STAR calibration review

Outlook

ALICE calibration and QA done in multidimensional parametric space

- I am biased. In my comment I will assume ND approach
- it is simpler to argue in ND space than interpret convoluted results (also for non experts)
    - rely more on automatic procedures - students only report results

Calibration:

- Calibration factorization can be assumed only in some cases
- ND correction or set of primitive correction

Calibration QA - what is good enough?

- Basic principle - calibrate down to intrinsic resolution
- Intrinsic resolution is not number, it is multidimensional function

Performance QA:

- Basic dimension:
    - Q/Pt, θ, φ
    - multiplicity, pileup multiplicity, mean charge, z vertex ...
    - TPC side ..
- Dashboards for major problems

Next slides - refernce presentation and dashboards

Reference material - distortion calibration

Run1 (2009-2012) distortion calibration and tracking

- https://indico.gsi.de/event/1469/contributions/4047/attachments/3283/4132/AliceTracking.pdf
- focus on the distortion calibration and splitting between T0 alignment, vdrift
    - B0, B+ and B- to disentangle between them
- pages 6, 12-17,

2009-2021 - distortion calibration - focus on new data taking

- https://indico.bnl.gov/event/10740/contributions/45982/attachments/32815/52449/ATO-490-DataDrivenSCDistrotionCorrection_2810.pdf
- Z alignment, T0 calibration and E field distortion
- Charging up - changing in time not ~ rate
- Distortion decomposition:
    - “static”
    - semistatic - O(min)
    - flux dependent

Reference material

NDimensional pipeline & RootInteractive for the QA/performance and calibration monitoring

- https://indico.bnl.gov/event/10740/contributions/45982/attachments/32815/52454/NDimensionalPipeline_QAtools08052019.pdf
  - Why ND slides 2-6
  - ALICE example analysis 7-9 (distortion location, dEdx pile up correction)
  - NDPipeline functional composition - 10-14
  - Time series - Distortion fluctuation QA slides ~~27~~ 29
  - TPC automatic QA and alarm decomposition - slides 30-31

TPC QA web-pages (automatic QA ~since 2011)

- https://aliqatpceos.web.cern.ch/aliqatpceos/data/2018/LHC18q/pass2/
- Automatic outlier detection (since 2015)
  - all potential problem to be catched
  - QA reports (by service task students) based on decision of Automatic QA (experts)
  - Combined alarms

Calibration and QA time series

- in case of problems custom expert queries to the calibration +QA DB
  - table (trees) with run/time as a key

Skimmed data and ND perfromance comparison

Detailed N dimensional reports generated using skimmed ESD data:

- event information
- skimmed, down-sampled information for the calibration, performance comparison (and planned for physics studies)
  - example trigger - nuclei track
  - downsampled topologies (tracks, V0s) - flat pt, flat qpt, MB
- O(20 minutes- hour) to generate performance report on the server) or to redo dEdx calibration
- Performance maps per reco/MC production

Performance reports:

- Data -reference data comparison in ND. See e.g:
- http://test-aliperf0.web.cern.ch/test-aliPerf0/alice/data/2018/2018c/pass2_CENT_syst_err/dashboard/kink_5sigma_CENT_pass2/fig0/compDefaultV0pass2_CENT_syst_errkink_5sigma_CENT_pass2HistComp.html

- different dashboards focus on different problatic aspects:
  - V0 - basic properties (qpt,tgl, 1/dEdx, mult)
  - V1 - properties close to the Central electrode of the TPC
  - V2 - properties in respect to sector boundaries
  - V3 - properties in respect to sector (phi at middle of IROC)
  - V4 - properties at vertex