Update on PPM-DU plots and DU-1 calibration

Robert, Jorinde and Dorothea
Leiden University and Nikhef Institute
February 3, 2015

DU 1 calibration

Calibration procedure

Clocks of CLBs and base container will be sinked with white rabbit clock using the nanobeacon pulsing (to be read out with external fast reader)

→ Once calibration is confirmed this way, check if it works by using laser signals on different PMTs on different DOMs

Figure : Setup as used by PPM-DU

Naive simulation

- Simulate frames with K40 decays (1 kHz L0)
- Add pulsed signal from laser (10 kHz)
- perfect detection, no missed laser hits etc

Figure : Setup as used by PPM-DU

DeltaT PMT

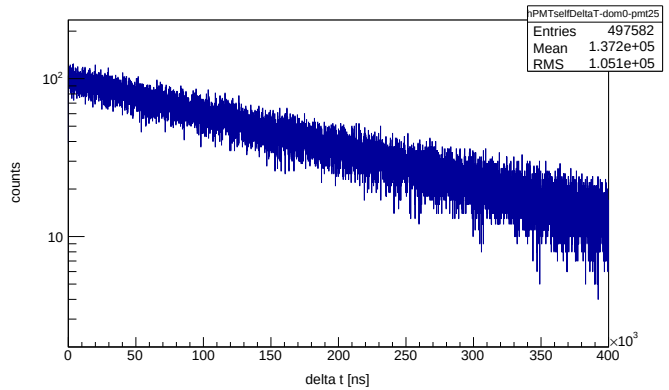

Figure : PMT DeltaT of PMT without laser

DeltaT PMT

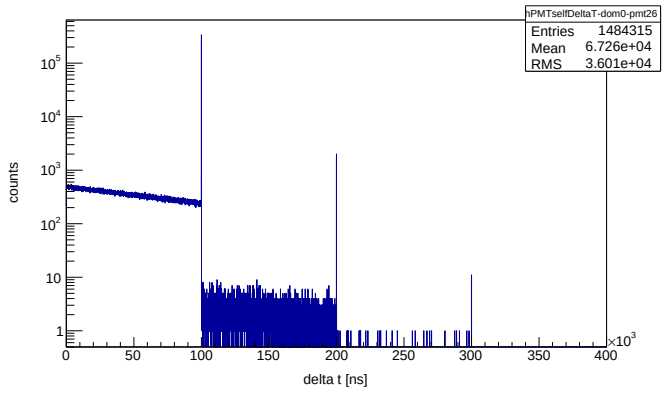

Figure : PMT DeltaT of PMT with laser

Fit Calib

Given offsets as introduced by me between DOM 1 and DOM 2
120.0835 ns

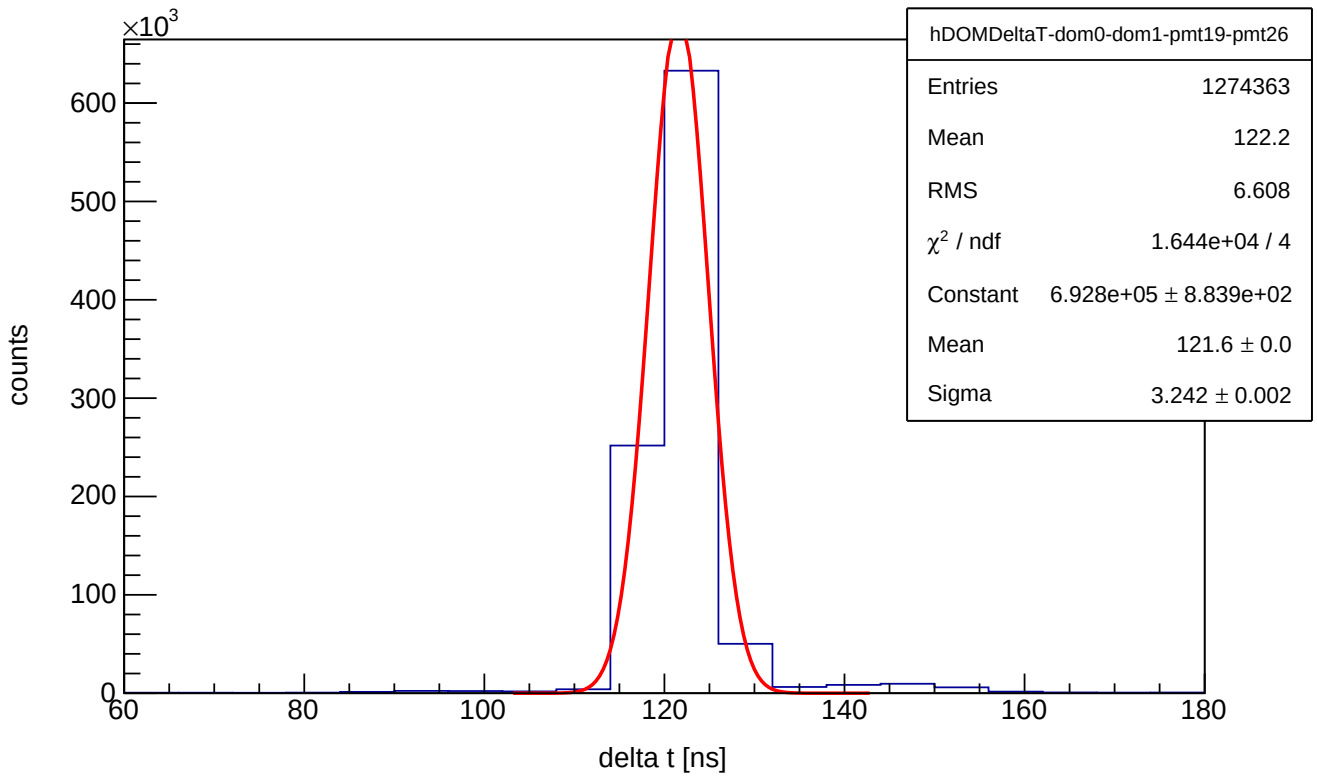

Figure : Time difference between DOM 1 PMT 19 and DOM 2 PMT 26

PPM-DU Nanobeacon calibration

Changed to take the time of the second L0 composing the L1 (rather than the first which is more likely to be background) and added correct speed of light

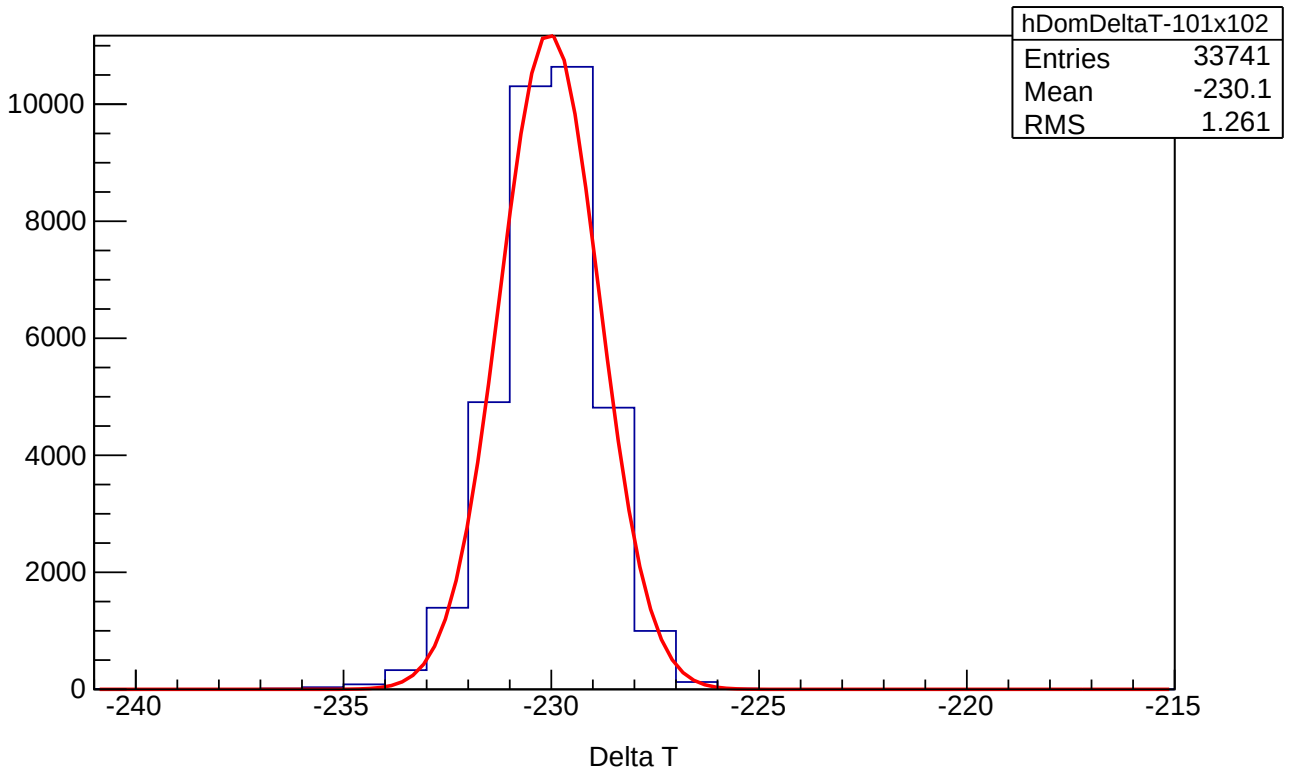

Figure : Time Calib for DOM 1 to DOM 2

New DOM DeltaT

Added background to mc from data sideband

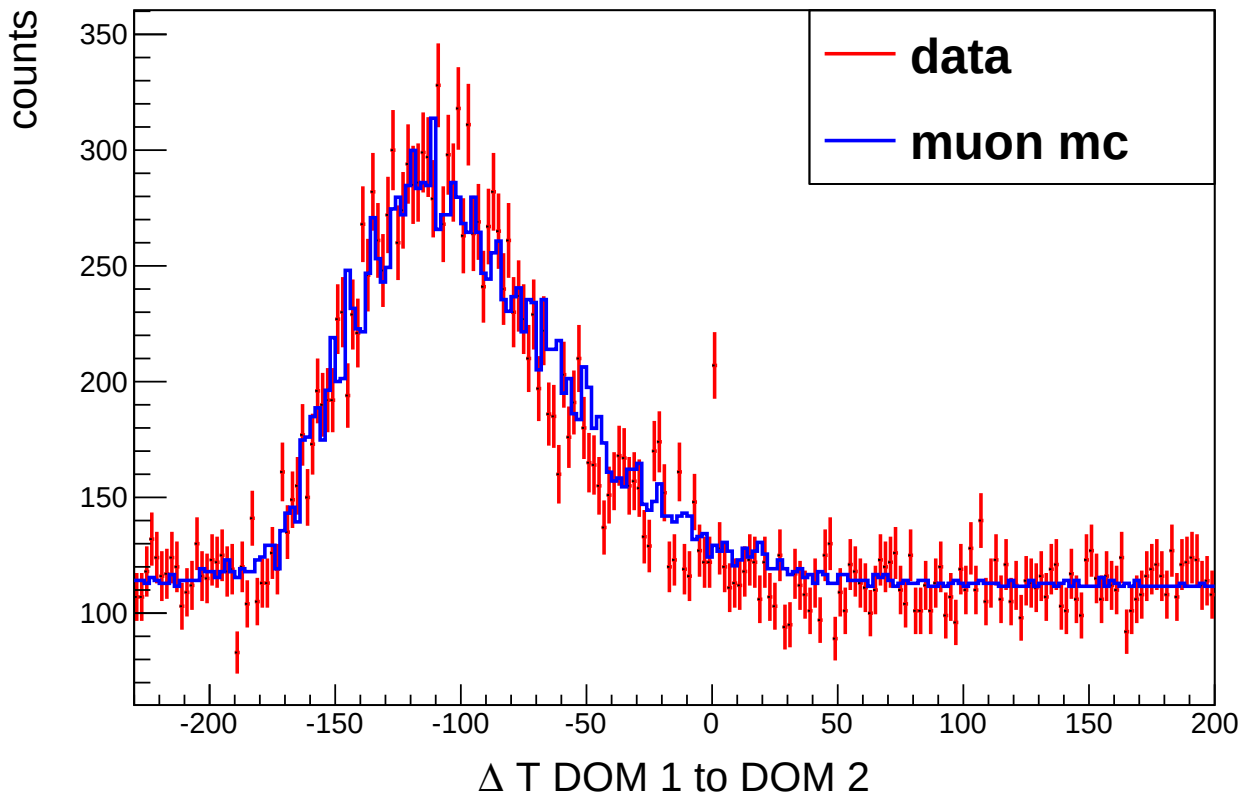

Figure : DOM 1-2

New DOM DeltaT

Added background to mc from data sideband

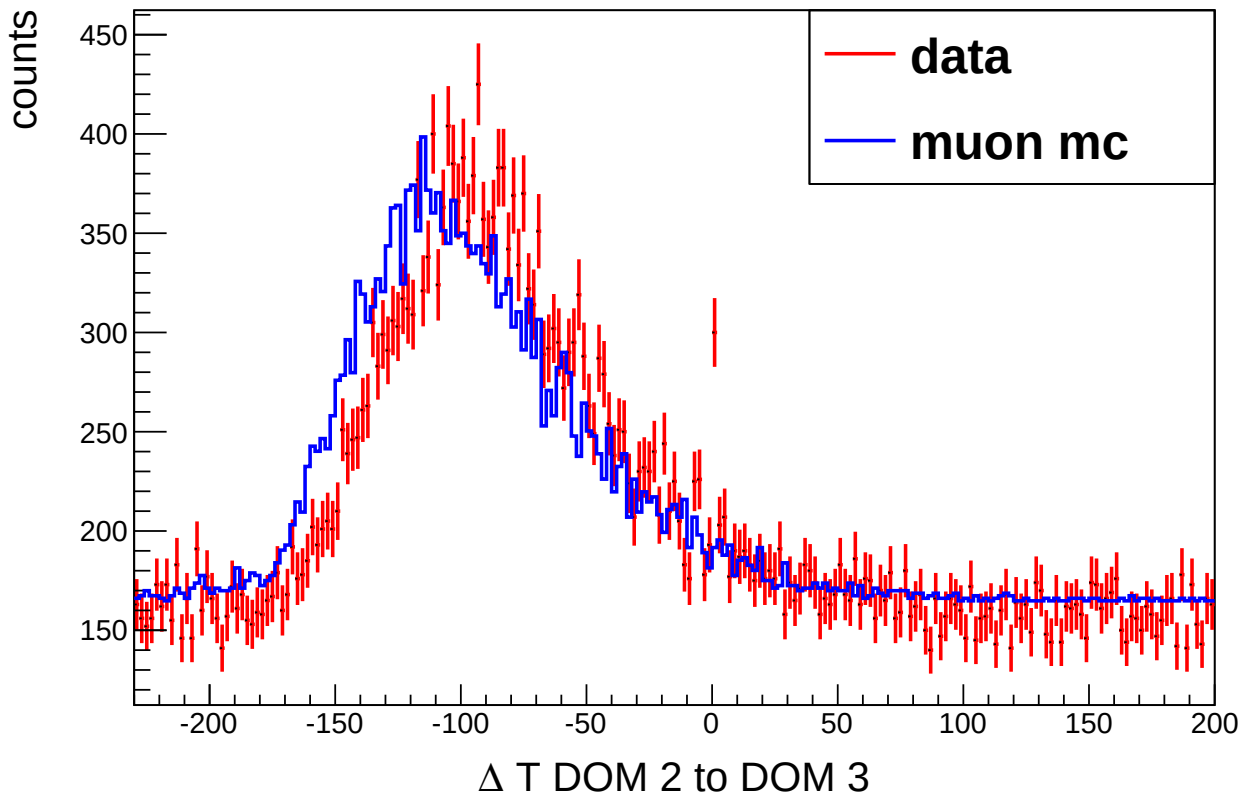

Figure : DOM 2-3

New DOM DeltaT

Added background to mc from data sideband

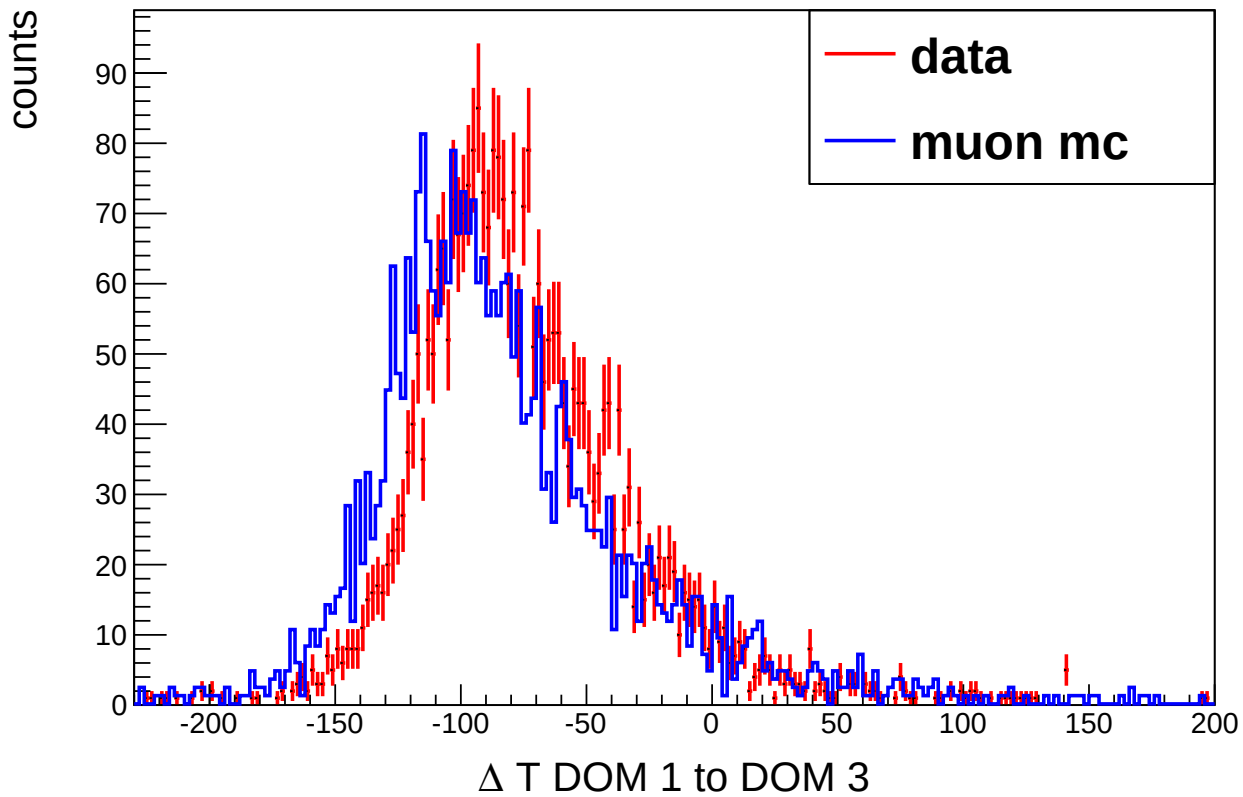

Figure : DOM 1-3

MC-Data comparison

New MC includes QE simulation (as determiend from one file)

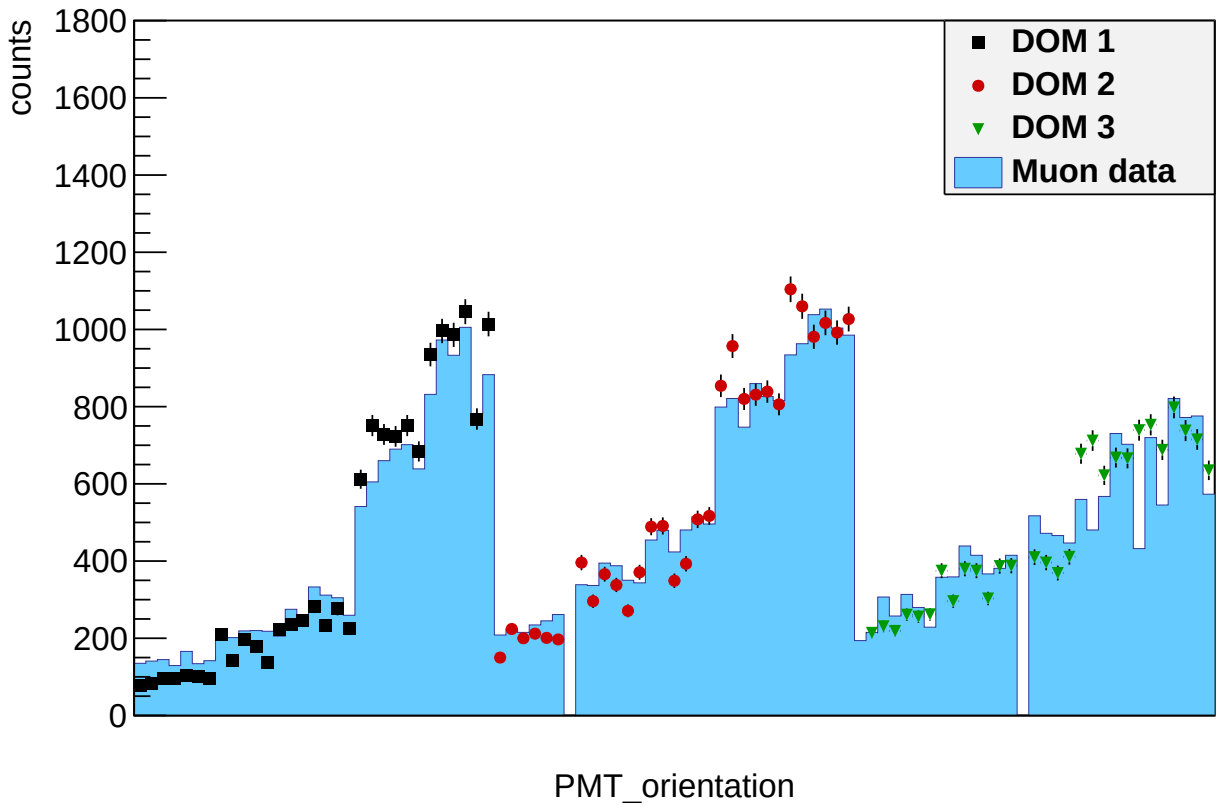

Figure : Zenith plot

MC-Data comparison, individual zenith

Make individual zenith plots for each DOM using PPM-DOM coincidences with size ≥ 8

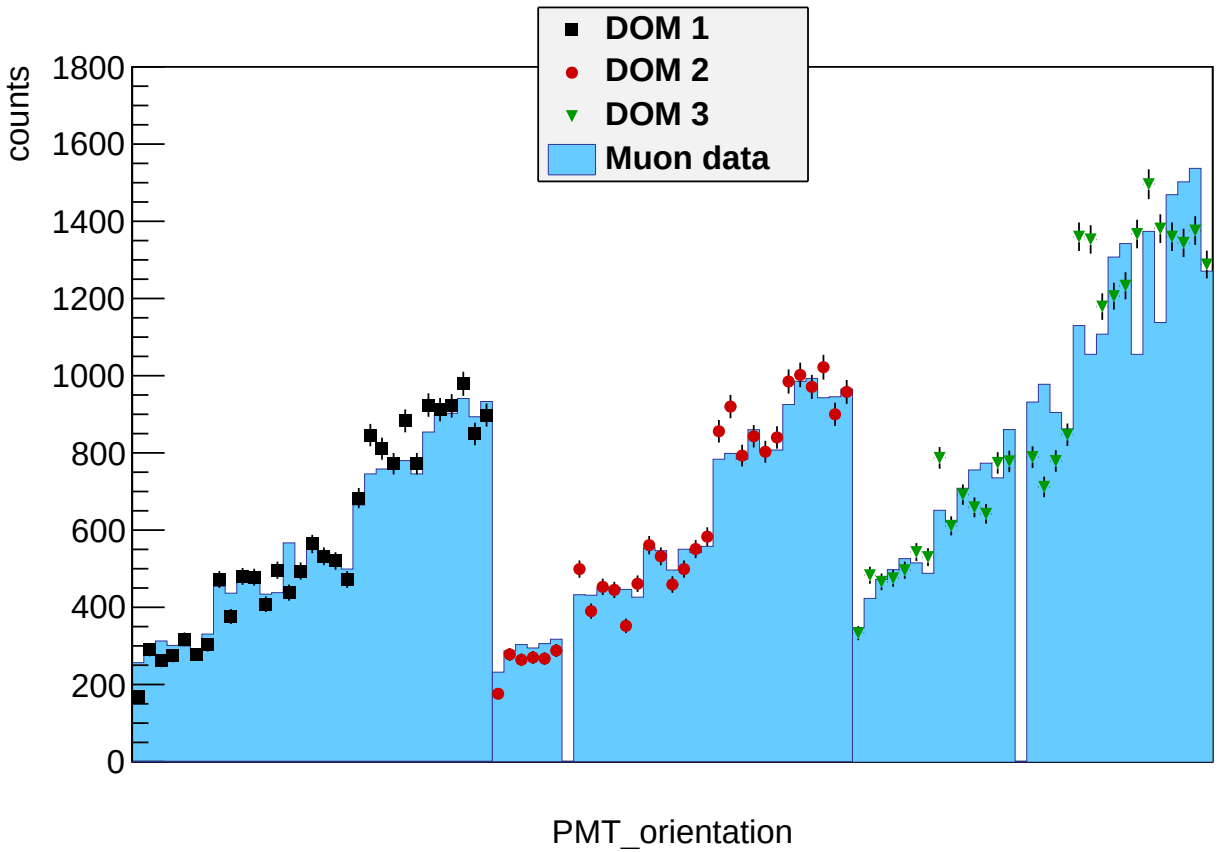

Figure : Zenith plot for PPM-DOM coincidences each dom scaled individually

Scaling factors

Always scaling MC to data using integral of histograms

dom0 1.27662 scale dom1 1.25377 scale dom2 1.58459

PPM DOM zenith DOM 1	1.28
PPM DOM zenith DOM 2	1.25
PPM DOM zenith DOM 3	1.58
DU 3 DOM zenith	1.01
DeltaT DOM 0-1	1.22
DeltaT DOM 1-2	1.25
DeltaT DOM 0-1-2	1.14
lifetime	1.32