iCSA08 Muon Alignment

7 May, 2008

Jim Pivarski

Alexei Safonov

Texas A&M University

PabloMartinez

FranciscoMatorras

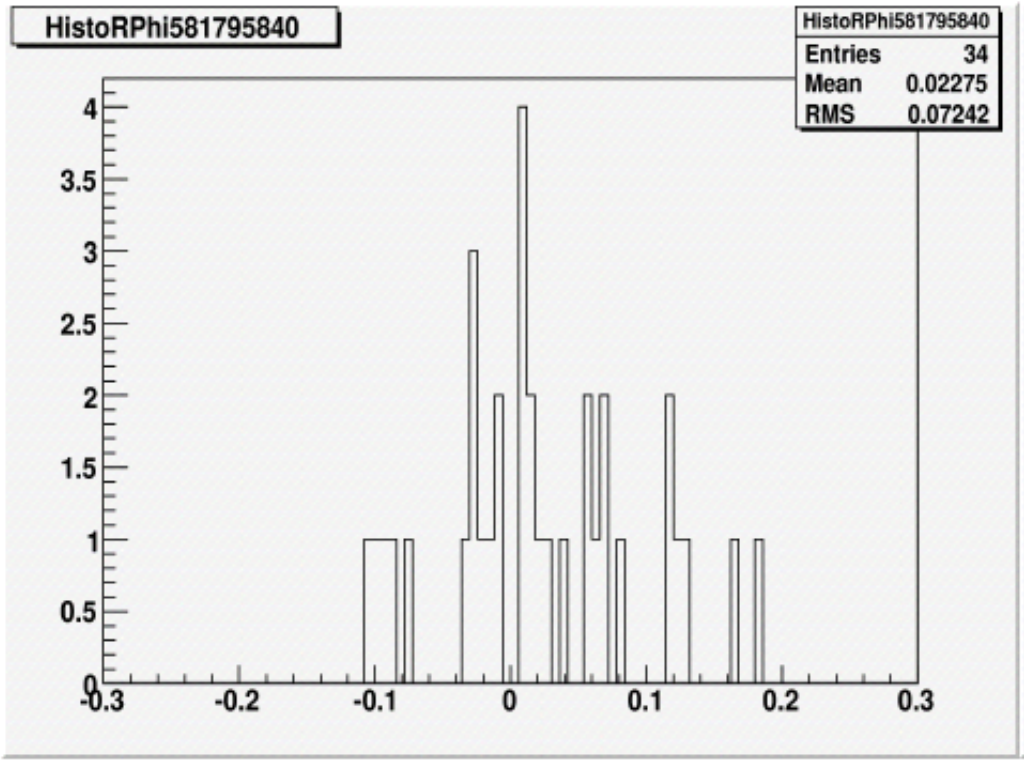
JavierFernández

RebecaGonzález

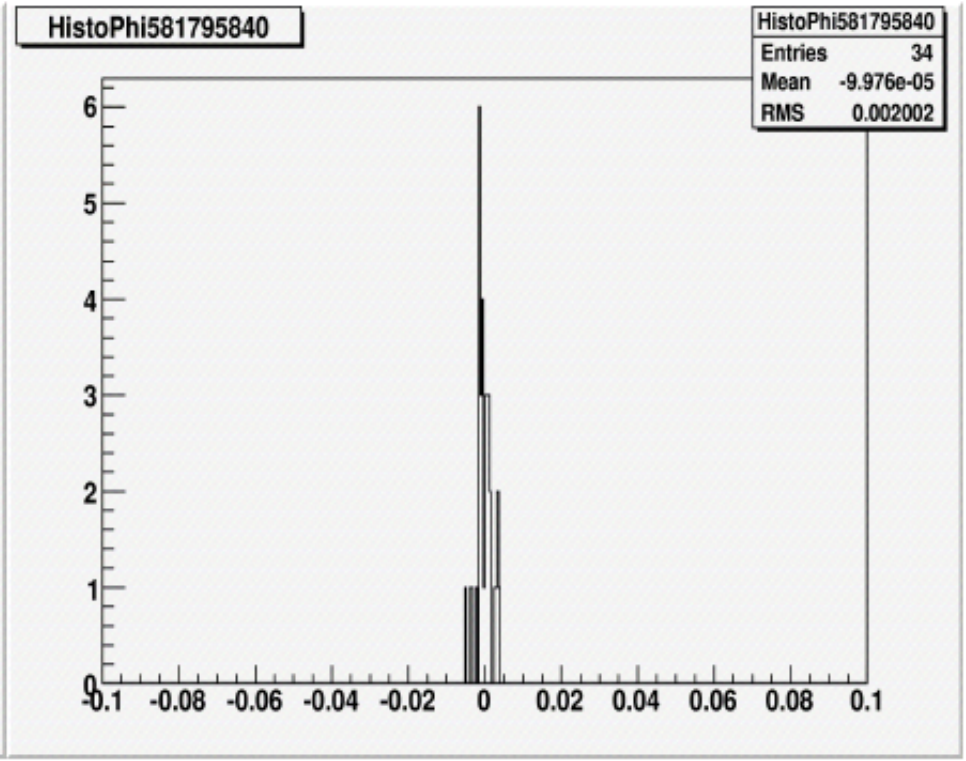
Instituto de Física de Cantabria

Check status

- The algorithm has been checked using FASTSIM AlCaReco samples for CMSSW184
  - Everything seems to work fine, nothing is missing inside AlCaReco
  - Low statistics to check if the algorithm is performing well

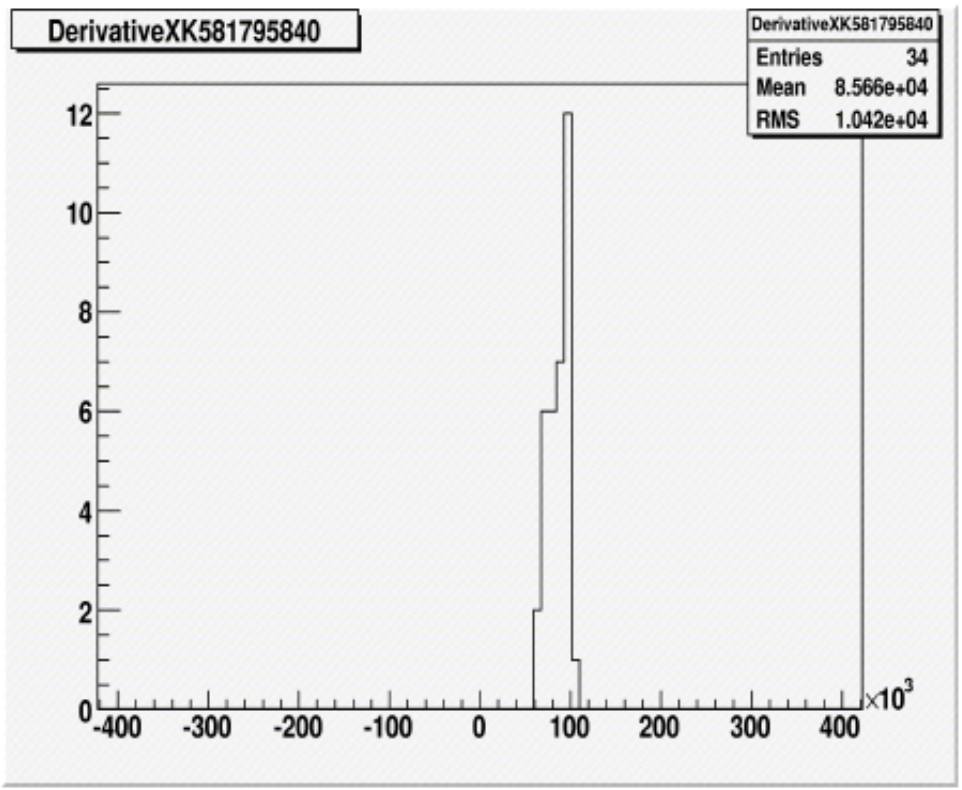


Rphi Residual

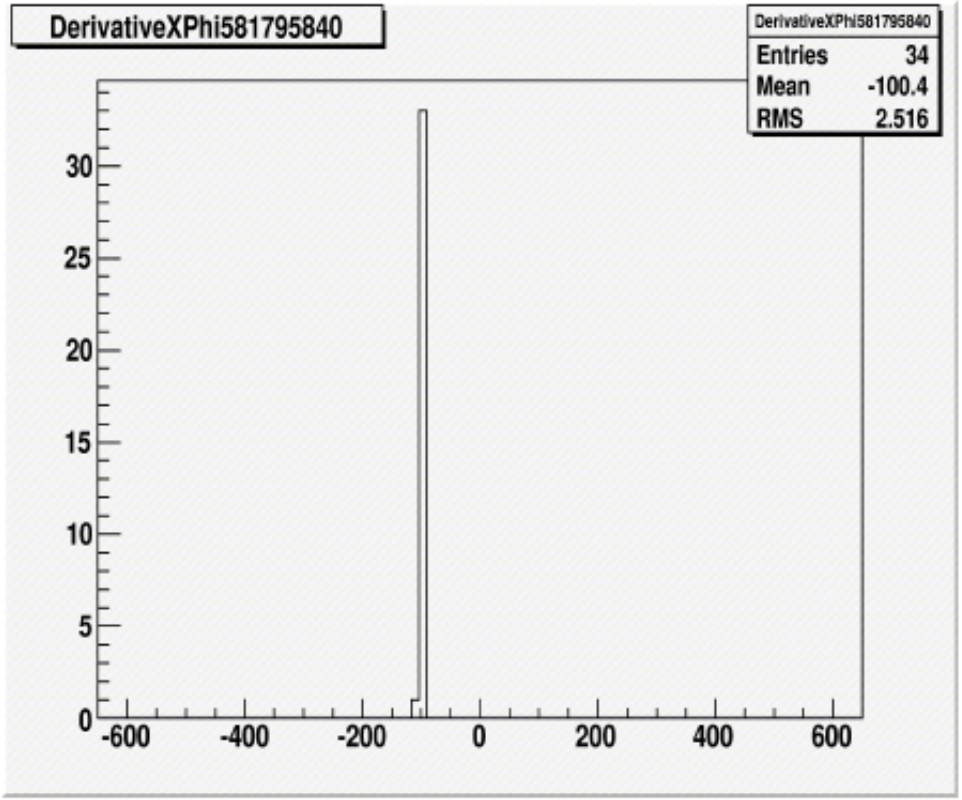


Phi Residual

Check status



Rphi Derivative w.r.t k

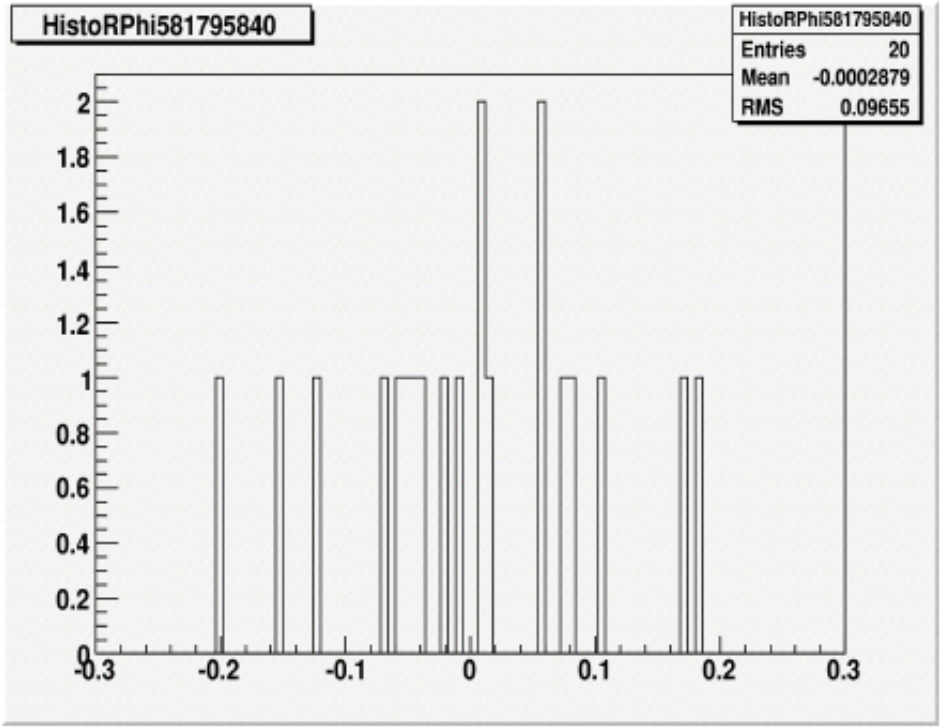


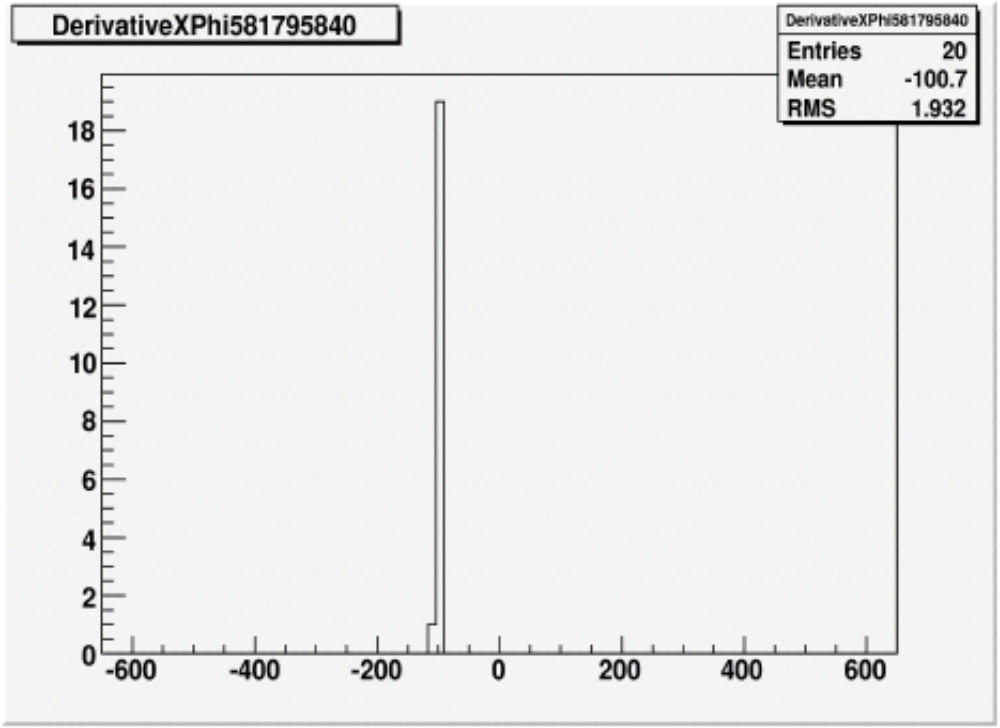
Rphi Derivative w.r.t. phi

- A directory hierarchy has to be defined in the AFS area for Muon Alignment
- Validate the procedure of uploading the constants to the DB

CSA08 samples

- The same has been done for the samples AlCaTestMuZMuMu and MinBiasMuAlZMuMu
- Again, everything seems to work fine but more statistics are needed (work ongoing...)





Updated metrics for the algorithm

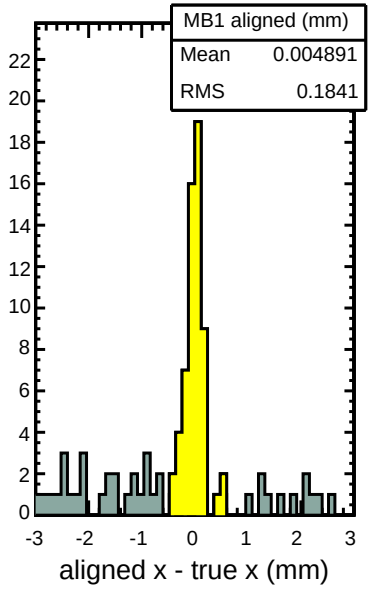
- The previous numbers obtained for the CSA07 and running on the IFCA Tier2 were very similar to the current ones for the CAF
  - 2000 events per minute
  - 0.5MB of output per 2000 events

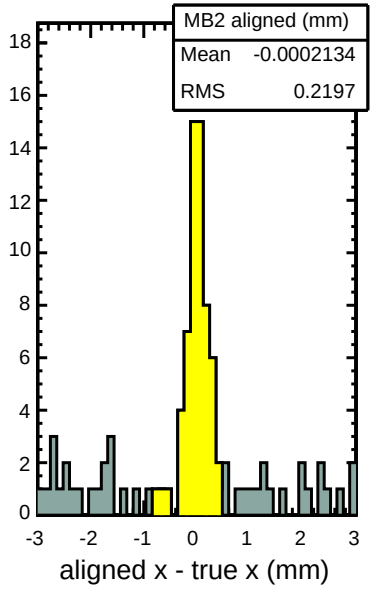
- TO DO: Test the uploading of constants (as soon as possible)

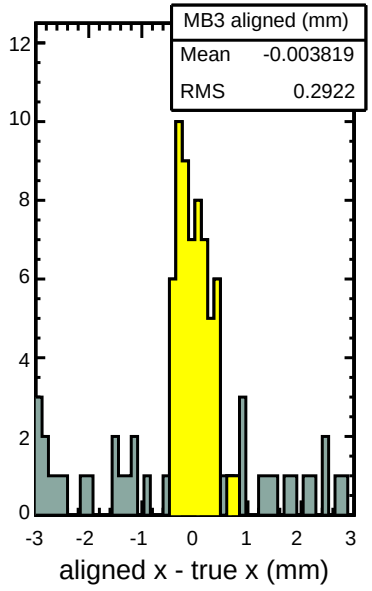
Baseline HIP Algorithm

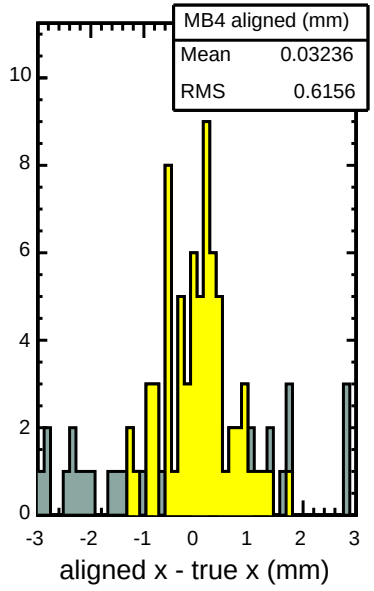
- Cleaned up scripts and installed in ALCA_MUONALIGN
- Tested alignment algorithm and validation plotting in 1_8_4
- Wmunu_10TeV (46,237 events ≈ 7 pb^{-1})
- Layers are perfectly aligned inside chambers

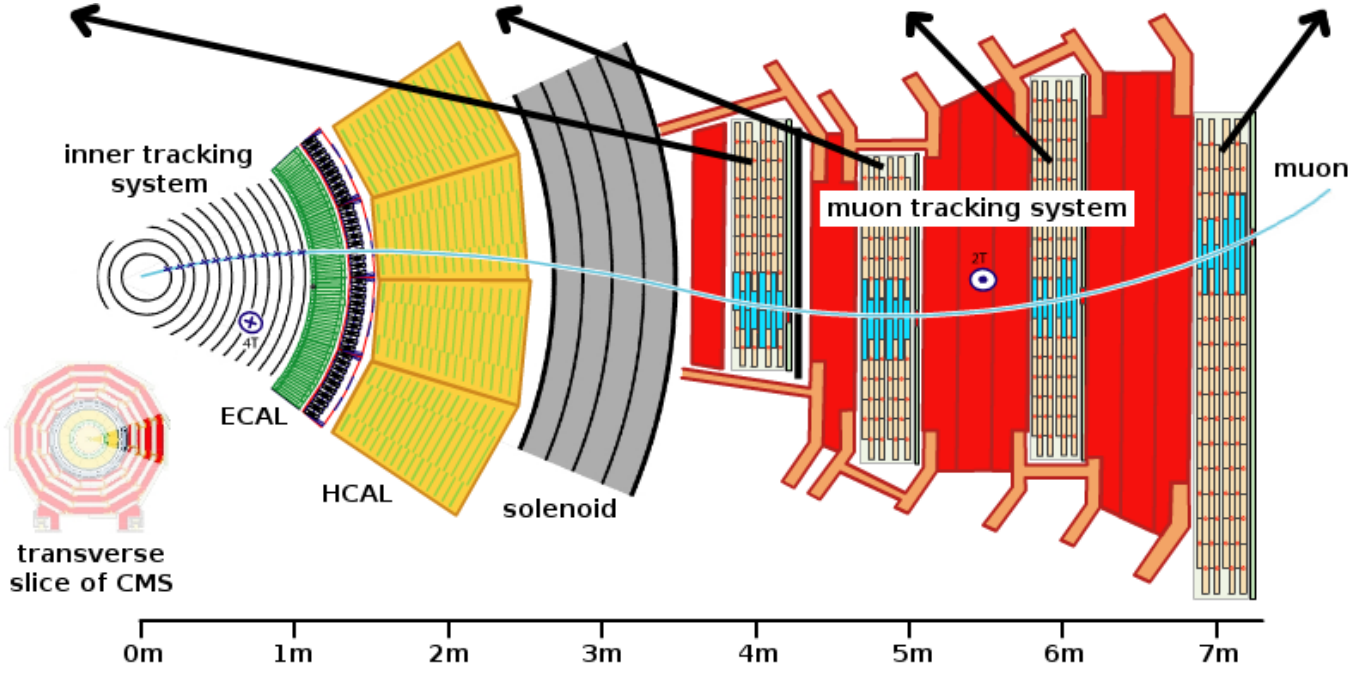
Barrel aligned positions



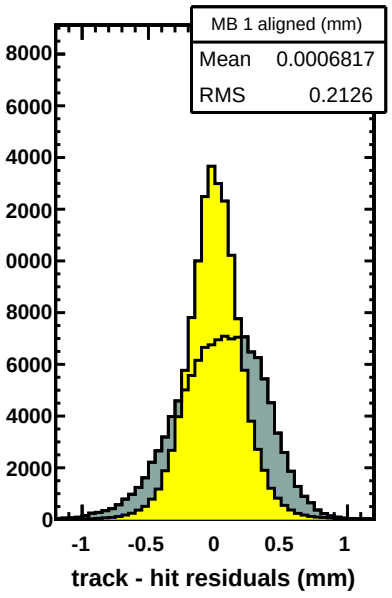


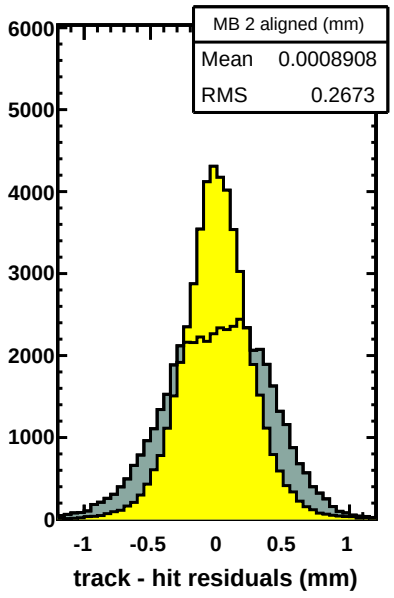


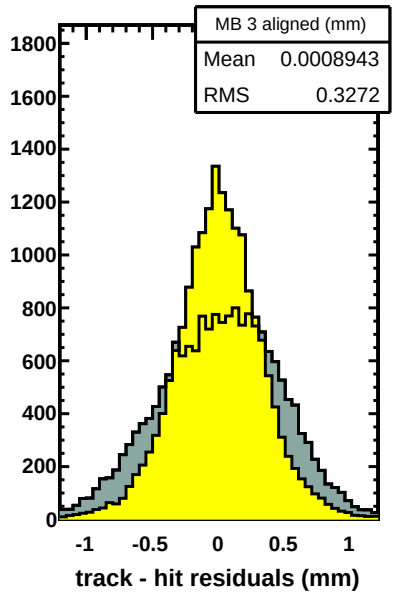


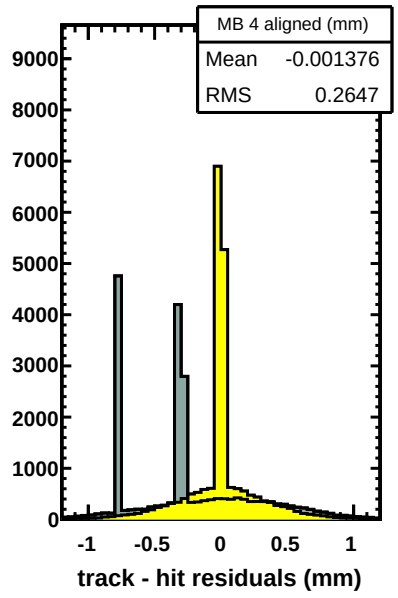


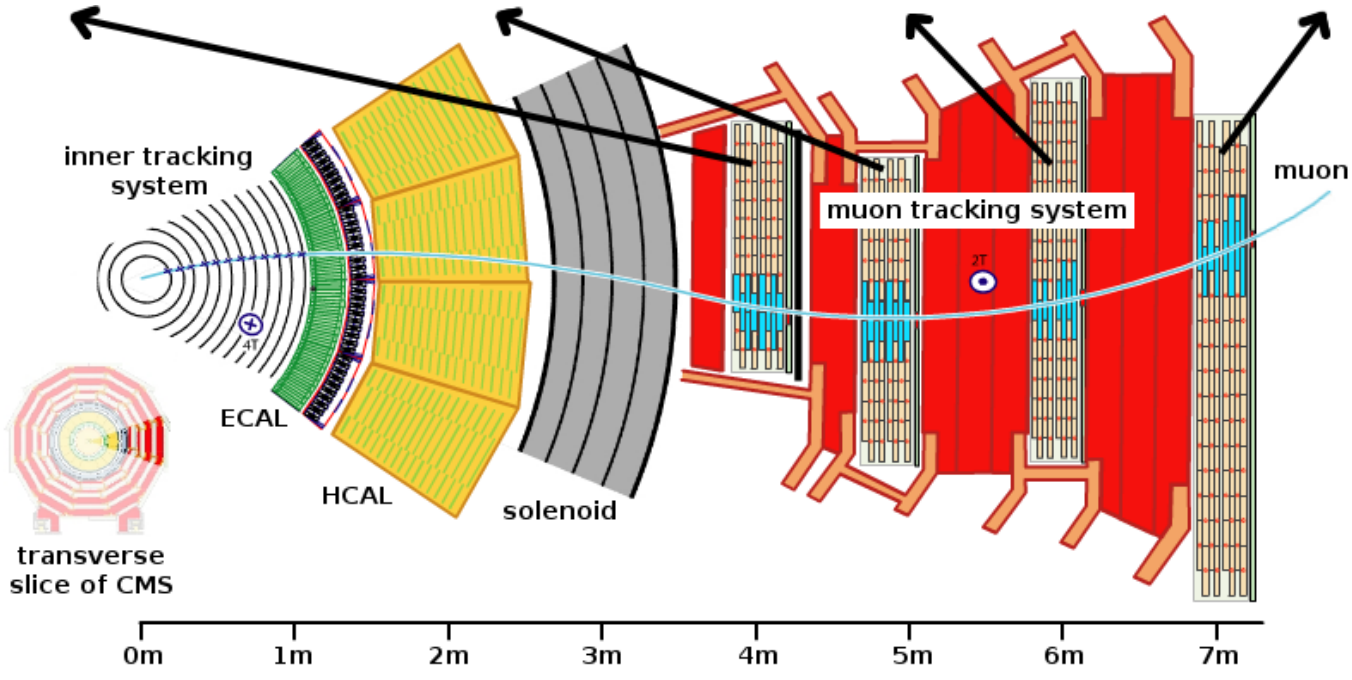
Barrel track residuals



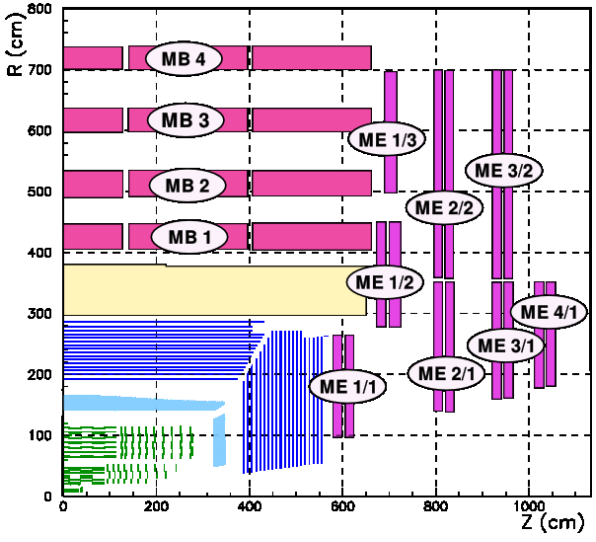


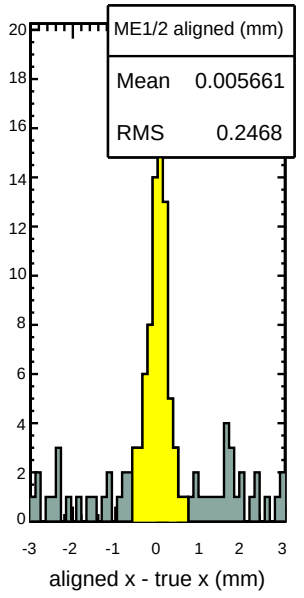


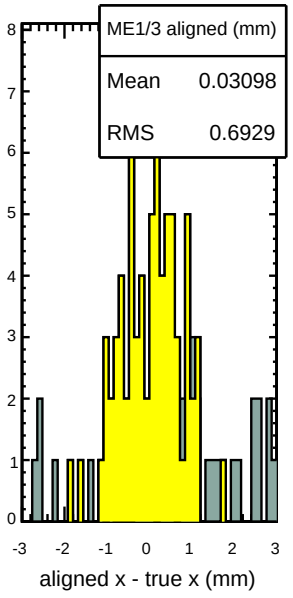


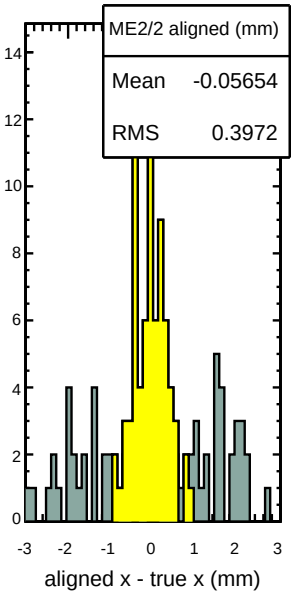


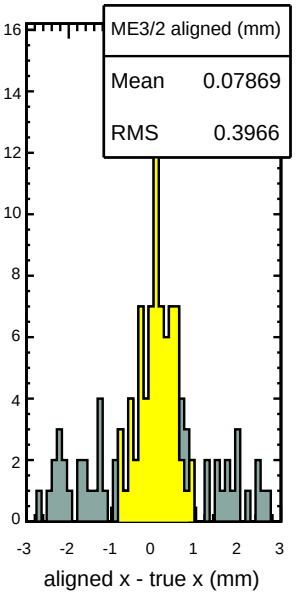
Endcap aligned positions

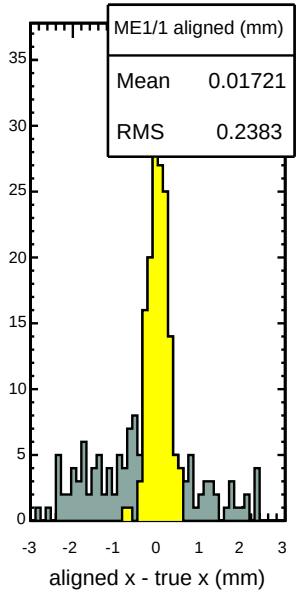


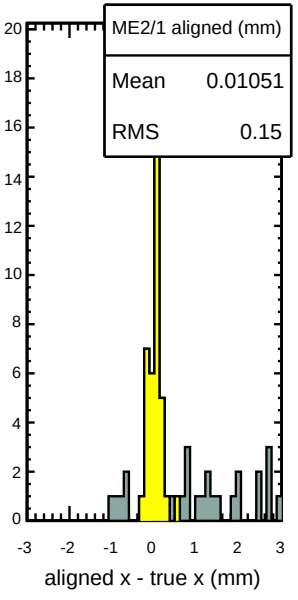


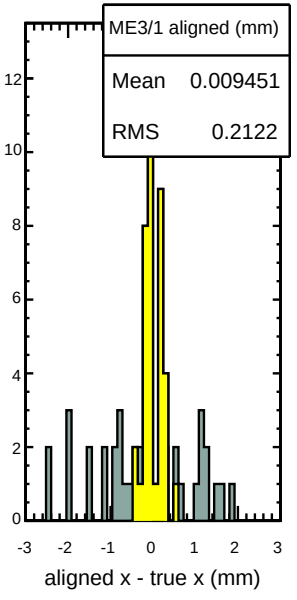


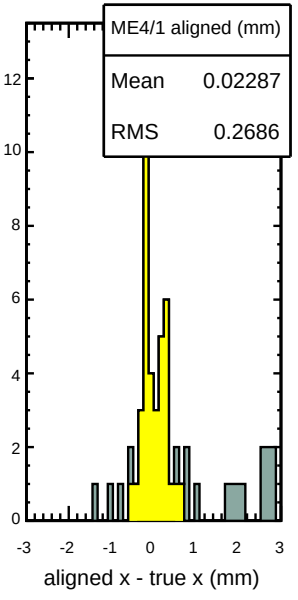




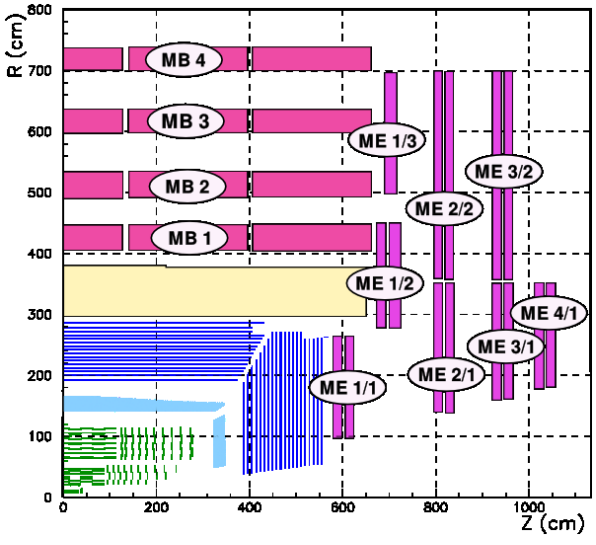


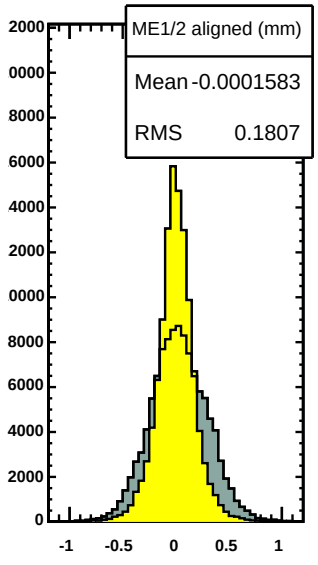


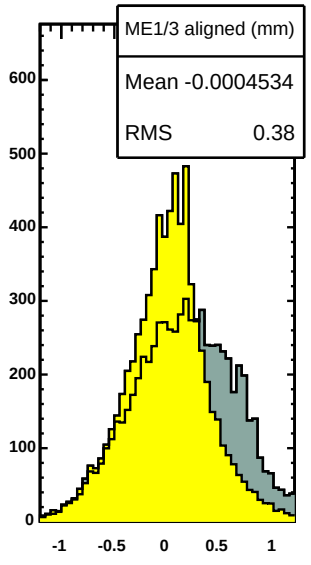


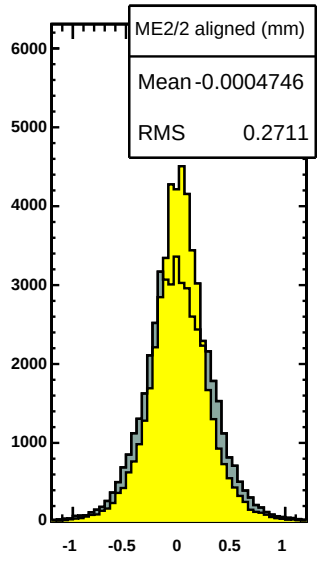


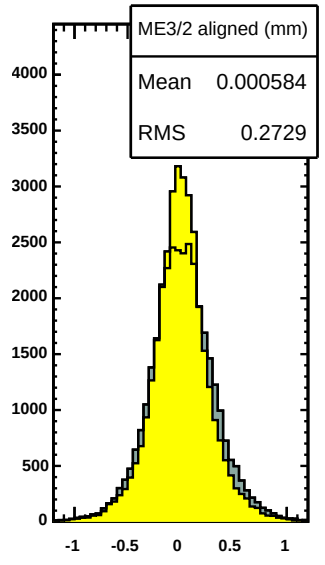
Endcap track residuals

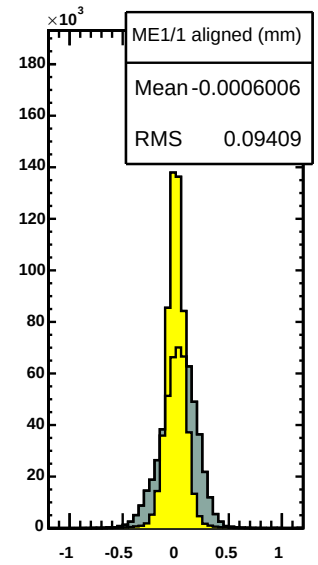


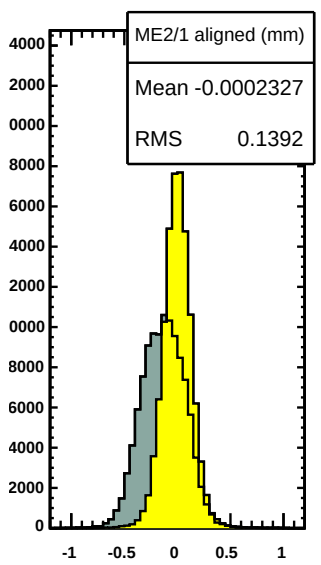


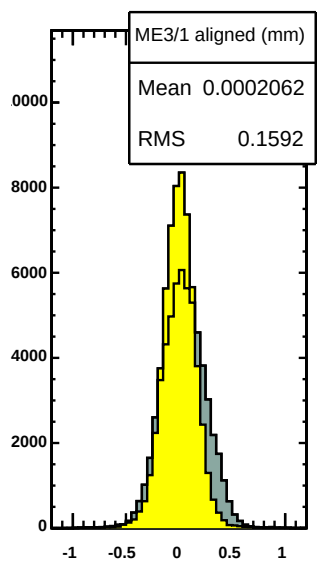


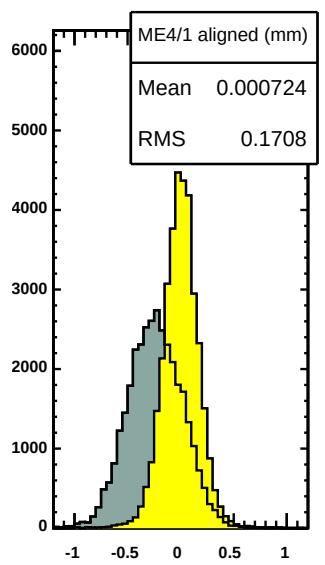






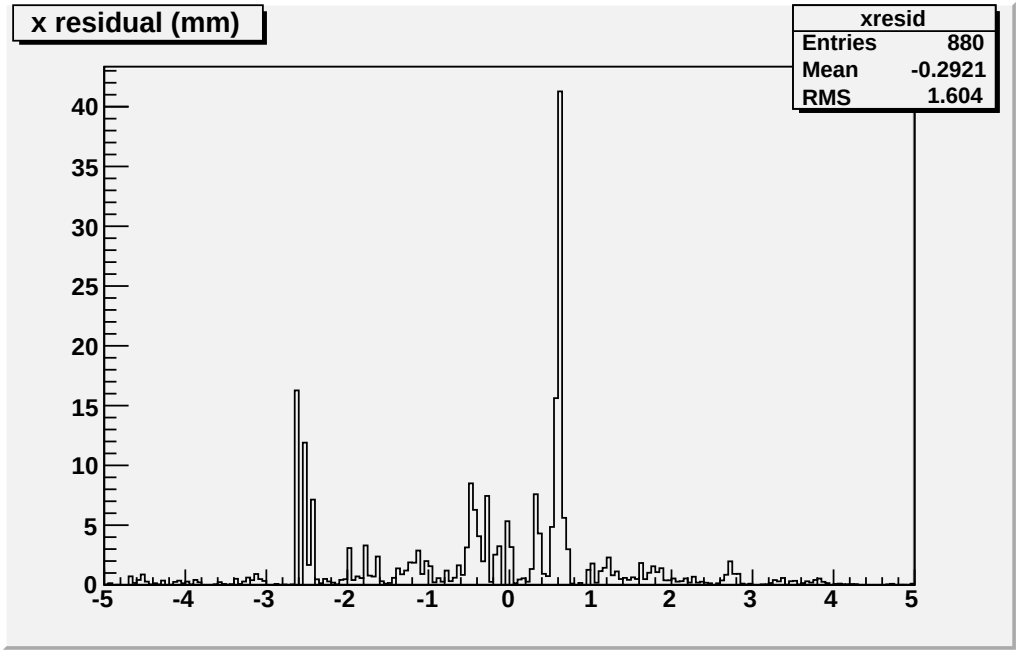




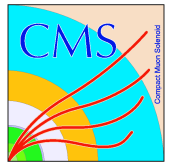


Alignment test in 2_0_6

- Minbias → muon AlCaReco was accidentally generated
- Only 39 events; most of our low-momentum muons will come from QCD, not minbias
- A good chance to test the 2_0_6 scripts
  - Fixed a bug (not loading misalignment at start of job)
  - Residuals are far too wide for our purposes
  - AlignmentProducer looped over the events, but 50 hits/chamber are required to test alignment



Conclusions



- Baseline procedure is the minimal goal for iCSA08
  - It is now much faster (10 hours on 50 CPUs $\longrightarrow$ 4 hours on 1 CPU) because a much simpler one-pass technique yields better results than the staged 55-pass technique
  - Not a new finding: I've been studying this for about a month, making sure the simulation is not overoptimistic
- Overlaps procedure (relative alignment of CSCs in rings), with and without beam-halo is in progress
  - I have 80% of a work-around for the AlCaReco sample containing the wrong track collections
  - Hopefully we'll have something to show for this workflow, but our metric for success is the "baseline" procedure