Update on alignment and studies of residual misalignment on TeV dimuons

Jim Pivarski, Alexei Safonov

Texas A&M University

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- Status of alignment algorithms in iCSA08

- Plans for studying residual misalignments on TeV muons

- Z' MC samples and Zprime2muAnalysis in 2_0_X

Status of alignment

HIP-based muon alignment has matured

- ▶ same basic idea: extrapolate tracker-fitted tracks into the muon system, align chambers to these tracks
  - ▶ simultaneously aligns muon system internally and muon system to tracker

- ▶ major correction from CSA07 experience (direction of refit)

- ▶ numerous bug-fixes and minor corrections improved resolution

- ▶ now in few-hundred micron range for inner stations

- ▶ separate "baseline" procedure from commissioning procedures that operate without tracker or magnetic field (e.g. CSC overlaps technique and related layer-alignment technique)

All tracker and muon alignment algorithms are being tested in
1 pb^{-1} (this week) and 10 pb^{-1} (next week) challenges

- ▶ full-spectrum event samples, including muons from QCD
- ▶ original track fits were misaligned (important!)
- ▶ up-to-date initial misalignment scenarios
- ▶ tracker alignment and muon HIP alignment performed in
  series

but. . .

- ▶ samples correspond to unequal integrated luminosities
- ▶ no layer misalignments in muon system

Martin Weber (tracker alignment) and I decided to do a more
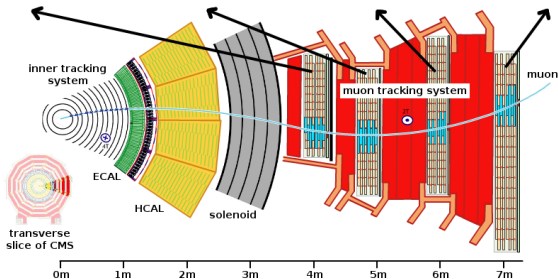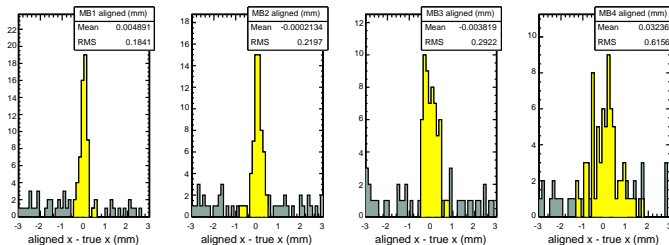realistic study after timed CSA test is over

Pre-CSA test approximates upcoming CSA 10 pb^{-1} results

Chamber $r\phi$ positions before (gray) and after (yellow) alignment

- ▶ Tracker and muon alignment output from post-CSA study will be a good starting point for quantifying the effects of misalignment on tracks, specifically TeV muons

- ▶ Alignment is in 2_0_6, misalignment study would be in 2_0_X, suitable for Muon POG note (twiki MuonPOGRecoNote)

- ▶ Would also come at the right time for Piotr's TeV reconstruction study

- ▶ Ivan and I have roughly split misalignment studies into basic resolution plots (me), shift of peak (me?), charge mismeasurement, effect on efficiency (Ivan)

New Z' samples in
/castor/cern.ch/user/p/pivarski/Zprime_206_FEVTSIM/

- ▶ New CMSSW version: we can do MPOG tests, use latest alignment
- ▶ Enough saved for track re-reconstruction and Zprime2muAnalysis
- ▶ Same generator-level cuts as CSA07 samples
- ▶ 1500 1 TeV, 1500 2 TeV, 1000 3 TeV
- ▶ Can be viewed as provisional if new official Z' samples are coming

Zprime2muAnalysis

- ▶ I plan to do all resolution studies in Zprime2muResolution
- ▶ Jordan is bringing the package up-to-date (compiles in 2_0_6)

- ▶ A lot of progress on alignment algorithms

- ▶ iCSA08 is underway, will provide reliable predictions of misalignment at 1 and 10 pb^{-1}

- ▶ Preparing tools for studying misalignment