PWG-DQ – Muon

Simulations

Runs 1 & 2 – pp & p–Pb

- Detector occupancy is not an issue
- Pure signal simulations
  - Independent simulation for each signal
    - J/psi, Upsilon, …
  - Parametrised shapes (AliGenMuonLib)
  - Several simulations run for systematics
    - GEANT3 vs GEANT4 (resonance shape)
    - Variation of Input shapes
  - Only MCH and MID response
  - Need also ITS, FMD, V0, T0, Absorbers, Magnets geometry

- For multiplicity dependent analysis
  - Use simulations for Tracklet to Nch correspondence

- For detector performance studies
  - Parametrised muon cocktail simulations

Runs 1 & 2 – Pb–Pb

- Detector occupancy is an issue
  - Occupancy in detector is driven by secondaries escaping the absorber
    - Hard to simulate
- MC-into-Raw embedding
  - Embed at the level of SDigits, the MC signal in a real data event and reconstruct the merged SDigits
  - work with a larger sample of signal in MC than in data spread through the full list of runs
    - E.g. in 2018, 4 times more reconstructed J/psi in MC than data (although centrality distribution is not the same …)
  - Embed 1 MC in each CINT7-B-NOPF-MUFAST event
    - 40% of the chunks of each selected run
      - Note that CINT7-B-NOPF-MUFAST is downscaled
    - Re-use the event n-times to reach the desired stat of each MC signal
      - J/psi, HFM, LMR: 5; Upsilon(1S), W: 1.25; psi(2S), Upsilon(2S): 0.75, Upsilon(3S), Z0: 0.5
  - Only MCH and MID response
  - Need also ITS, FMD, V0, T0, Absorbers, Magnets geometry
  - Other useful information copied from the original event (in ESD)
- Pure signal simulations as for pp and p–Pb also used for systematics

Runs 3 & 4

- MC-into-Raw embedding will remain a must in Pb–Pb for MCH and MID
- For analysis using MFT + MCH + MID the simulation strategy may have to be revisited
  - Can we rely on pure MC-signal simulations for the MFT (pp and p–Pb)
  - Is MC-into-Raw embedding needed and viable for MFT?
    - QED background for instance may be a serious issue

- Explore as much as possible data-driven methods