DL BASED APPROACH FOR TRACK DECONVOLUTION AND Z MEASUREMENT

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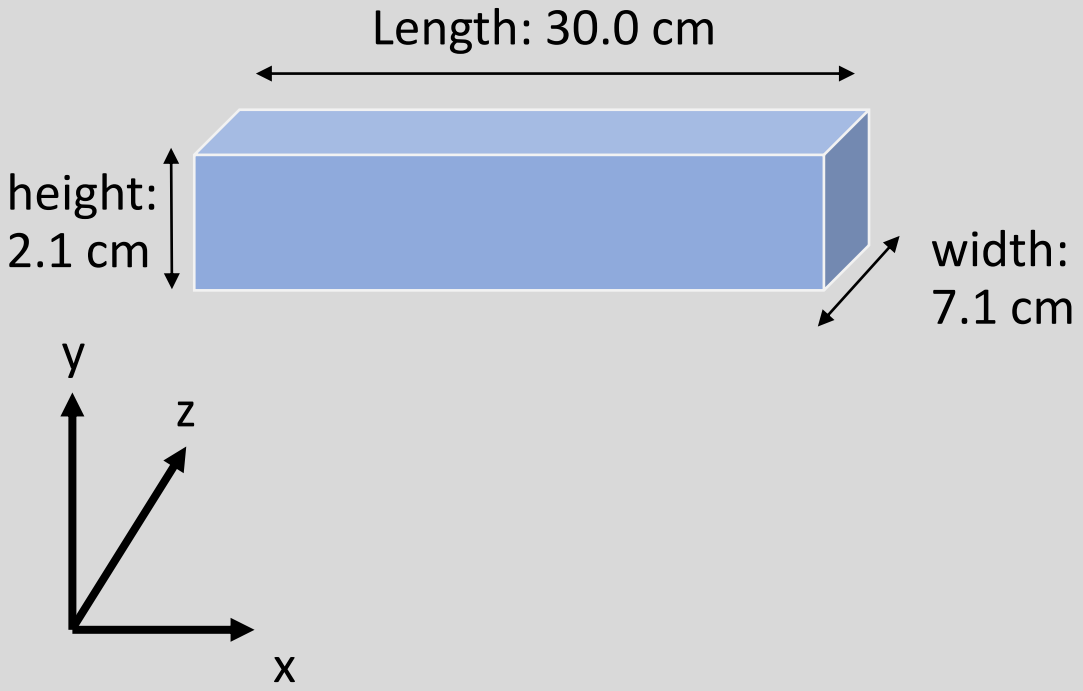
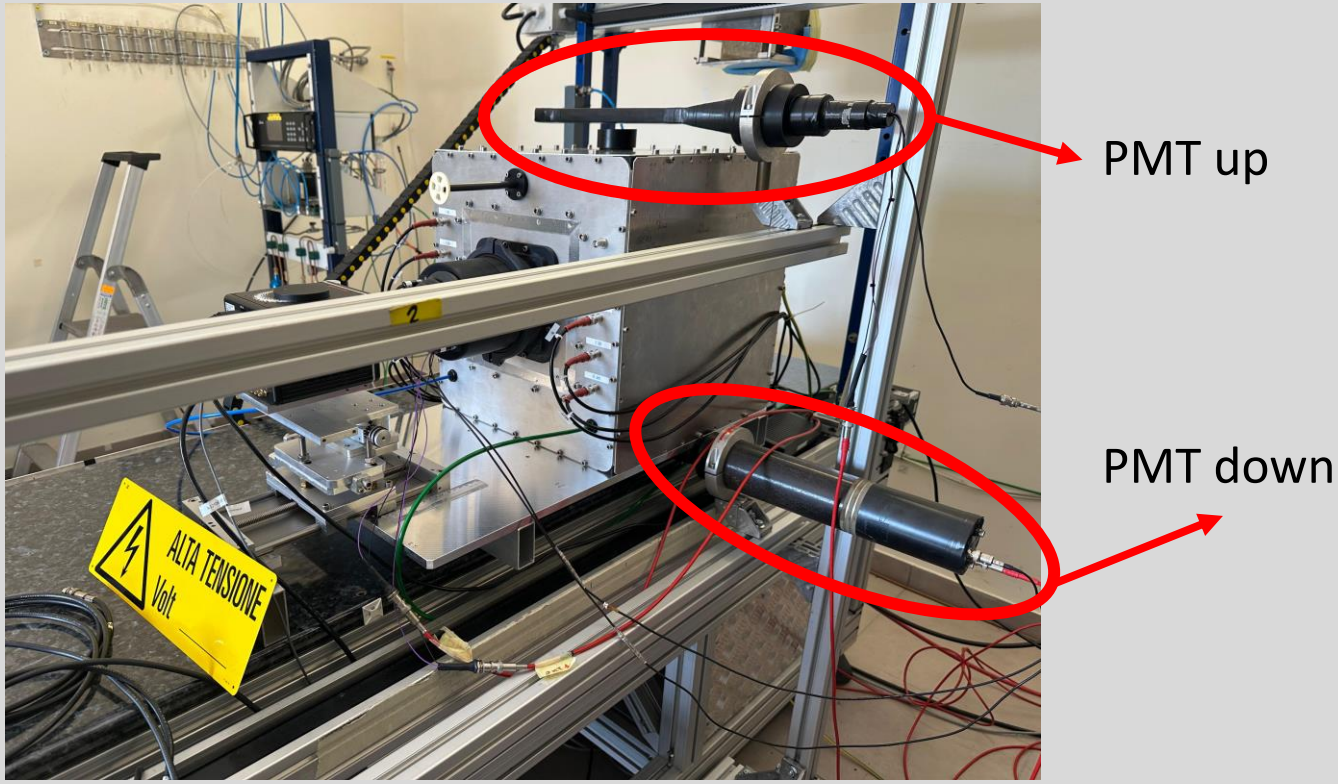
THE IDEA

- Primary track of charged particle is smeared by diffusion and amplification by GEMs.
- Smearing is described by PSF kernel.
- DL based approach to ‘remove’ smearing.
- Use muons to measure PSFs at different z.
- Use MultiWienerNet for deconvolution and z reconstruction.

GIN UPDATES

Installed 2 scintillators above and below GIN:

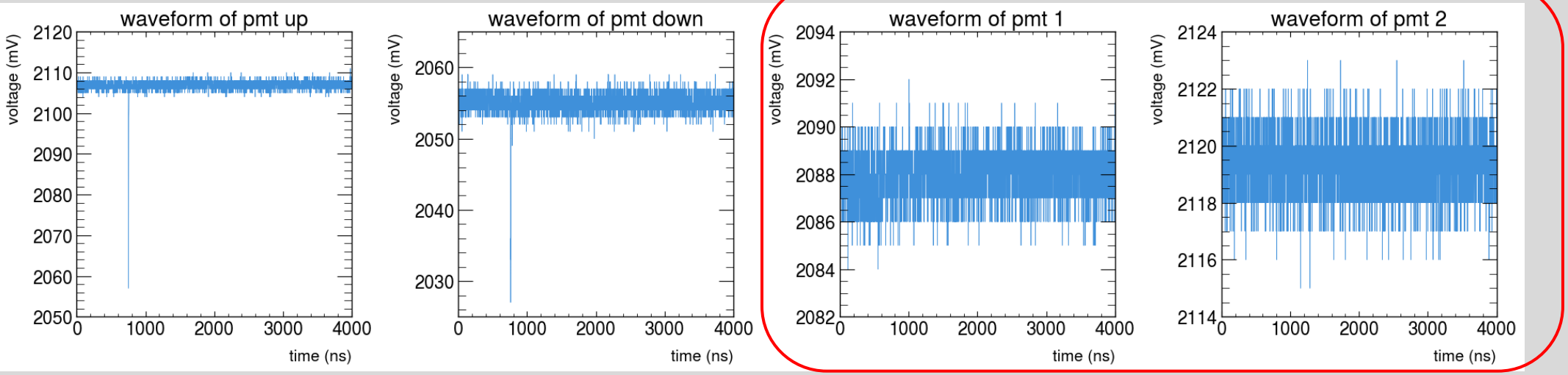




GIN UPDATES

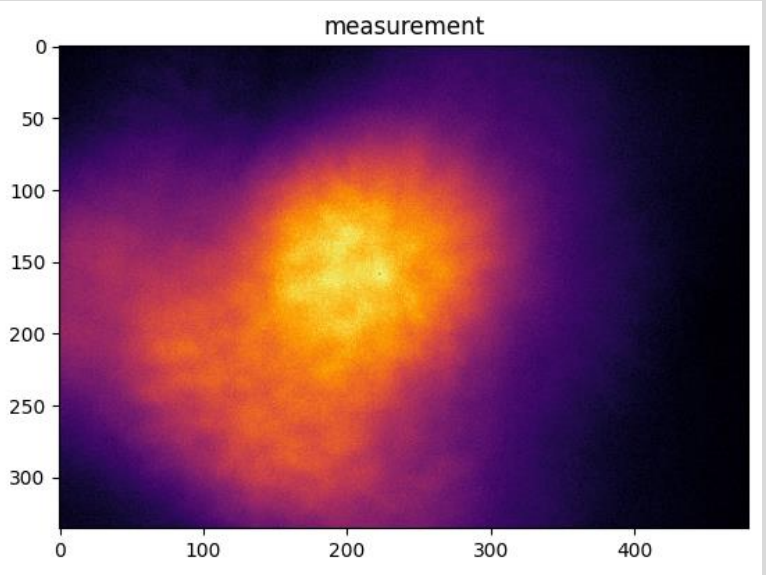
- Trigger on PMT up and PMT down to ensure muons captured within a chosen z range.
- Due to smaller active volume, only about 30% of triggers contain muons.
- Event rate of about 3 μ per 100s.

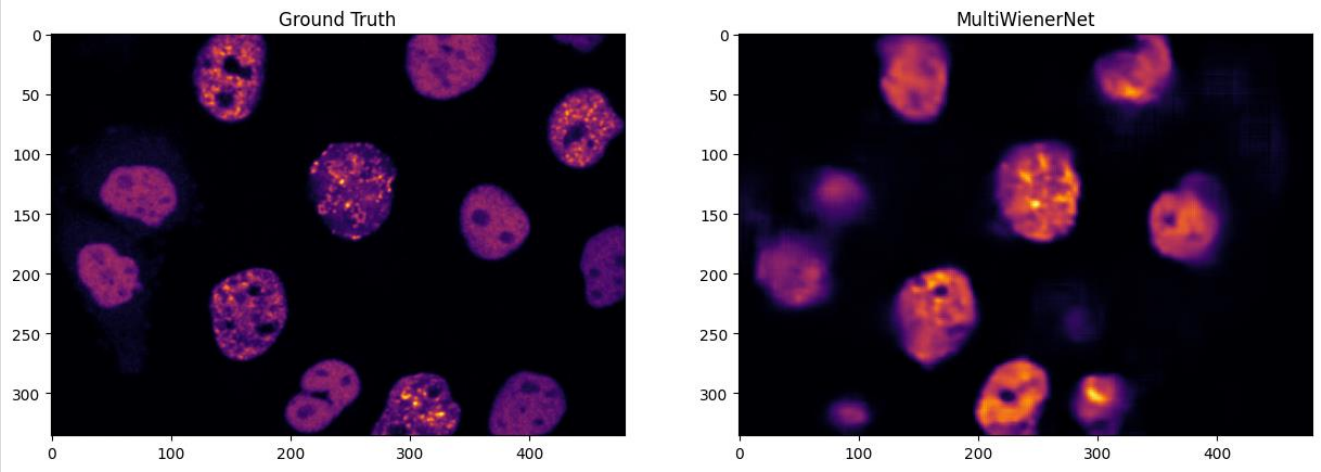
PMTs inside GIN did not see an event



CURRENT APPROACH

- Find single cluster deposits from muons, measure shift invariant PSF at different z positions for 5 positions.
- Feed into MultiWienerNet for deconvolution.





- Uses different PSFs measured at different z and then uses a CNN to optimise the image by combining the filtered layers.
- In principle, can label the various PSFs to extract z.

THANK YOU