

The FTOF reconstruction: a (very) short update

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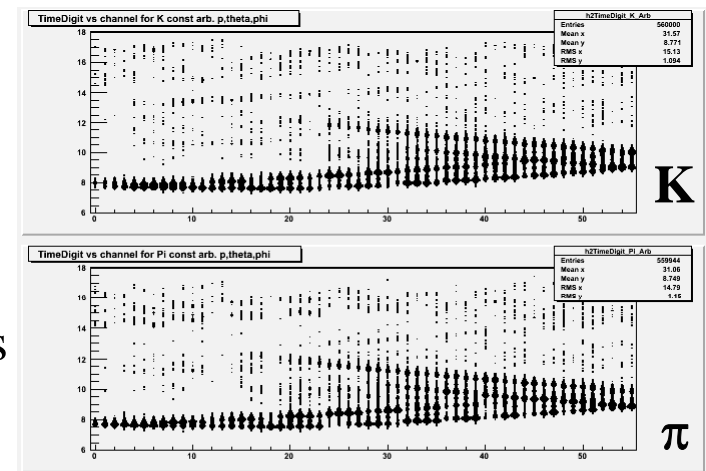
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- Brief summary of the simulation method
- Bug fix
- Next steps

Simulation method

- Use ph.e. time vs. PMT channel 2D-maps computed using a high statistics sample of particles simulated through the FTOF using Leonid's G4-based standalone code
- Maps used as PDFs by the reco algorithm
- The interaction of a particle with the FTOF produces a set of points in the 2D plane
- Test their compatibility with the K and π hypothesis by computing the likelihoods L_K and L_π .
- Cut on the ratio $L_K / (L_K + L_\pi)$
→ get efficiency and misID probabilities for various thresholds between 0 and 1
- For now assume perfect knowledge of the particle trajectory
→ mass is the only unknown
- See <http://agenda.infn.it/getFile.py/access?contribId=36&sessionId=4&resId=0&materialId=slides&confId=2262>
for more details



The Bug and the fix

- $K - \pi$ separation too good
 - Problem first pointed out by S. Kononov
 - One cannot draw randomly point from the 2D maps to simulate the interaction of a particle with the FTOF and test the reco algorithm.
 - When one such event occurs, the distribution of points has a given structure in the 2D plane which is ignored when using the map, computed by ‘averaging’ many sets of points.
 - Fix: split the track sample generated by Leonid in two subsets
 - Use the first one to produce the map
 - Use the second one to simulate the reconstruction
- ⇒ As expected by Sergey, the separation goes down significantly and becomes more ‘reasonable’: good at low momentum, between 2.5 and 3 σ @ 3 GeV/c

Next steps

- Improve the simulation:
 - Standalone (no inner detector, just B-field; all effects added by hand) → Bruno!?
 - Deal properly with 2+ hits in the same electronics channel
- Agree on how to simulate background hits
 - Simulation their proper number is important
 - Getting their 2D-distribution right is crucial
- Maps depend on mass, momentum and track angles/positions
⇒ huge parameter space!
 - Need to find out how to sample it with a ‘limited’ number of maps without loosing too much efficiency
- Work will go on if the experiment does...

