VZERO Status Report

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On behalf of
VZERO Team

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Alice Offline Week

Where is VZERO used?

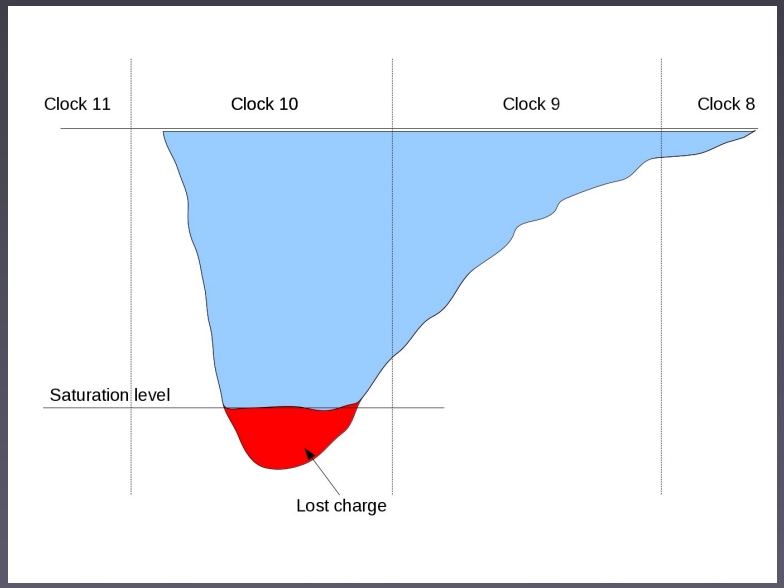
- Main L0/MB Trigger – pp & PbPb
- Offline trigger
    - Beam-Gas removal – pp & PbPb
    - Event classes (INEL, NSD, SD) - pp
- Luminosity & cross-section measurements – V0AND
    - Cross-section normalization
- Default centrality determination in PbPb
- Event-plane determination in PbPb
- New: multiplicity measurement in PbPb

Calibration

- Pedestals – online via DA
- Time offsets – no calibration, estimated directly from various sources (clock phase from BPTX, CTP & LTU configs, FEE config etc)
- Time delays (channel-by-channel) – done once in 2009, has to be redone only in case of hardware intervention (change of PM)
- Time-slewing – no calibration, parametrized was a function of all relevant data (signal amplitude and TDC thresholds), no need to redo it
- Light collection efficiencies – obtained once with 2010 pp data
- PM gain curves – so far using data from the lab
- TDC thresholds – effective vs FEE values, done once on HV-scan runs, intrinsic property of the detector
- Signal saturation in 2010 PbPb data – strictly speaking not a calibration, but rather a recovery

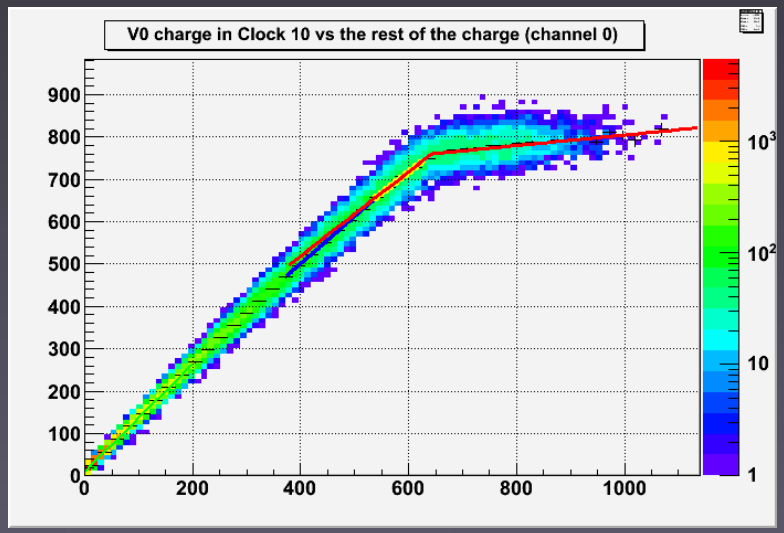
Saturation (1)

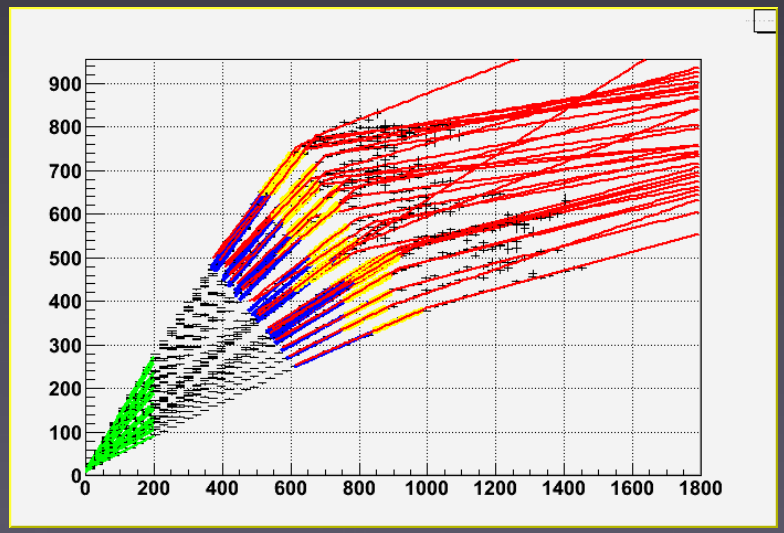
- From studies of charge distribution among ADC samples:
  - Preamplifier signal clipping
  - @ ~ 1300 ADC which corresponds ~2.5V
  - Clipping observed only in 'central' sample (clock 10)



Saturation (2)

- Estimated by correlating signal in 'clock 10' to rest of the collected charge
- Fitted with two linear functions (below/above saturation threshold)
- Done for each channel individually

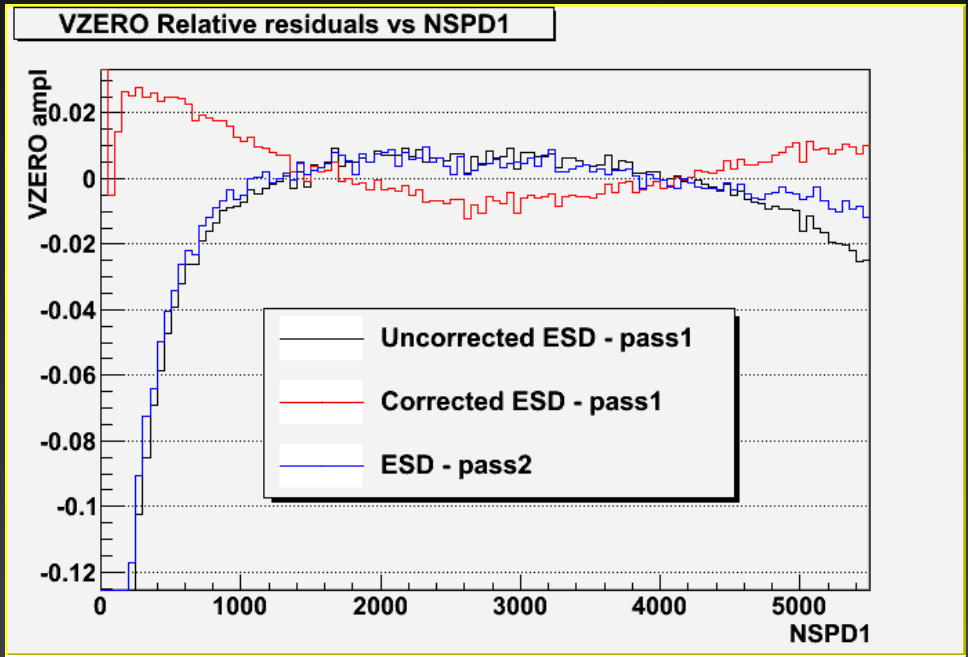


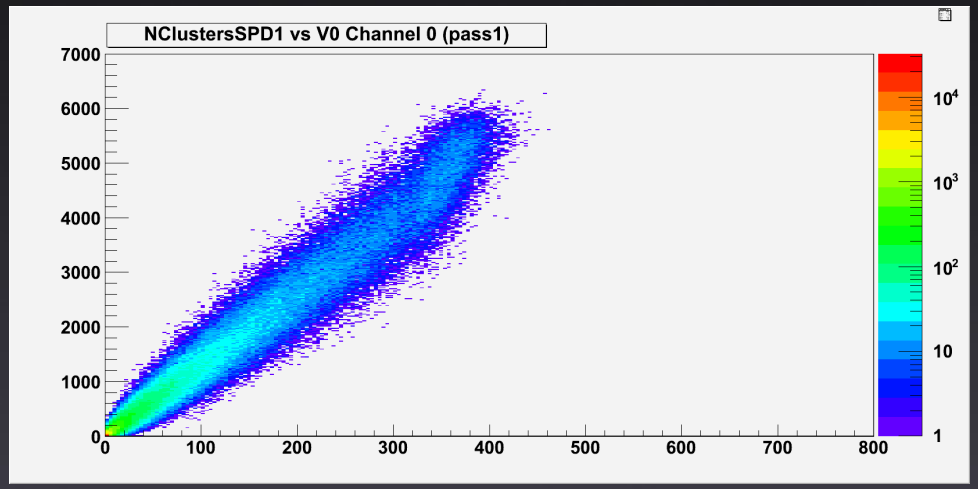


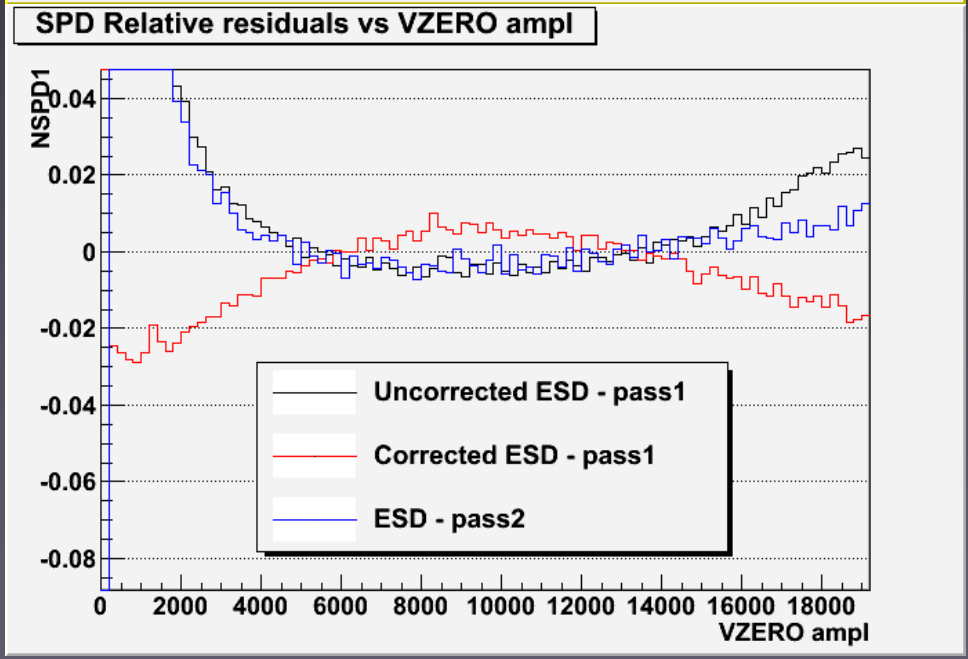
Saturation (3)

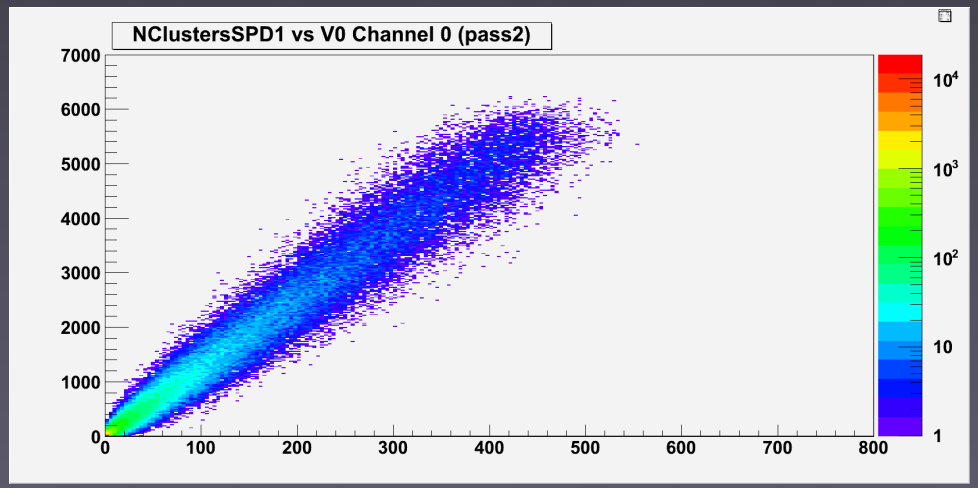
- Correction applied on total collected charge (including clock 10)
  - Assuming that the reason is signal clipping
  - More robust against clock phase drift
  - No need to calibrate the charge distribution among samples (run-by-run)
- Correction:
  - $A \rightarrow A + \alpha (A - \beta)$, if $A > \beta$

Saturation: Results







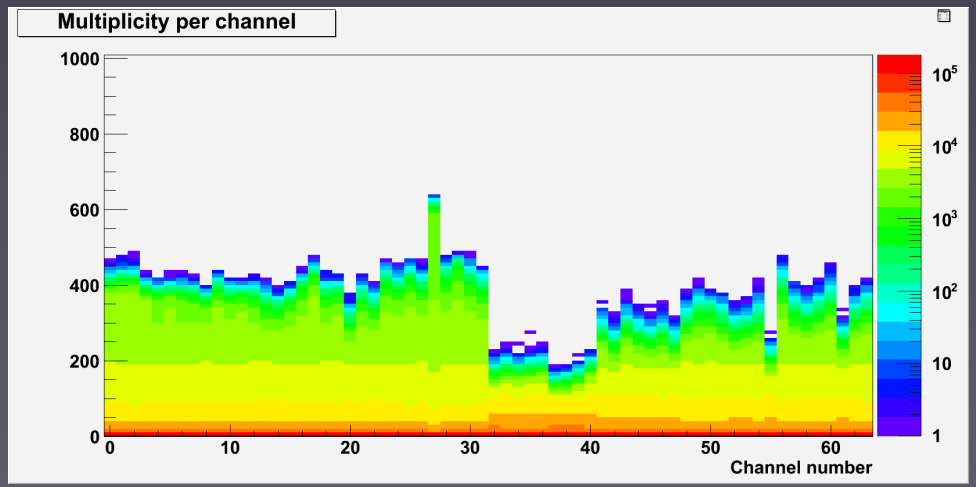


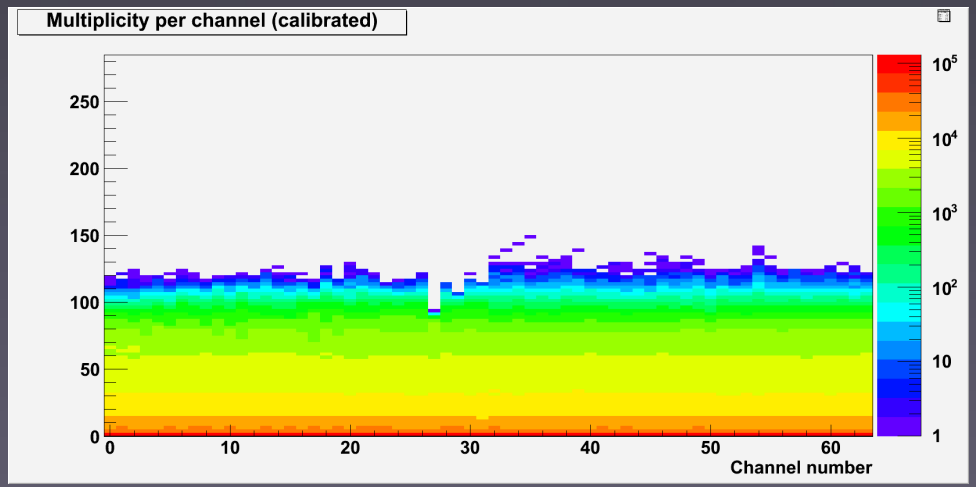
Light coll. eff & PM gains

- VZERO signal =
  (# of prim + # of sec + geom effects)x
  light yield x light collection eff x
  PM gain x FEE reponse
- Therefore collection eff and PM gains are couple and can't be disentangled using the data
  - MIP signal shape (RMS) is rather broad due to sec + geom effects + low light levels
- So far we use:
  - PM gains from the lab (no field)
  - Fit MIP peak in the data & MC
  - Extract collection eff
- Even if the method works to first order it has caveats especially in channels which behave quite differently from the lab and in channels coupled to two scintillator units

Event-plane measurement

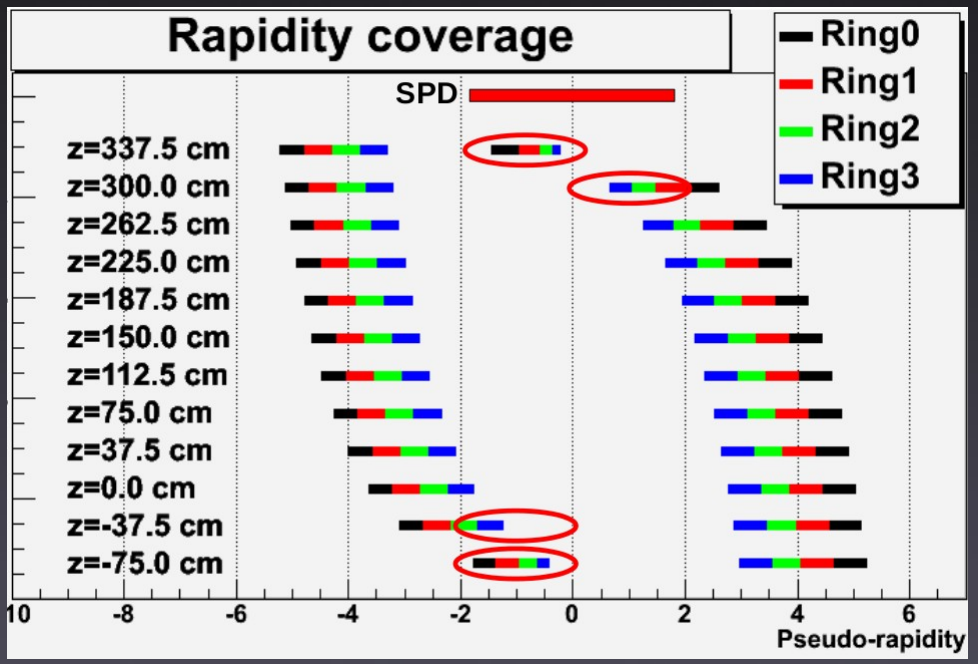
- Needs 'calibrated'/equalized response among VZERO sectors
  - Equalization could be done with very simple 'analysis', no need to calibrate coll.eff/PM gains
  - Presently applied on ESD (should go to OADB)
  - In principle a simple DA would do the job – could be developed for this year PbPb run





Multiplicity measurement in PbPb

- Besides its physics value can provide also 'calibration' of the detector response – signal(# of prim)
- Idea is to use satellite collisions (z @-37.5,-75,..) and results from SPD in the central region
  - Selection of satellite events using ZDC timing cut a la phys sel
  - Secondaries + geom effects corrected using MC
  - ZDC stand-alone centrality selection
- dNdeta = A(z~0) * dNdeta(SPD, z~0) / A(z~-75) * A/dN(z~-75) / A/dN(z~0)



The analysis is underway, more news next week on PWG2 meeting

Summary

- All is good with VZERO ;-)
- The problem with light coll.eff and PM gains
  - Is not a question of calibration framework, as the calibration needs to be done only once per year (assuming const HVs)
  - Is not a question of stat, in principle ~100k events would be enough for the purpose
  - Is not a question of which data to use, we need only ESDs + small fraction of friends for pulse shape studies
  - Is a question of (new) ideas how to measure them