Outline HEP EPS talk

The talk is in the detector session:

The MICE instrumentation system for a precise emittance measurement (PID and tracker detectors)

It will be O(20')

Outline

1. Describe the concept of the emittance measurement with TOF+trackers
2. Show installed detector's performances for TOF (beamline PID), CHKOV(signal vs TOF), KL(mu,pi,e signals)
3. flash expected performances for EMR and tracker
4. The idea is to use mainly material/plots from the BL paper (for which deadline is 20/7 against a talk delivery of 22/7)

TOF performances in 2010 run

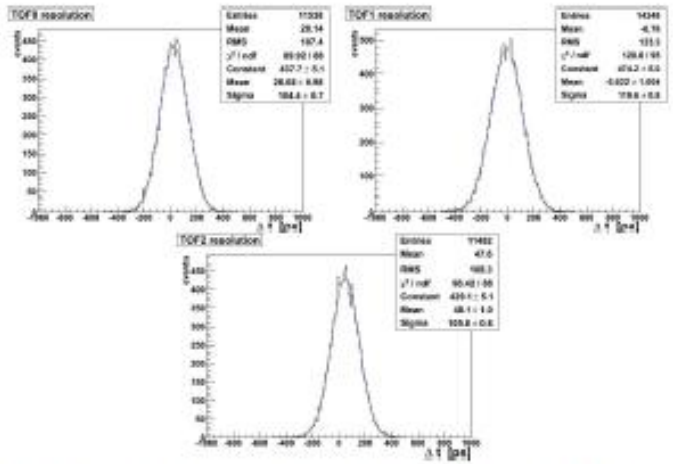


Fig. 9. Time difference Δt_{XY} between vertical and horizontal slabs in TOF0, TOF1 and TOF2. Trigger is on TOF1.

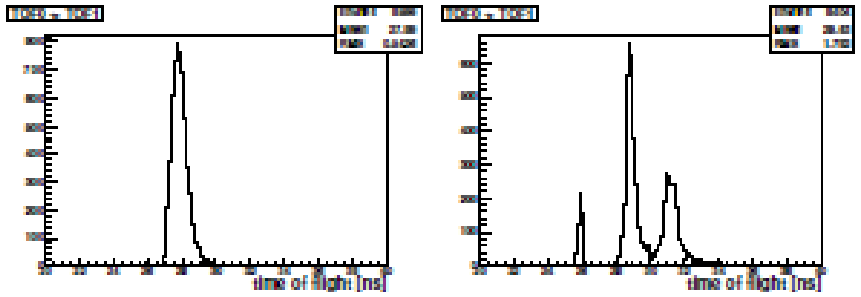


Fig. 10. Time of flight between TOF0 and TOF2 for muon (left) and electron (right) beam.

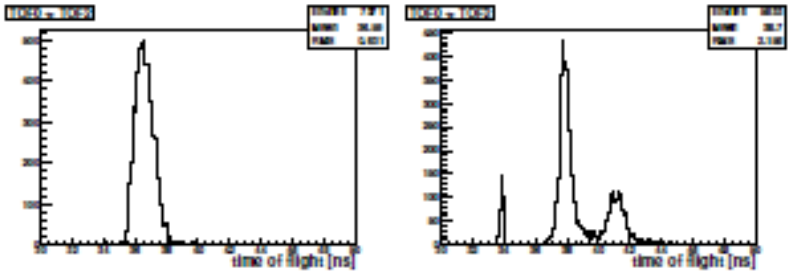


Fig. 11. Time of flight between TOF0 and TOF2 for muon (left) and electron (right) beam.

- Time resolution after calibration:
- TOF0 – 51ps;
- TOF1 – 58ps;
- TOF2 – 52ps.

TOF stability during 2010 run

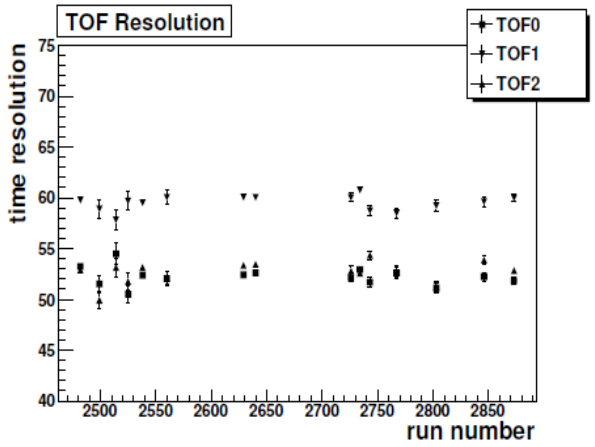


Fig. 12. Stability of the time resolution of the TOF stations versus running time. Non muon beam data with trigger from TOF1.

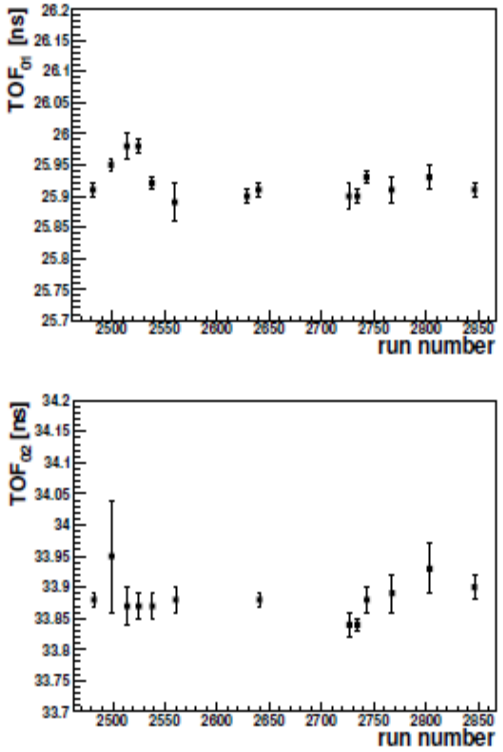
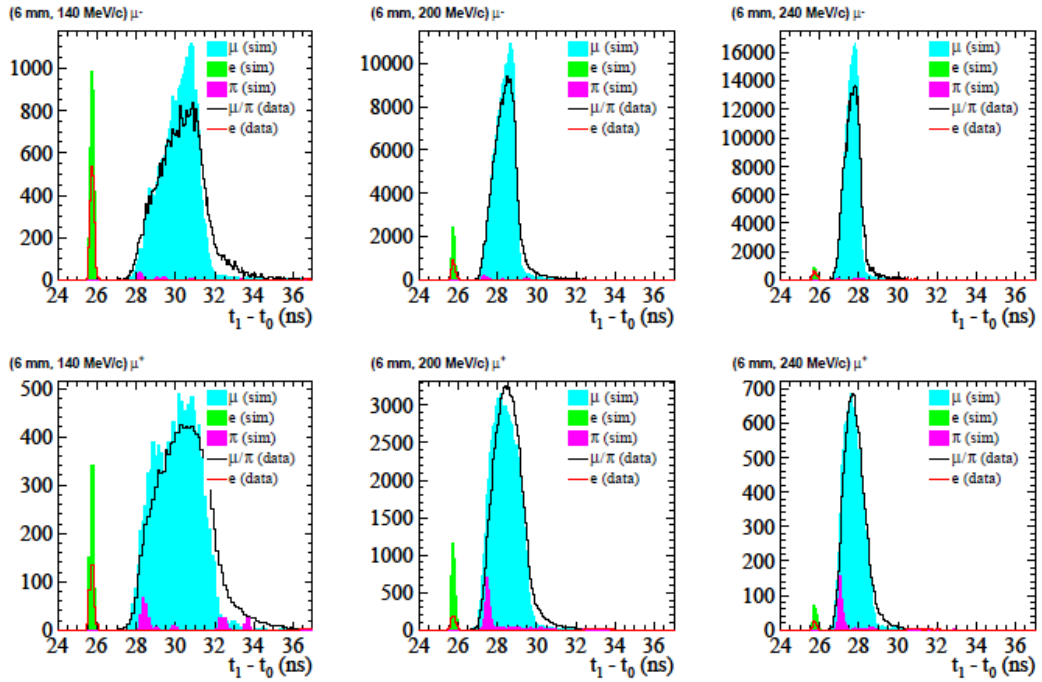


Fig. 13. Stability of the time-of-flight of electrons between TOF0 and TOF1 (top) and TOF0 and TOF2 (bottom) versus run number. Nominal muon beam data with trigger from TOF1.

DATA-MC comparison



CHKOV performances vs TOF

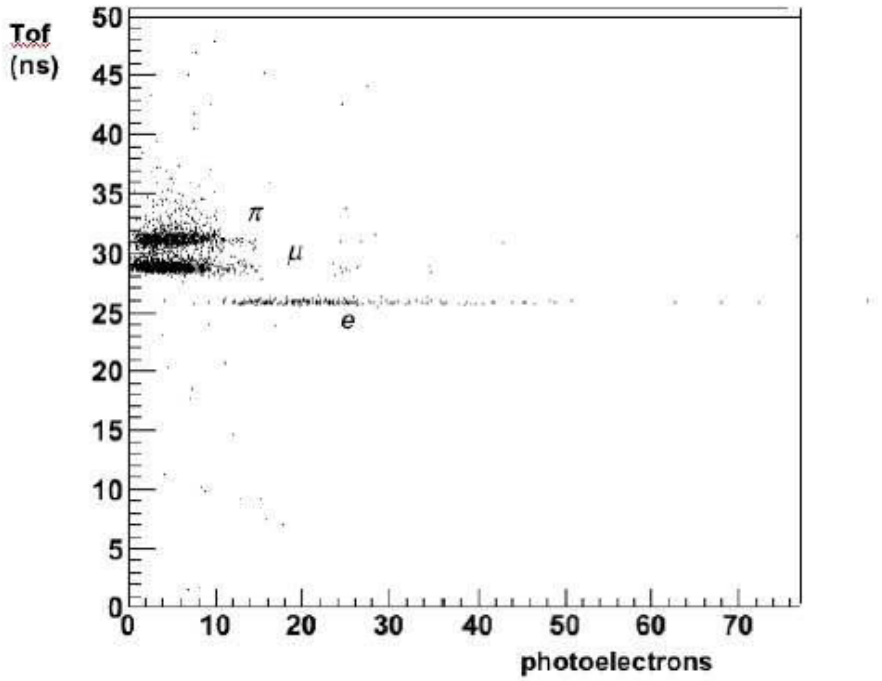


Figure 19. Aerogel Cherenkov counters light yield vs. time-of-flight.

KL performances

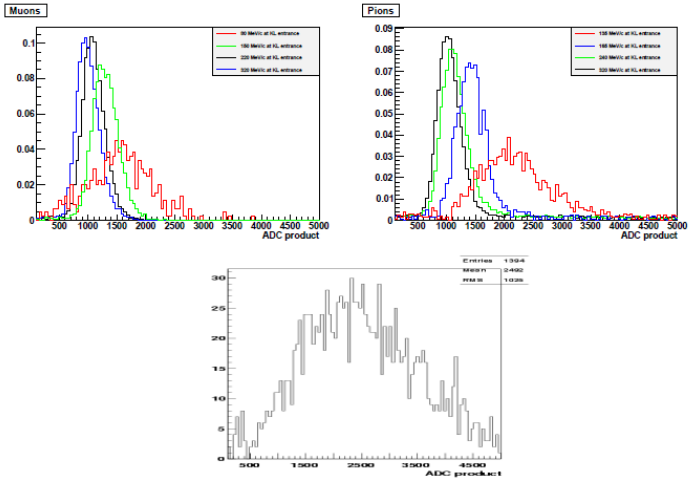


Figure 30. KL response (normalised) to muons for different incident momenta (top left panel), to pions (top right panel), with different momenta, and to 80 MeV/c electrons at KL entrance (bottom panel).

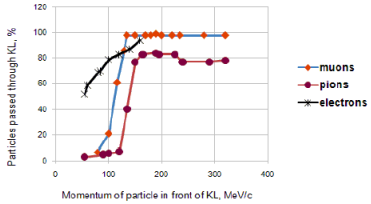


Figure 31. The fraction of electrons, muons and pions passing through KL and reaching the TAG counters.

Lumi monitor

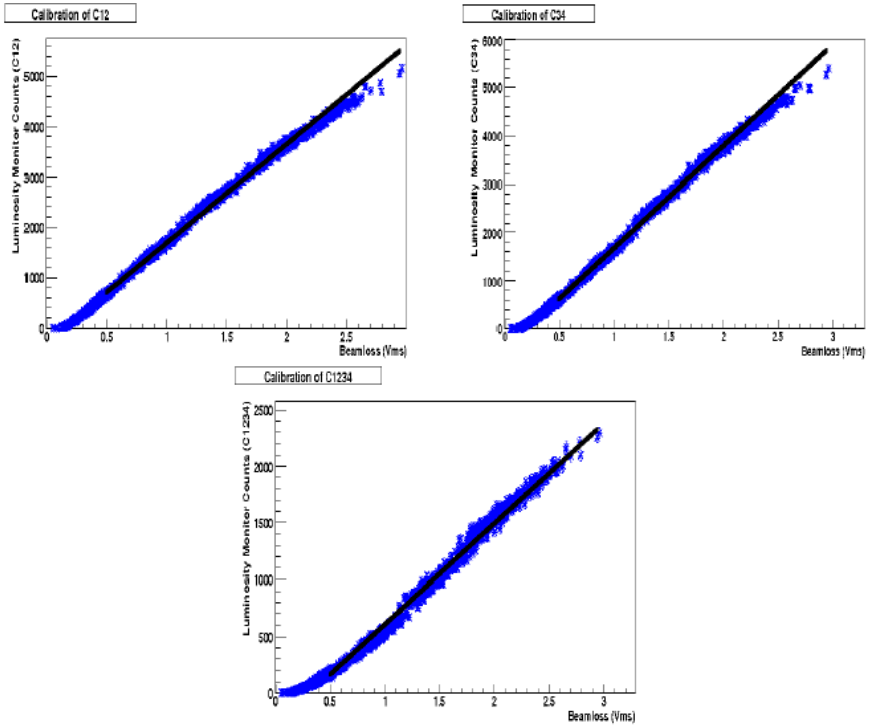


Figure 11. First data from the luminosity monitor showing a direct relationship between luminosity and beam loss on all three scaler output channels. Graphs show counts for coincidences of signals for PMTs (a) 1,2 (b) 3,4 and (c) 1,2,3 and 4. The straight lines indicate a linear fit to the data between 0.5 Vms and 3 Vms, since the method for calculating beam loss is unreliable below 0.5 Vms.

Results on muon rate

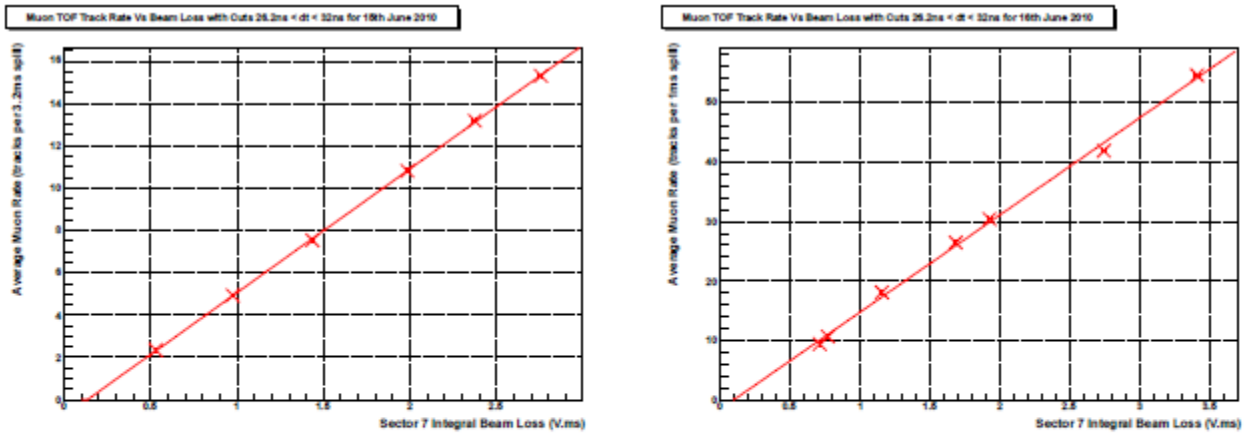


Figure 34. Average muon TOF track rate per spill as a function of induced ISIS beam loss for a negative $\pi \rightarrow \mu$ beam, with a 3.2 ms spill gate (left), and for a positive $\pi \rightarrow \mu$ beam, with a 1 ms spill gate (right). The tracks are reconstructed between the TOF0 and TOF1 detectors. The cuts applied to the TOF spectrum to isolate the muon tracks are 26.2 ns $< \Delta t <$ 32 ns. Linear fits are also shown giving good agreement with data.

Foreseen improvements: EMR

- put some new results from July data taking
- or refers to prototype results ??

Foreseen improvements: tracker

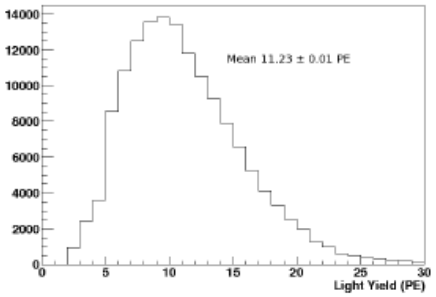


Figure 4: Light yield per doublet cluster from cosmic-rays, corrected for saturation effects in high-gain VLPCs.

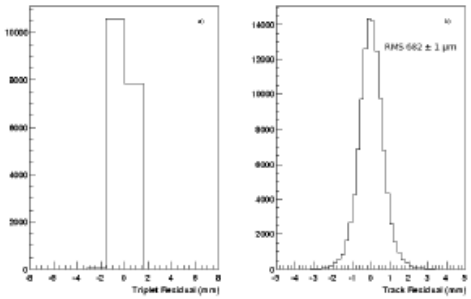


Figure 5: Performance of the MICE tracker evaluated using cosmic-rays. a) Triplet residual distribution, consisting of triplets made from single-channel clusters and used in full tracks. b) Track residual distribution. The RMS is noted on the figure.