

Run16 Au+Au 200 GeV TOF Calibration Update

Daniel Brandenburg

Rice University

Vertex Position Detector



VPD consists of 19 PMT on the east and west side covering an η rang of $\sim |4.25| < \eta < |5.1|$.

VPD Calibration consists of 3 steps:

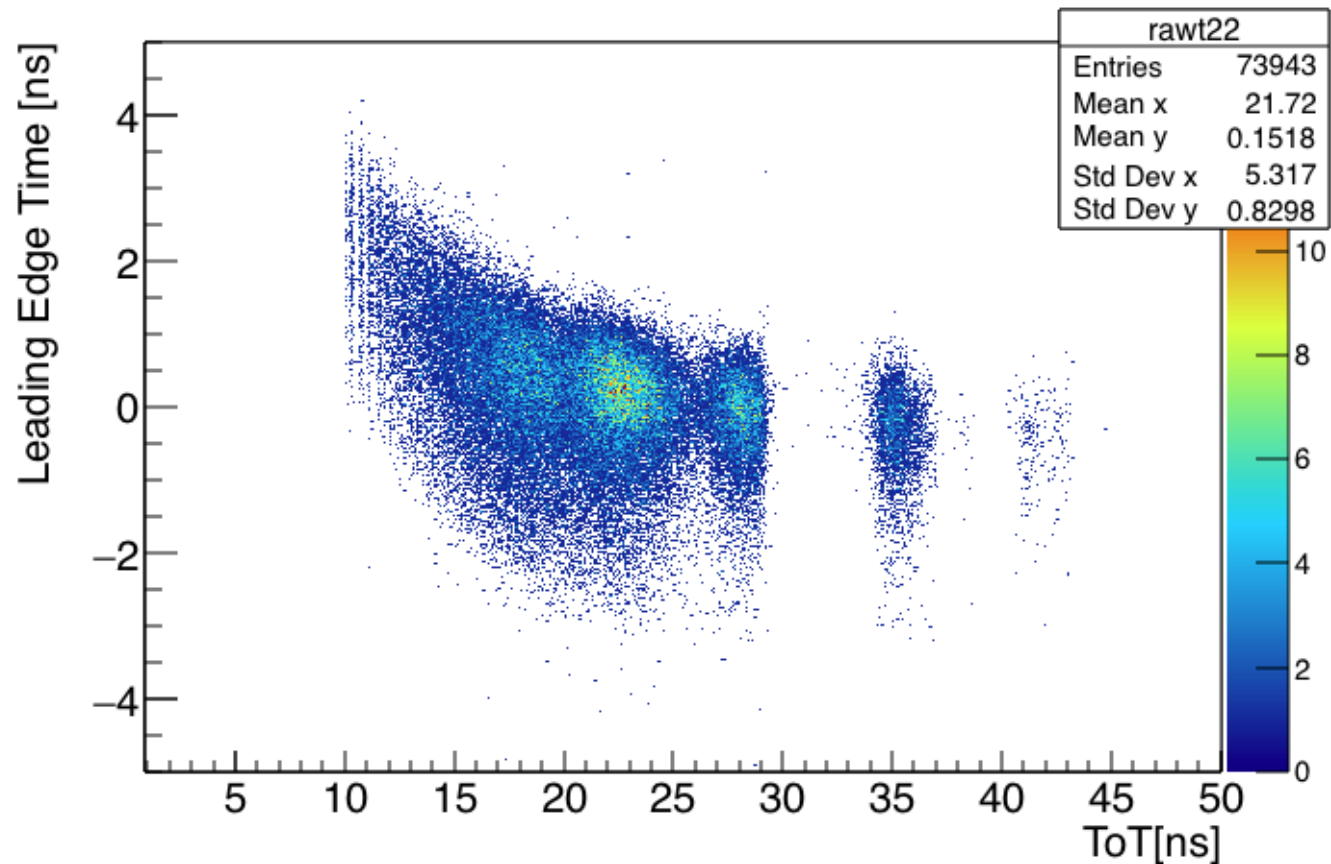
1. Remove average relative offset between tube leading edge times
2. Iteratively correct for slewing
3. Center VPD_z – TPC_z vertex at 0

VPD provides Z vertex position and start-time for Btof detector.

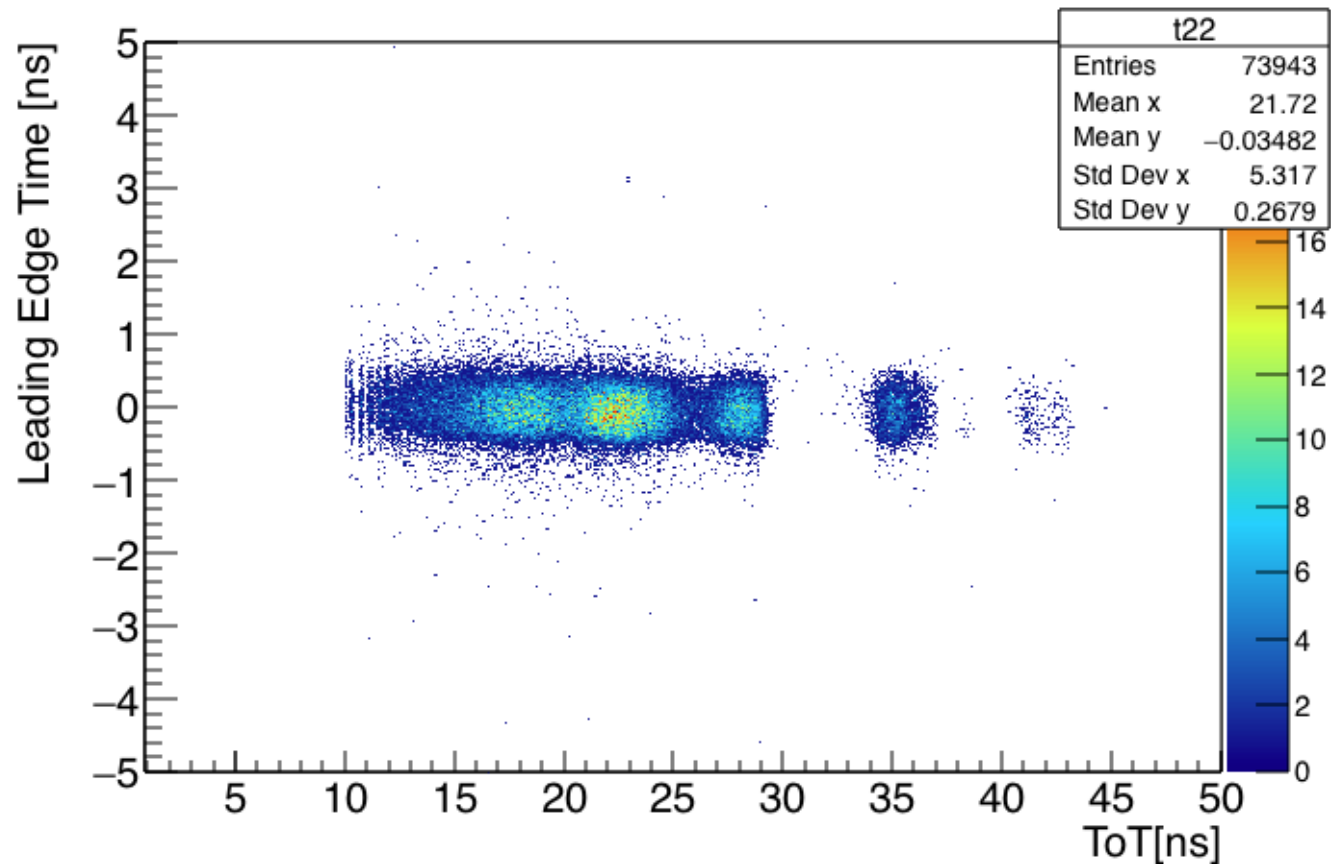
Run16 : Several issues

- 3 distinct periods:
 - Before day 80 (period 1)
 - Between day 95 and 135 (period 2)
 - After day 135 (period 3)
- Each period require a dedicated calibration since significant changes were made at each transition
- In period 2 & 3, the VPD firmware was changed for the plan B vertex algorithm

VPD Slewing correction (before)

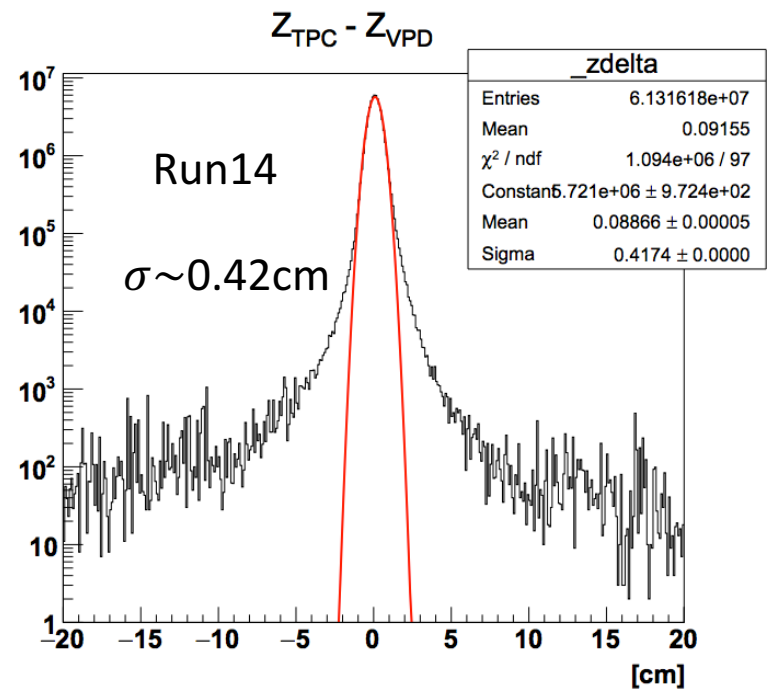
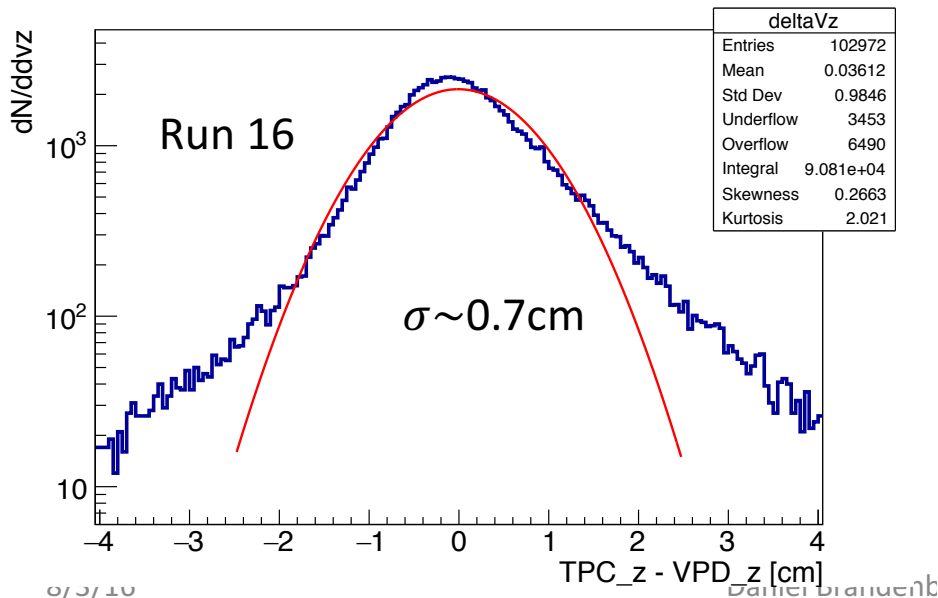


VPD Slewing correction (After)



VPD Calibration (Period 1)

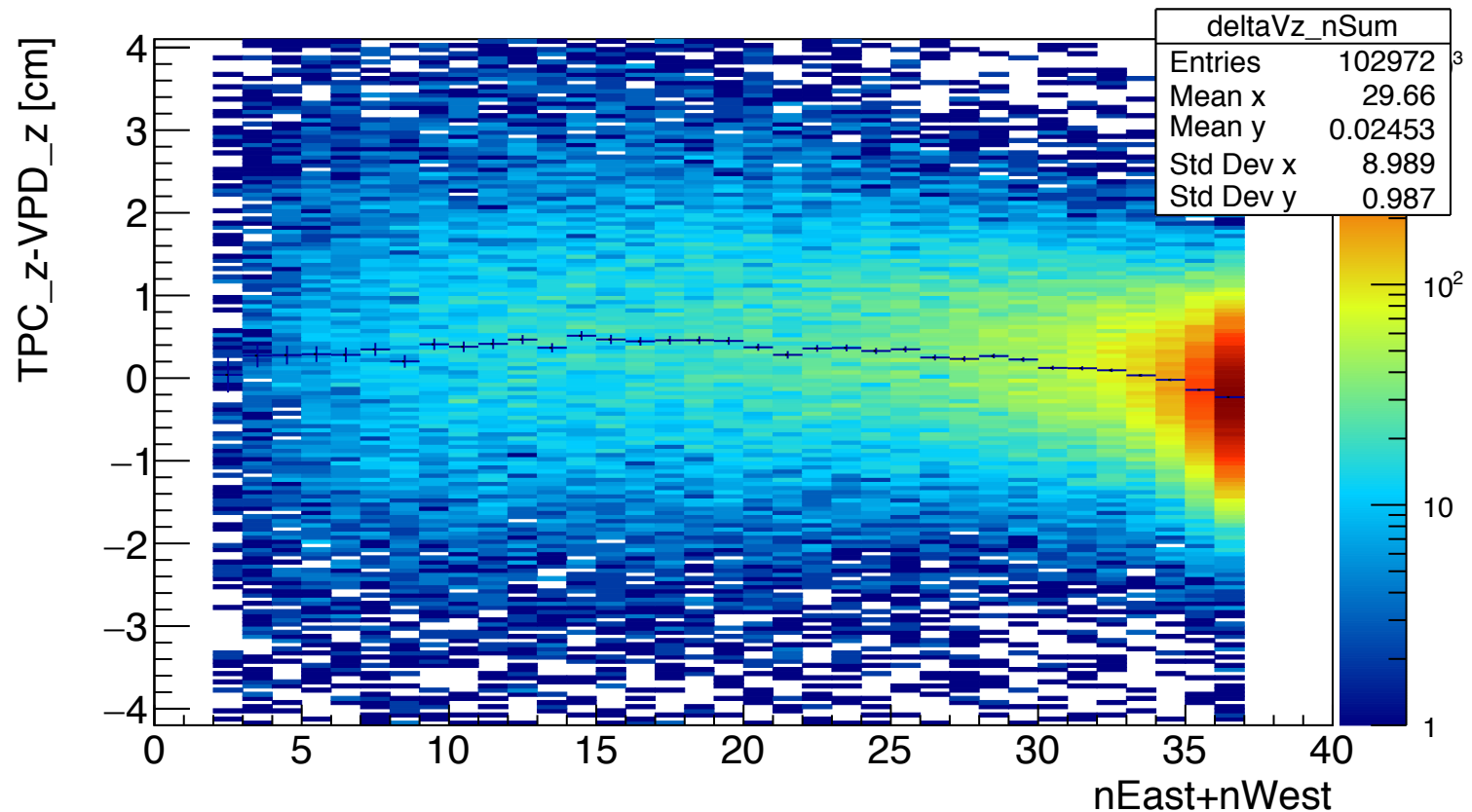
- After Slewing correction the VPD is “centered” on the TPC_z vertex
- Expect $VPD_z - TPC_z$ to be Gaussian with the width determined by the timing resolution



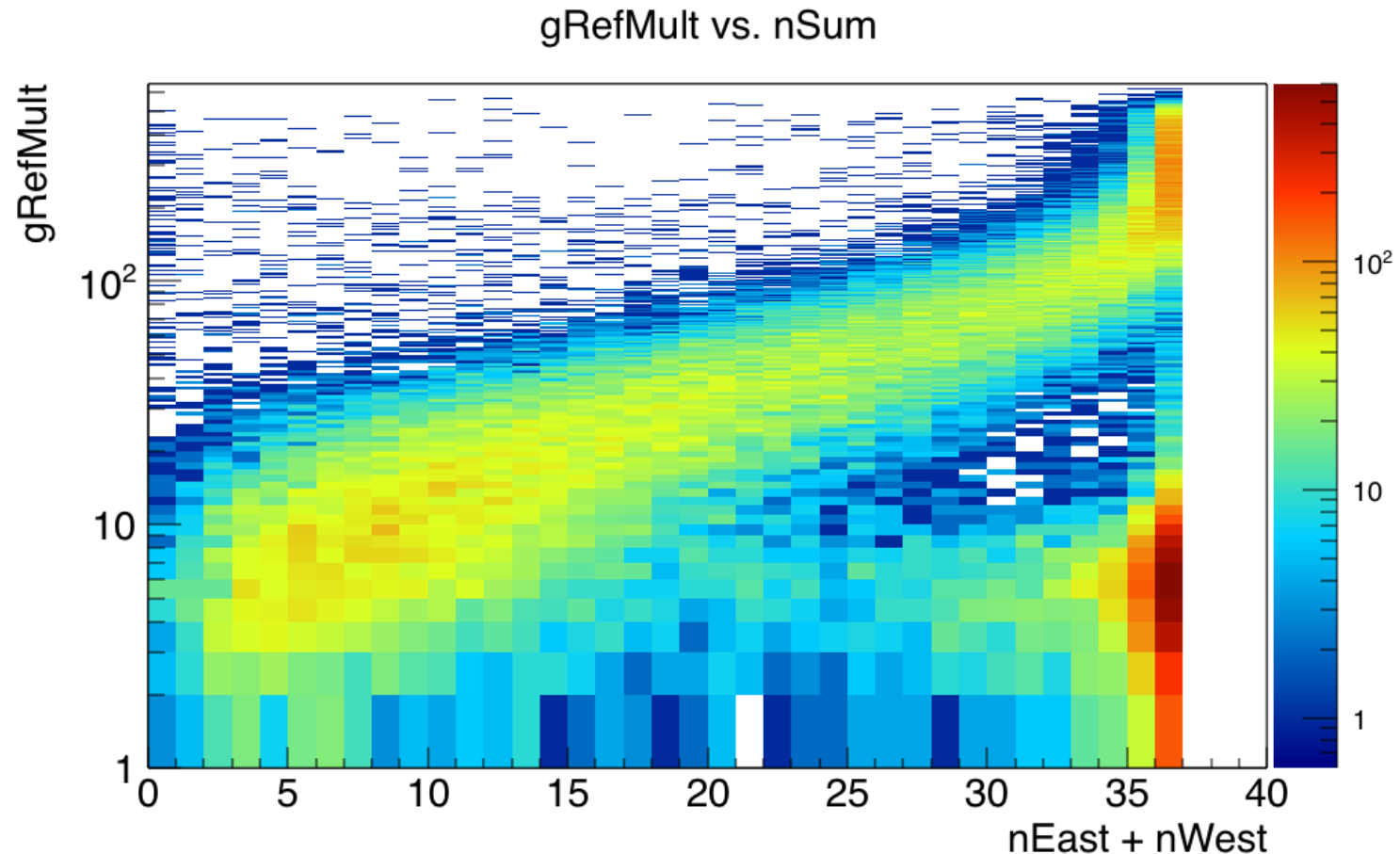
Non-Trivial nTubes Dependence

nEast = # of tubes fired on East

nWest = # of tubes fired on West

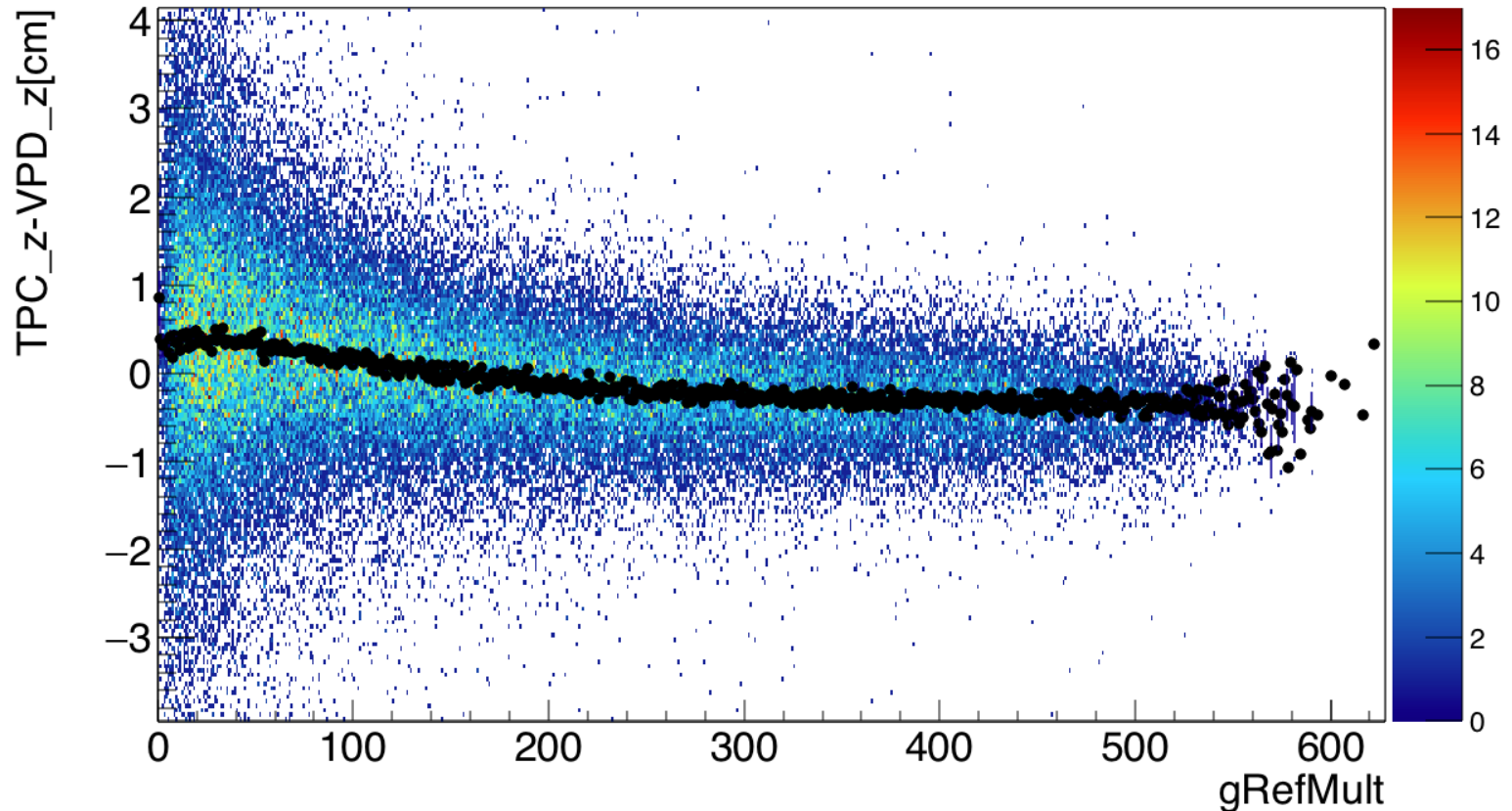


gRefMult vs. nTubes fired



Causes a small multiplicity bias

About 0.7cm (1σ) from most peripheral to most central



Total Btof Time Resolution

- These issues result in a total Btof Time resolution of ~ 76 ps compared to ~ 65 ps in Run14 AuAu200

