Status of PiD Paper

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Paper target

- Estimate the pion contamination in the MICE muon beam
- by using the TOF detectors to extract from pion runs pure samples of pions and muons
- and comparing KL response to the pion and muon samples (templates) to the KL distribution in MICE muon beam

Previous reports

CM34:
https://indico.cern.ch/event/208246/session/9/material/slides/0?contribId=50

CM35:
https://indico.cern.ch/event/222409/session/4/material/slides/0?contribId=12

CM37:
https://indico.cern.ch/event/275261/session/5/material/slides/0?contribId=40

CM38:
https://indico.cern.ch/event/290685/session/21/contribution/42/material/slides/0.pdf

Up to CM37 analysis based on reconstruction and truth level simulation not fully integrated in MAUS. No direct comparison possible between data and MC.

Since CM37 ongoing effort to:

- **Integrate G4Beamline with MAUS (John Nugent)**
- **Include KL digitisation in MAUS (Mariyan Bogomilov)**
- **Run full MAUS chain both for data and MC (John Nugent)**

Status

- **Reviewed in a dedicated phone call on May 21st,**

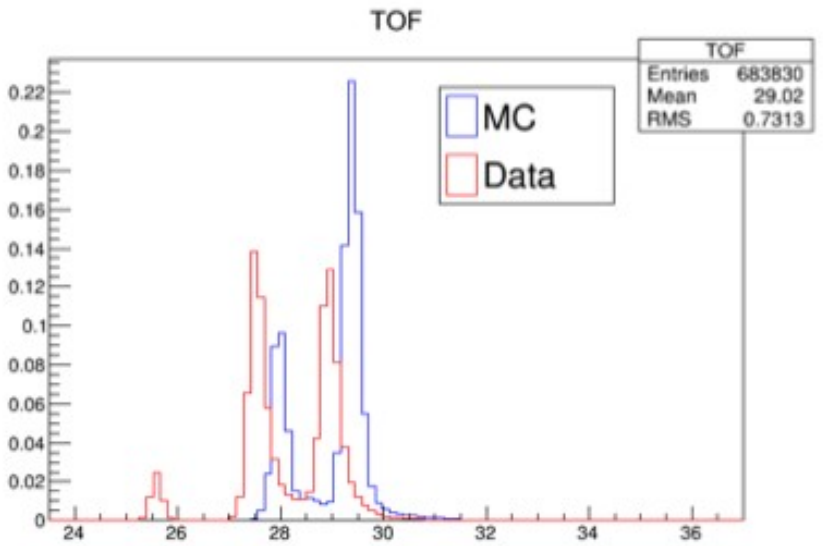
  present: M. Bogomilov, P. Soler, K. Long, J. Nugent, D. Orestano, V. Blackmore

  http://micewww.pp.rl.ac.uk/projects/analysis/wiki/PC_210514b

- **The full machinery is in place:**
  http://micewww.pp.rl.ac.uk/attachments/2183/PIDanalysis2105.pdf

- **However discrepancies are observed**

  - **both in TOF values (calibrations?) and in TOF shapes (different popoluation & momentum spectrum?)**
  - **In KL spectra, both at low energies (thresholds and smearing effects in digitisation) and in high energy tails (cutoffs in Geant 4?)**



rescale using positrons peak

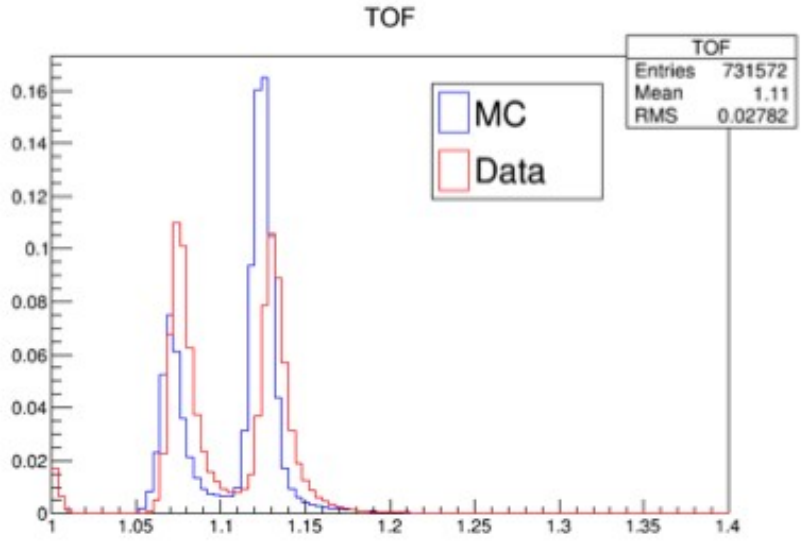
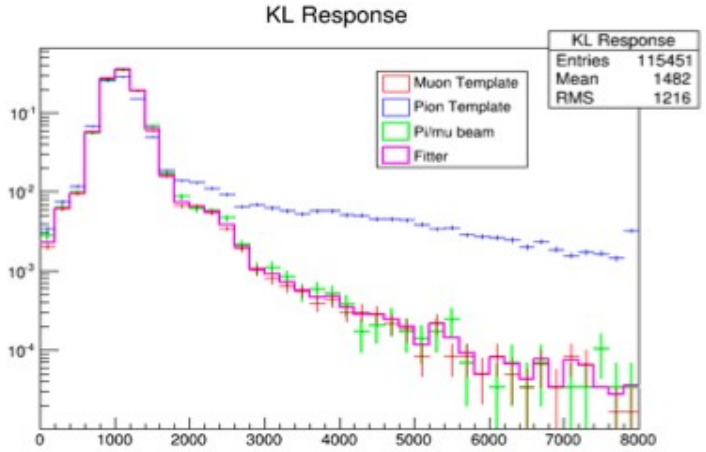


Figure: Pion beam 3253

Shown in last analysis meeting

Figure: Pion beam 3253



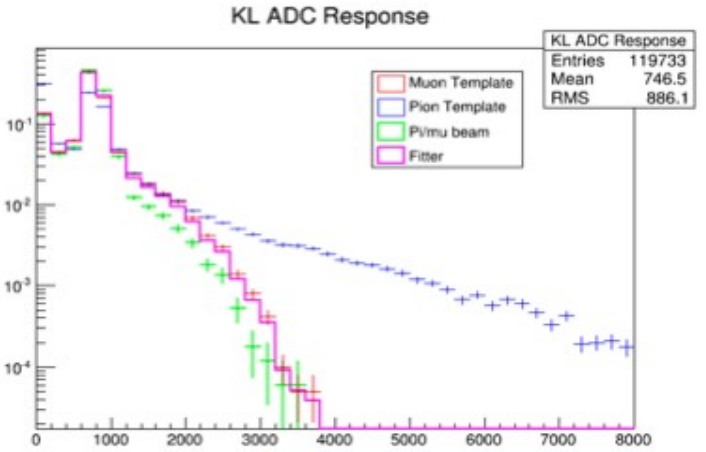


Figure: Data (6, 200) μ^+ beam

Figure: MC MAUS (6, 200) μ^+ beam

Plans

- Work at improving the KL MC agreement with data
  - Checking TOF calibrations and geometry
  - Tuning KL digitisation
  - Tuning Geant 4 settings
- Milestone 1: present at CM39 all the material which should be included in the paper
- Prepare a detailed Mice Note
- Milestone 2: Paper Draft by CM40