

Transverse Profiles Analysis - Update -

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Overview

- 1 Track Software Issues
- 2 Track Coordinates Reweighting
- 3 Conclusions and Overview



Reminder

- Data sample: CERN 2007 pion runs
- Results with **18 GeV** π^- run presented in Addendum C of CAN-011
- Transverse profile: energy density in bins of radial coordinate R :

$$R = \sqrt{(x_{HCAL} - x_{track})^2 + (y_{HCAL} - y_{track})^2}$$

where:

- x_{HCAL} - x coordinate of the HCAL hit
- x_{track} - x coordinate of the track projected at the HCAL front face
- Track in data: found with (old) Michele's code
- Track in Monte Carlo: simple linear fit of (not digitised) drift chamber hits

Reminder: Analysis Cuts

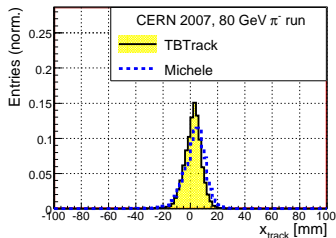
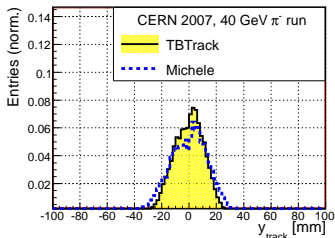
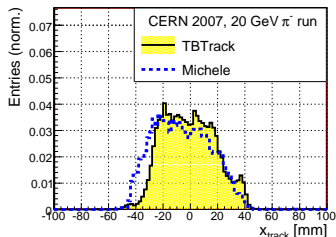
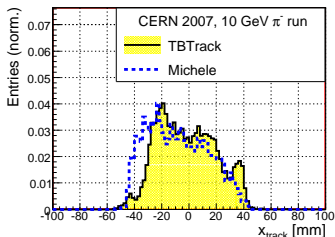
| Detector | Applied cut | Meaning |
|----------|------------------------------------|--------------------------------|
| ECAL | $N_{hits} < 50$ | No shower in ECAL |
| HCAL | $N_{hits} > 150$ $E > 0.5$ MIPs | Shower in HCAL Reject noise |
| TCMT | ... | No muon-like particles |

New

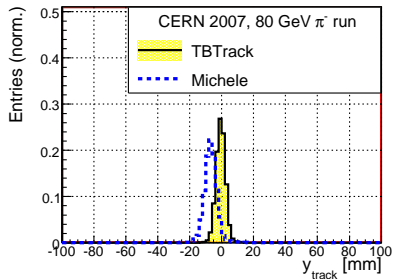
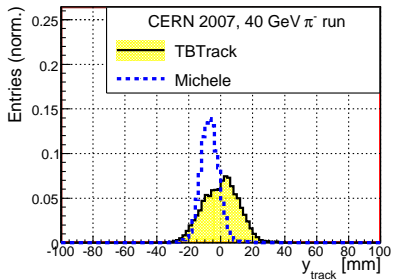
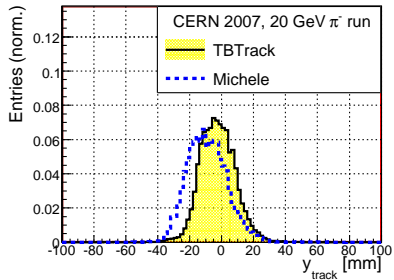
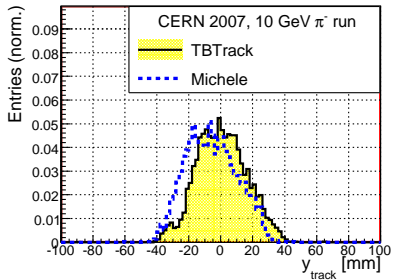
- Switch both in data and in Monte Carlo to tracks found by **TBTrack**
- New Monte Carlo files with different absorber thicknesses

Track Software Issues: X-coordinate

- TBTrack and Michele's code give different results: see distributions for experimental data
- Strange structures observed at small energies (broad beam)



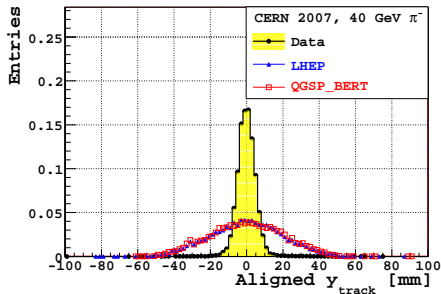
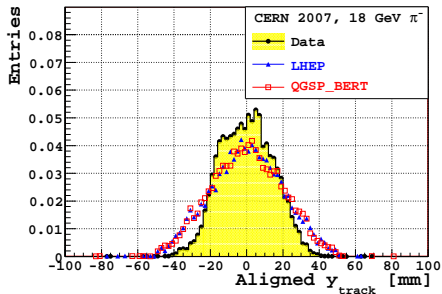
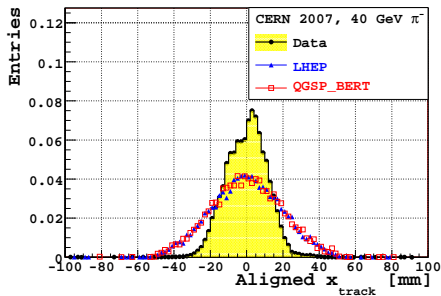
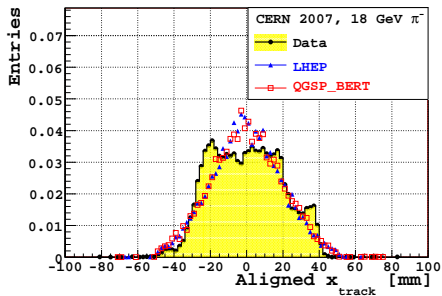
TBTrack: Y-coordinate



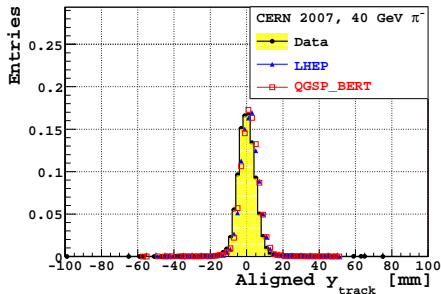
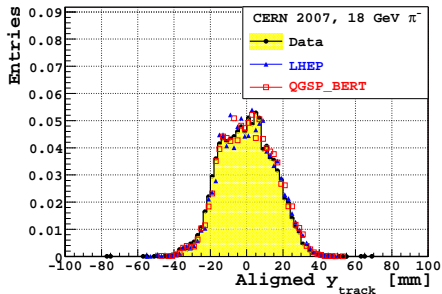
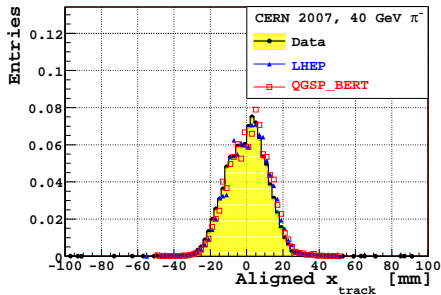
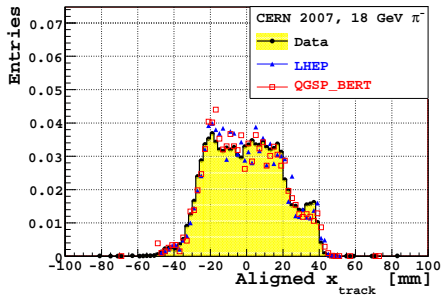
Transverse Profile Analysis

- Decision: stick to TBTrack
- Advantage: same code for data and Monte Carlo
- Following results shown for **18** and **40 GeV**

Track Coordinates

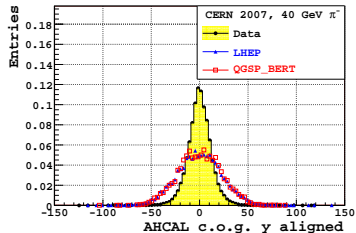
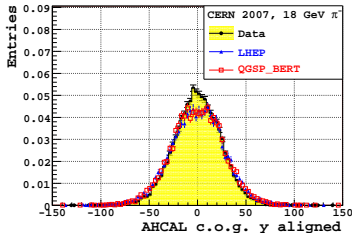
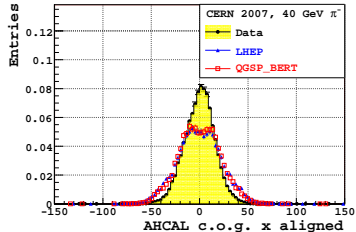
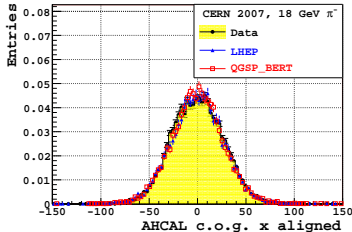


Track Coordinates - Reweighted

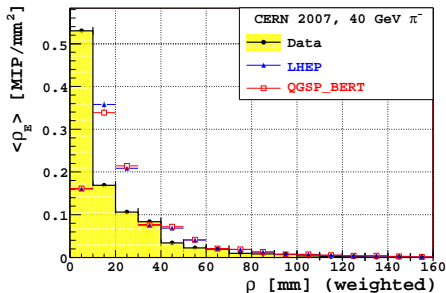
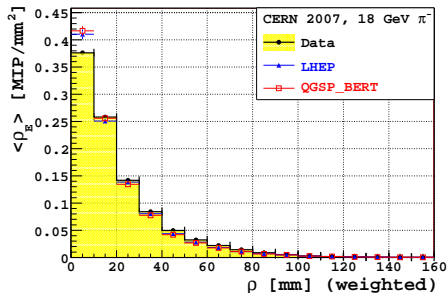
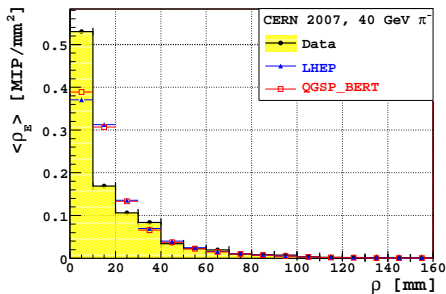
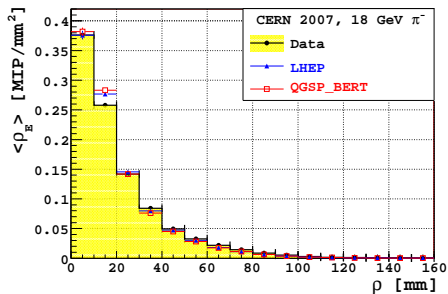


Transverse Profile Analysis

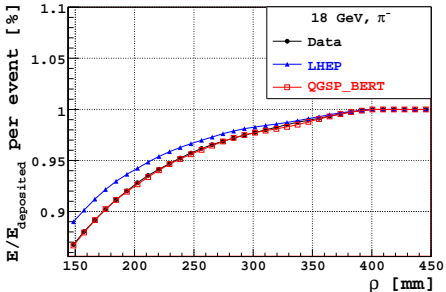
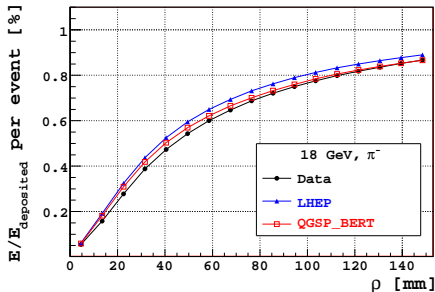
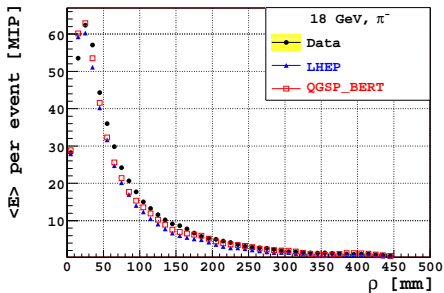
- Reweighting of Monte Carlo distributions to data for track coordinates works, but
- Beam profile in HCAL still not optimal (to be solved)



Transverse Profile Analysis



Lateral Containment - 18 GeV



Conclusions

- Use of same code (TBTrack) for data and MC
- New Monte Carlo samples (with different absorber thicknesses, and broad beam profile)
- Reweighting of the track coordinates

Overview

- Improve reweighting method
- Profiles from shower start
- Extraction of electromagnetic and hadronic component
- Energy dependence