Our goal: to develop a simple (HIP) muon alignment procedure for

(a) 14 TeV data (expected in 2008)

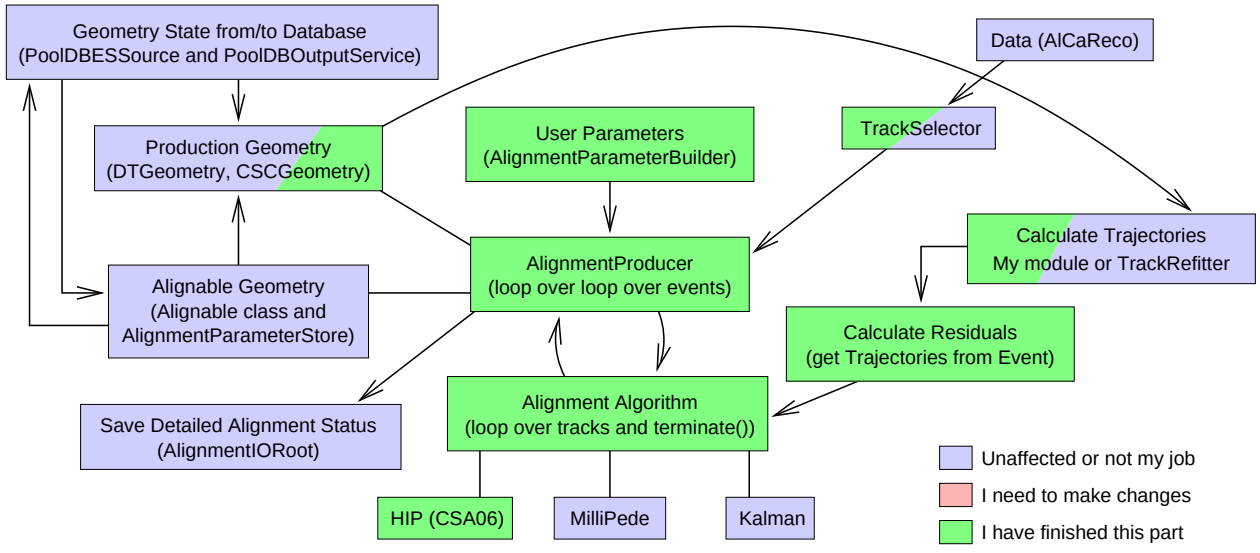
(b) 0.9 TeV low-lumi data (2007)

Milestones:

- Write muon alignment software (DONE)
- Demonstrate that it works (DONE)
- Finalize procedure
  - Data sample/cuts: (a) Z and W, (b) $b \rightarrow \mu X$, beam halo
  - Exclusion or de-weighting of muon hits in track-fit
  - Alignment systematics: effect of backgrounds, fitting bias, ...
  - Monitoring alignment quality
- Full exercise with final procedure
- Study effect on $\sim$TeV muons from $Z' \rightarrow \mu\mu$

Software Development

- Included muon alignables in AlignmentProducer and removed tracker-dependent assumptions
- This requred a reorganization of track refitter and Trajectory-calculating code

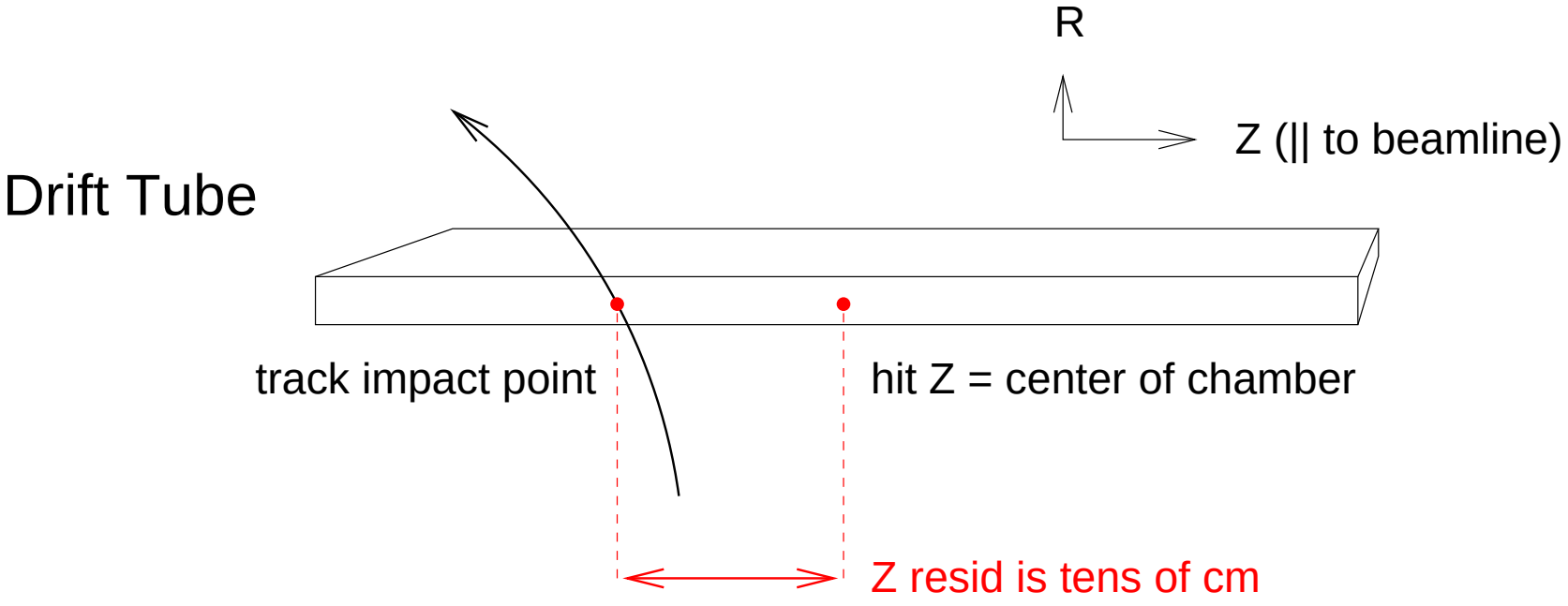


- *Most* updates are in CVS
- We have a fully operational local copy for first alignment tests

Corrected treatment of 1-dimensional hits

Our first muon alignment moved DT chambers tens of cm

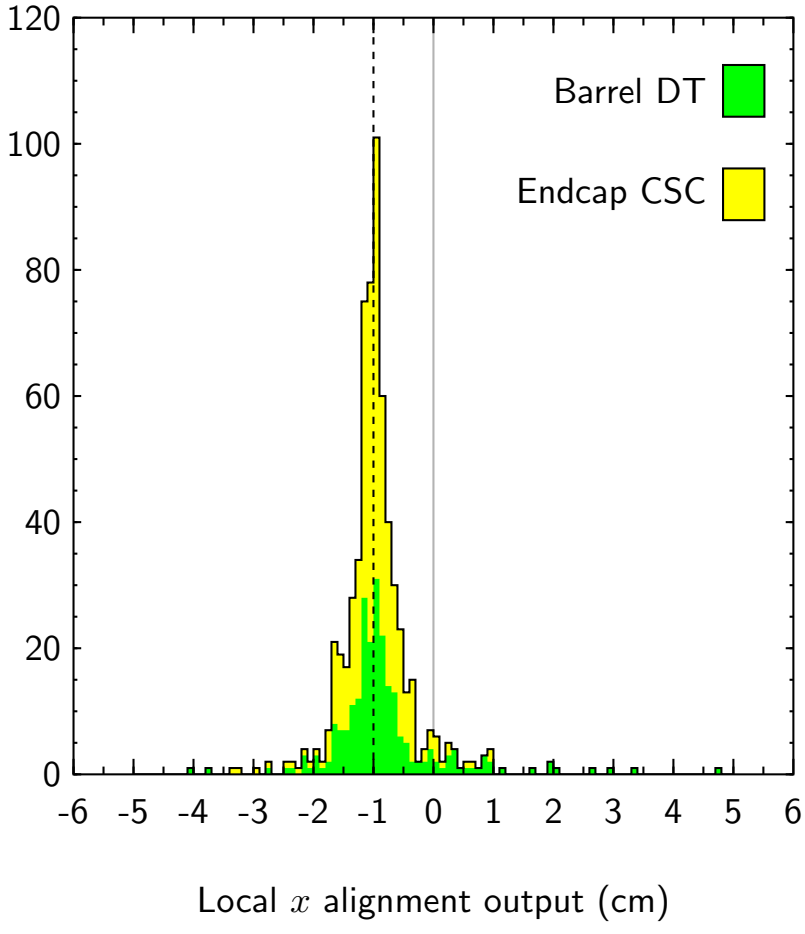
- CSA06AlignmentAlgorithm assumes all sensors are 2D
- Axial DT hits have no Z information



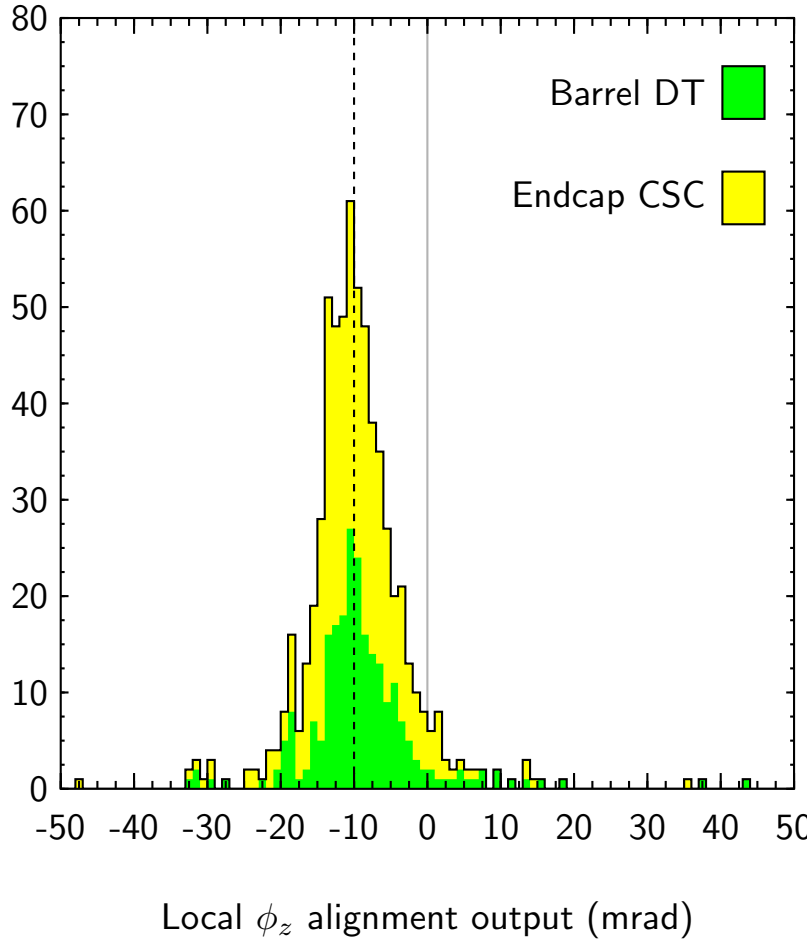
- We modified the algorithm such that these hits contribute to RPhi alignment but not Z alignment

First Demonstration of Muon Alignment

All chambers misaligned $\Delta x = +1$ cm



All chambers misaligned $\Delta\phi_z = +10$ mrad



Next Steps

- Migrate from CSA06AlignmentAlgorithm to HIPAlignmentAlgorithm, write twiki page
- Define muon alignment data stream: coarse cuts for $Z \rightarrow \mu\mu$, $W \rightarrow \mu\nu$, and "good muon"
- Include but de-weight muon hits in track-fit, study fitting bias
- Study effect of backgrounds on alignment, optimize cuts
- Develop a suite of quality-monitoring plots