Analysis discussion

April 14th, 2022

Proposed sensor iteration workflow

1. Define X/Y ranges, sensor edges, and thresholds in Geometry2022
2. Run InitialAnalyzer
   - Get strip centers → copy to Geometry2022
   - Get delay map → keep in output directory
3. Run Analyze
   - Run DoPositionRecoFit.py → copy parameters to Geometry2022
   - If RecoFit parameters are changed -> must re-run Analyze to see the impact.
4. Run Align (1-2 iterations, not too many)
   - Get Z, alpha, beta, gamma → copy to Geometry 2022
5. Repeat steps 2 → 3 → 4 until Align output is stable
   - #2 & #3 should change after running #4, but probably #4 output won't change again.

Goal plots for sensor performance

- Spatial resolution
  - sigma(deltaX) for all events (“global”)
  - sigma(deltaX) vs XY (“local”)
  - sigma(deltaX) vs X
  - mean(deltaX) vs X and vs Y—flatness would confirm good angular alignment

- Time resolution (multi-channel and single-channel)
  - sigma(deltaT) for all events (“global”)
  - sigma(deltaT) vs XY (“local”)
  - sigma(deltaT) vs X
  - sigma(deltaT) with XY taken from LGAD reco.
  - mu(deltaX) vs X, Y, XY → should confirm delay corrections

Other important plots

- Averaged & normalized pulse shape comparisons
  - tiny vs 5mm vs 1cm vs 2.5cm
  - variety of widths
  - Small and large signals from same sensor

- Overlay of amplitude fraction vs X (output of PositionRecoFit) for various sensors
  - Impact of metal size.

Assignments

- Claudio
  - Align procedure
- Rene
  - Pulse shape comparisons
- Ryan
  - InitialAnalyzer → time delays
  - Use leptonSF helper
- Shirsendu
  - Run timing analysis and organize results
- Chris
  - Update code to run on more sensors