Calibration/Distortions Planning

SPHENIX

- Priorities for the next few months
  - Provide calibrations/distortion corrections for pp data processing for QM
    - Limited scope distortions to O(1mm) level
    - Timescale end of 2024 to leave time for QM analysis
  - Prepare for AuAu data taking
    - Need to be ready for start of beam operations
      - At least have all hardware, firmware and data flow items set up
      - Working and tested analysis framework

- Establish status quo
- Need to plan workforce assignment and priorities
  - Define milestones
  - Resource loaded schedule
- Define forum for efficient communication and monitoring progress

Task List

- Low level hardware calibrations (Detector groups)
  - Hot, Dead channel maps for all detectors, gain studies
  - FEE alive status, data dropping
- Calibrations / Distortions work for QM Production (time scale 6-8 weeks)
  - Finalize Padplane Geometry / Channel mapping
  - Sector Edge corrections
  - 0th order alignment (barrel z placement, TPC module wise phi offsets)
  - Automated drift velocity calibration for the whole pp run
  - Static distortion correction validation
  - 0th order luminosity dependent distortions – 2D (Flash laser + central membrane seams)
- Preparations for AuAu (by April)
  - Digital Current
    - Firmware implementation
    - Processing and data flow
    - Offline DC derivation from full streaming pp data
    - Electronics noise rejection
    - Model building from charge profile to distortions
    - Beam background impact on distortions
    - Impact of gain offsets between sectors
- Ongoing Development (joint effort with the tracking team)
  - Full alignment including TPC / TPOT
  - 3D Distortions using track residuals (Hugos mechanism) and flash laser
  - TPC Cluster placement, z-residuals vs ADC and shape
- Geant tuning (All)