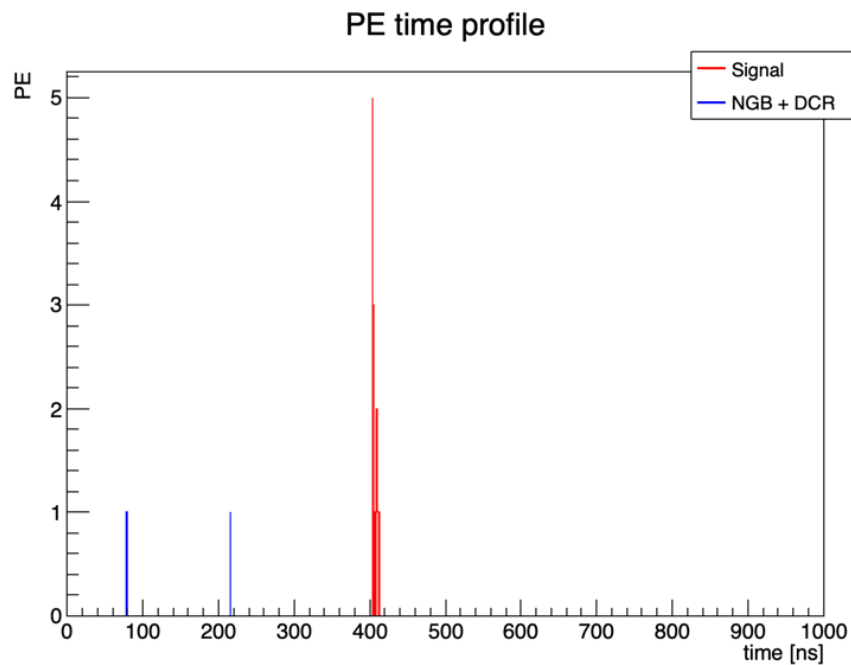
Focal plane simulation

Cherenkov event (energy = 100 Pev) projected on FPA:

Focal plane

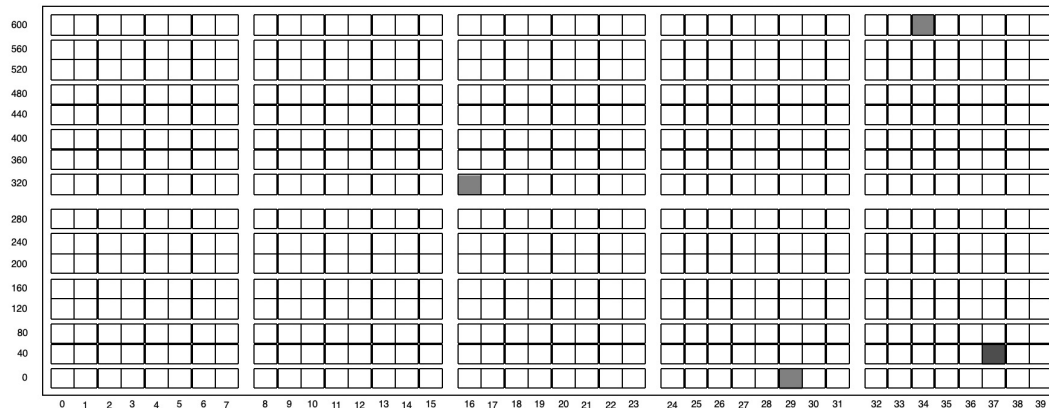


Waveform simulation

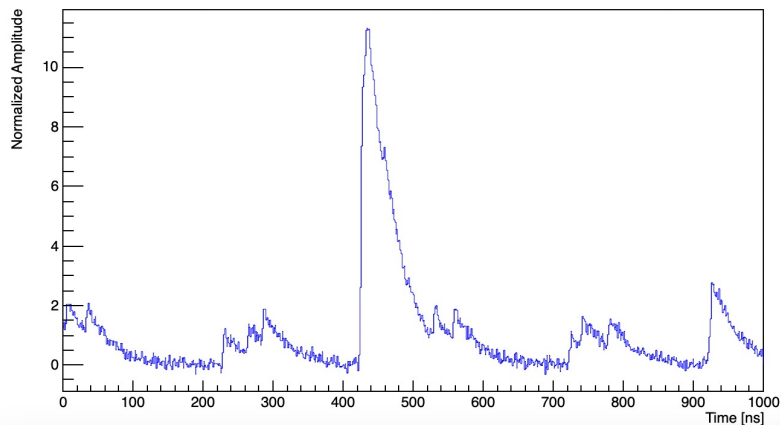


Trigger logic implementation

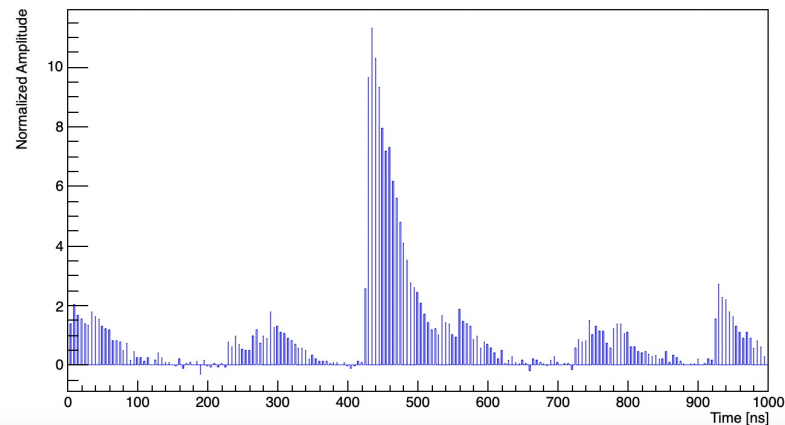
High threshold:



Pixel 77

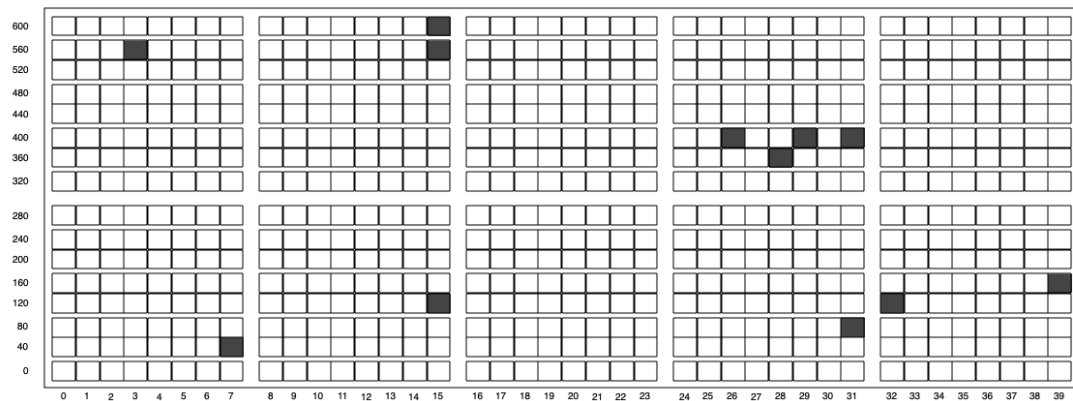


Pixel 77 (5ns sampling)

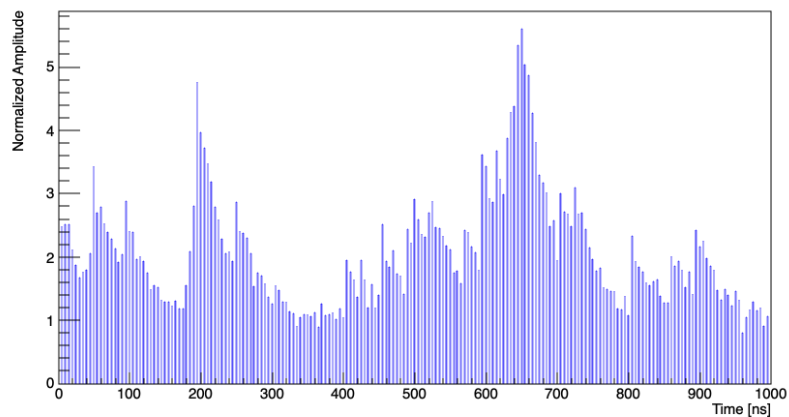


Trigger logic implementation

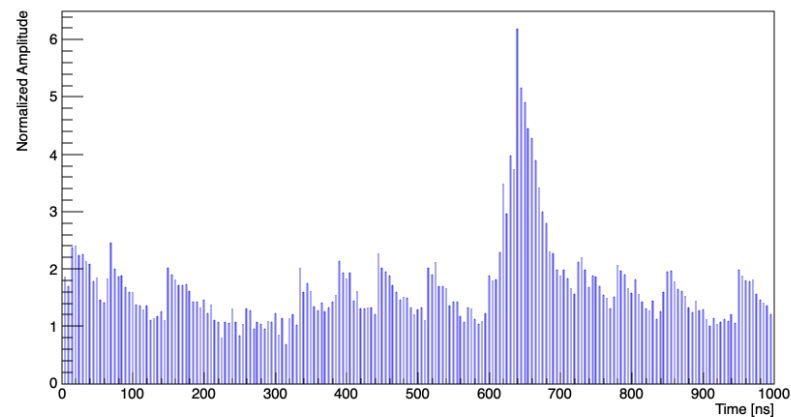
Low threshold:



Pixel 575



Pixel 615

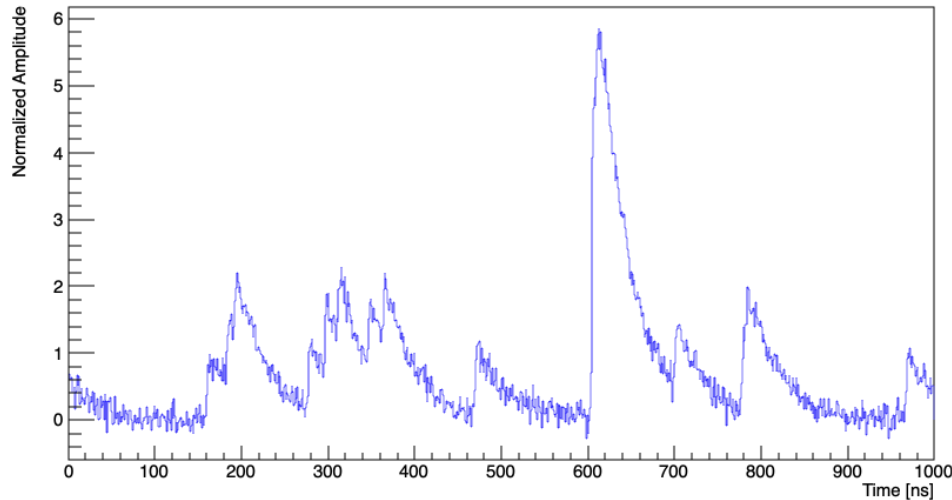


NGB rate variation

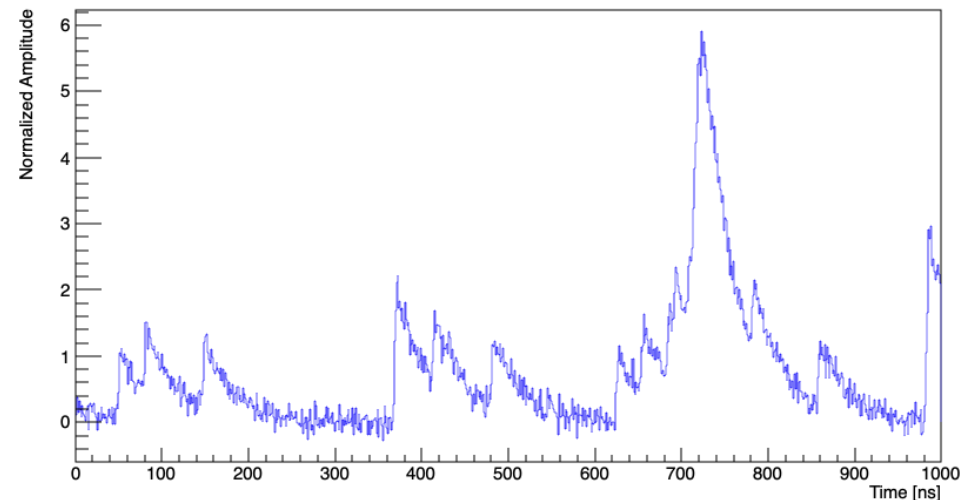
What if NGB rate changes?

- First, hitmap request rate greatly increases!
- Then, if a real Cherenkov event is spreaded among few pixels, it is really challenging to distinguish it from a fake one generated by background

REAL EVENT



FAKE EVENT





Summary

Already implemented:

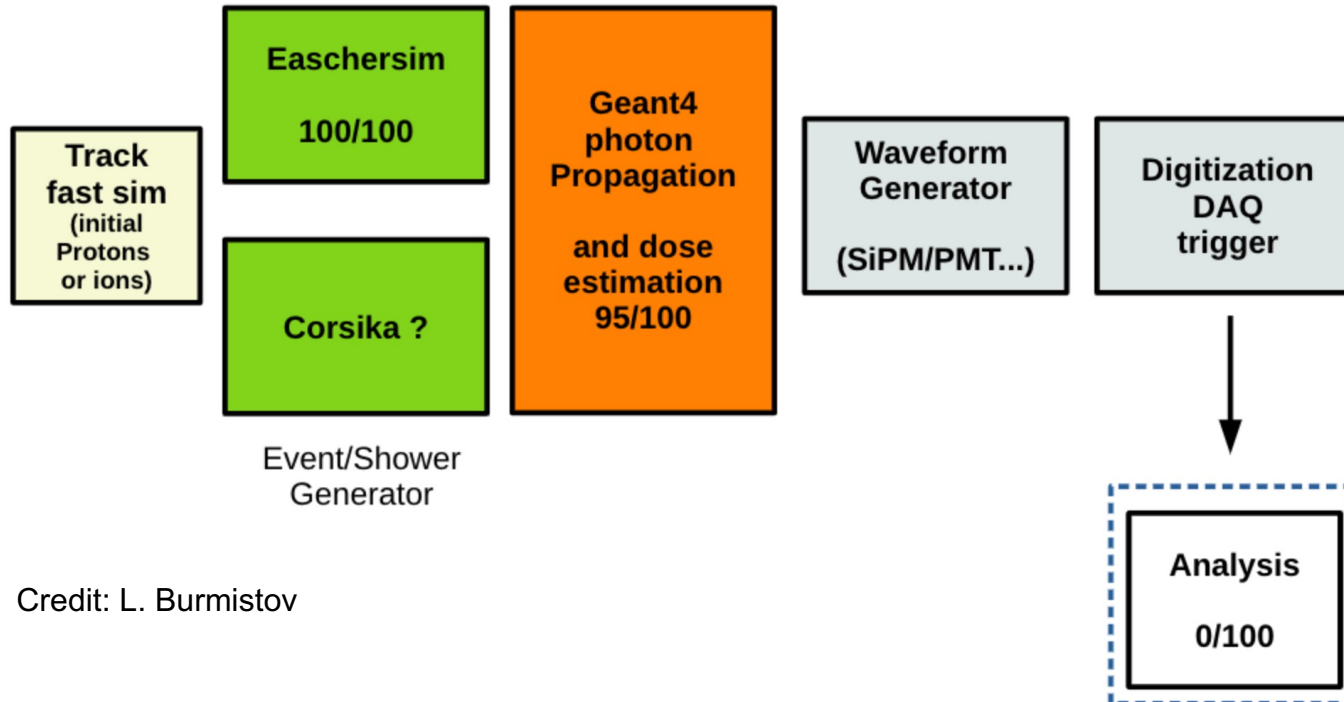
- High/low threshold trigger
- Hitmap pattern recognition and validation algorithm

To do:

- ASIC "memory" buffers for 32 channels configuration
- Dead time

Full simulation pipeline

Leonid Burmistrov and Caterina Trimarelli are now working on a full simulation pipeline which will handle either geometry and propagation with Geant4 or waveform simulation and analysis



Credit: L. Burmistrov