

# Muon Reconstruction using RPC & Water Pool

Qing He

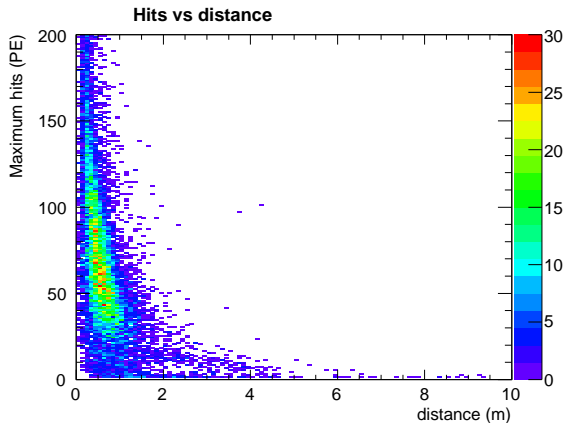
Princeton University

Dayabay Collaboration

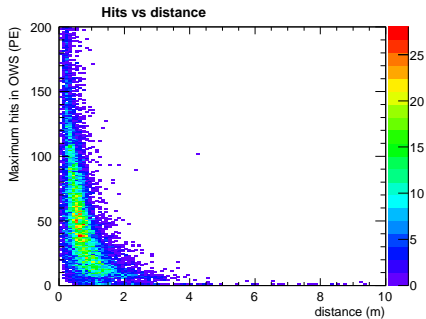
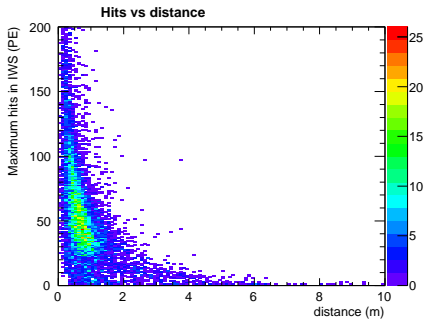
# Muon reconstruction using RPC & Water Pool

- RPC spatial resolution:  $\sim 10$  cm (Doc 4677)
- No RPC simulation in this study. Using MC truth to check if muon pass RPC, if it does, its  $x$  and  $y$  positions are smeared 10 cm and used as reconstructed values.
- Three cases for Muon reconstruction:
  - RPC + Maximum PMT in water pool (58.6%)
  - Maximum PMT in IWS + Maximum PMT in OWS (25.1%)
  - Maximum PMT on wall in OWS + Maximum PMT on bottom floor in OWS (16.3%)

# Some plots

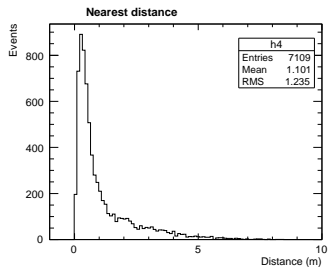
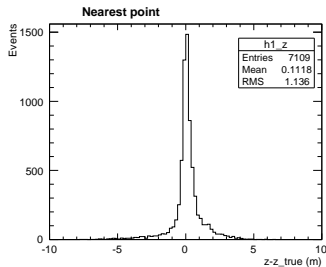
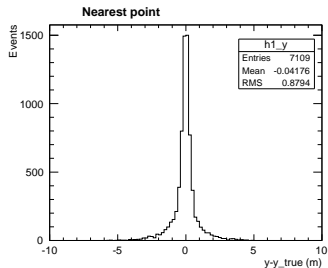
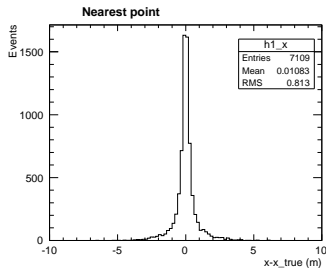


- Find the maximum hit PMT in the whole water pool
- Calculate the distance of maximum hit PMT position to muon track.



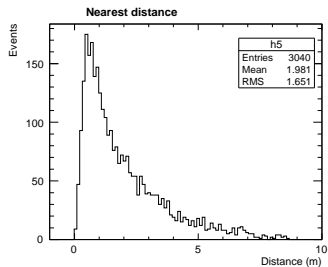
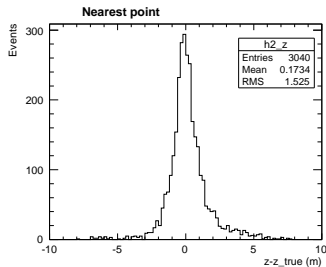
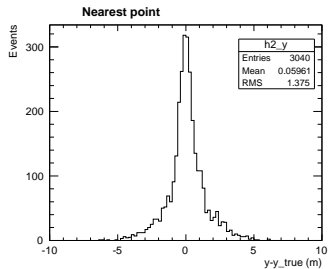
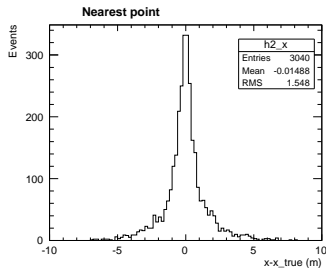
- Left: find maximum hit only in IWS
- Left: find maximum hit only in OWS

# Case 1



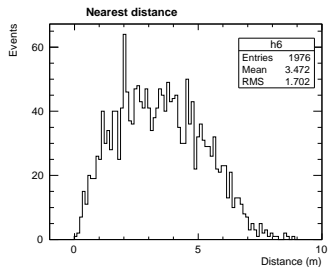
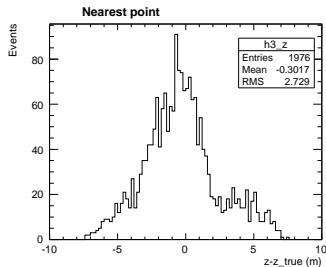
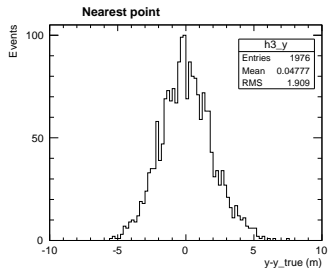
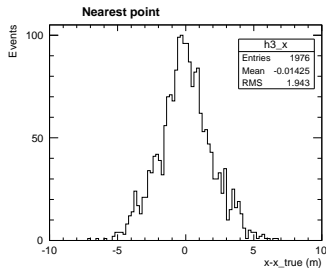
- The nearest point comparison.

# Case 2



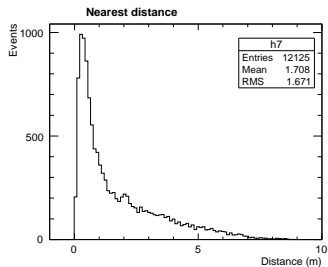
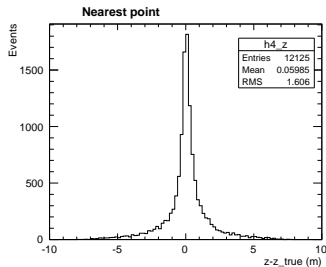
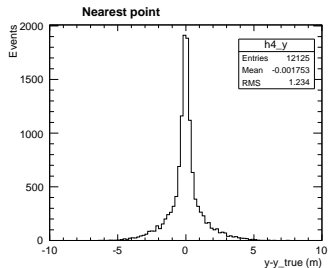
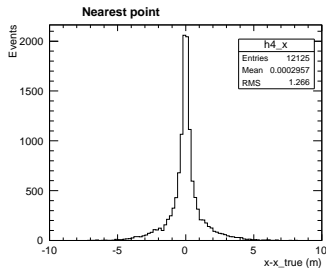
- The nearest point comparison.

# Case 3



- The nearest point comparison.

# All together



- The nearest point comparison.



- It is easy to reconstruct muons which pass RPC.
- The reconstruction results are comparable with water pool fit results.
- For one zone pool, will get better resolution for case 1, but not easy to reconstruct case 2 & 3.