Muon Isolation Validation Package

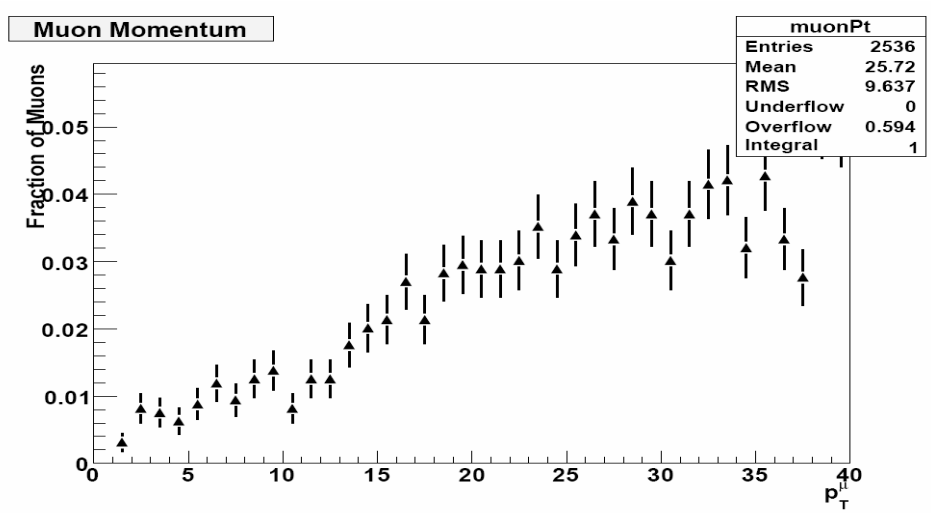
- Version-to-version consistency check for CMSSW
- Online monitoring of IsoMu DQM
  - Current quantities available:
    - Number and p_T of muons in an event
    - Number and total p_T of tracks within .3 in $\eta-\phi$ of candidate
    - Number of CAL towers and total E_T within .3 in $\eta-\phi$ of candidate
      - Separately for ECAL, HCAL, and HO
    - Muon momentum / N Tracks
    - Weighted CAL energy: 1.5 (ECAL E_T) + HCAL E_T
    - Cumulative Distributions of each
  - Quantities plotted as 1D Histograms, 2D scatter and profile plots
- 3 Sample types used:
  - b-jet, c-jet, $z \rightarrow \mu\mu$

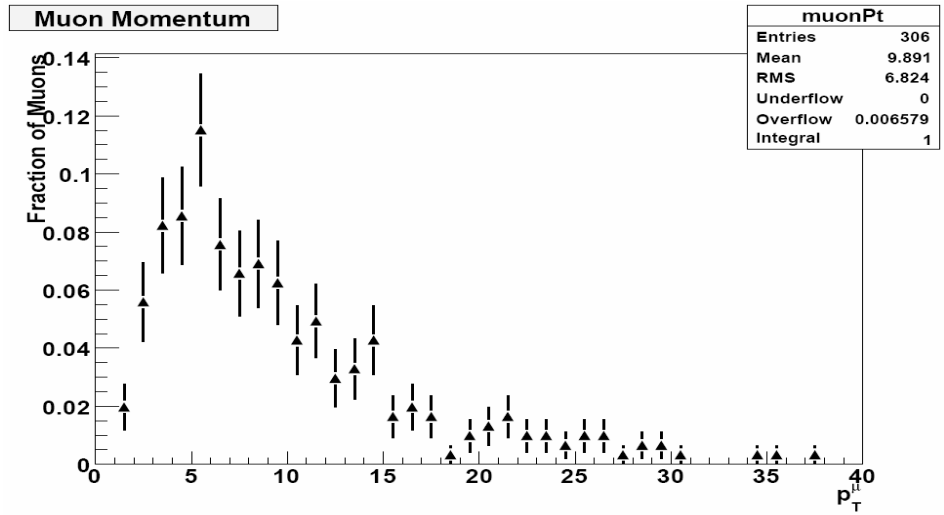
Current Development

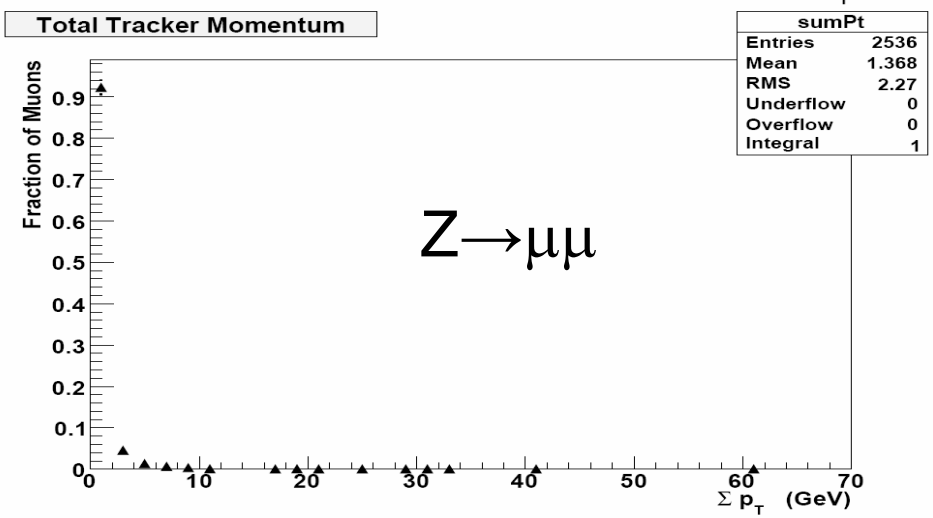
- Version-to-version consistency
  - Adapted package to run for 17x, 18x, 200prex
    - Results in following slides
- Online monitoring
  - Original scheme: record data in vectors, fill histograms in one final step
    - Potential memory issues
    - Histograms don’t fill continuously: not good for monitoring
  - New scheme: continuously filling histograms
    - Implemented for all releases
      - Testing implementation, updating versions in CVS

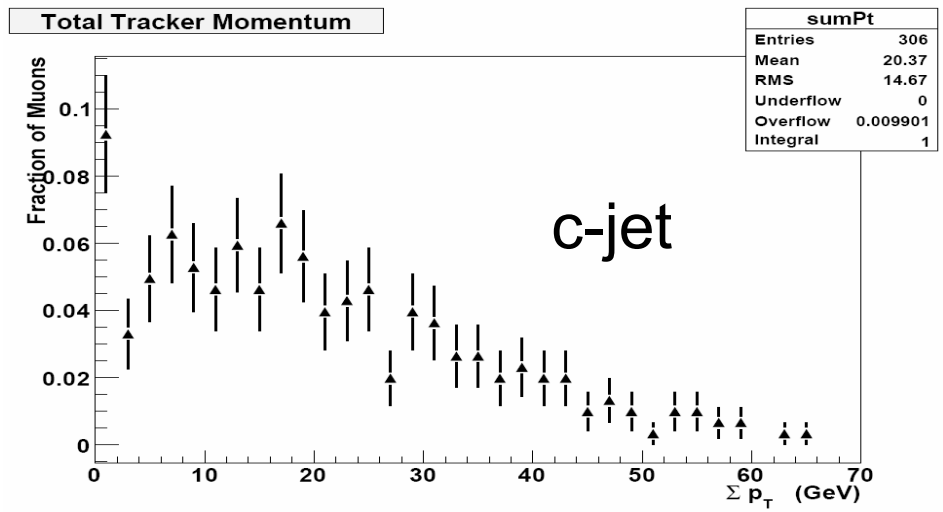
Example: Z→μμ vs b(c)-jet (167)

Muons from Z tend to be higher momentum, better isolated



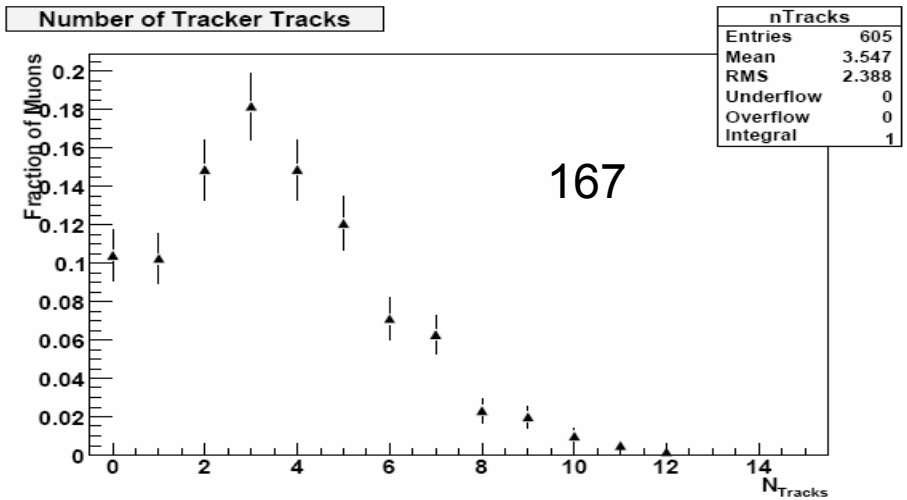


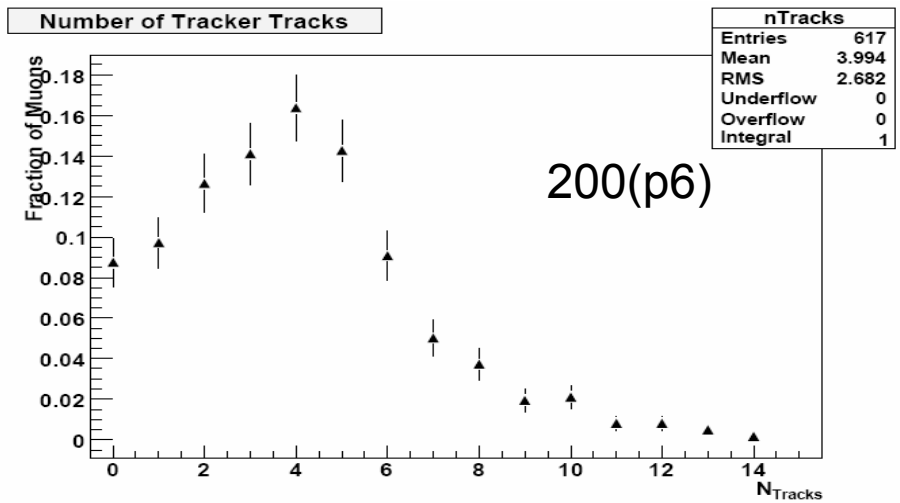


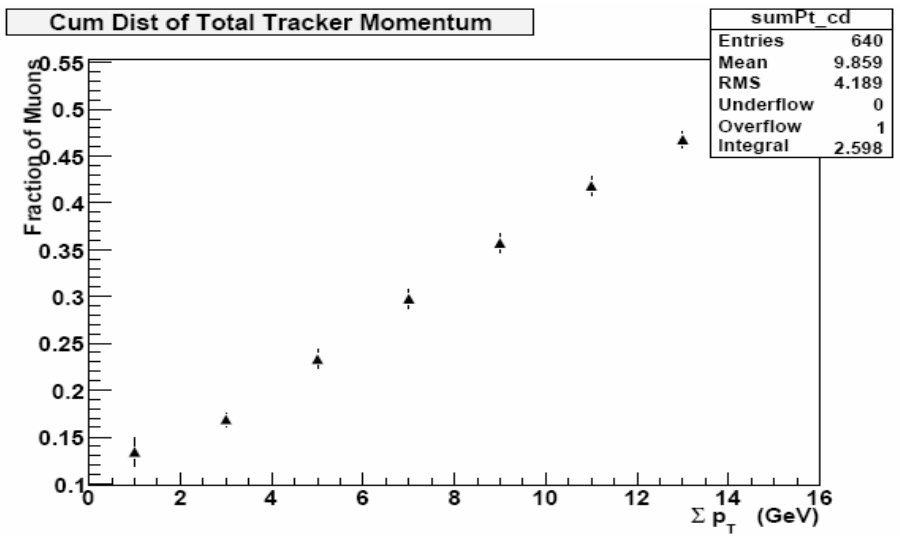


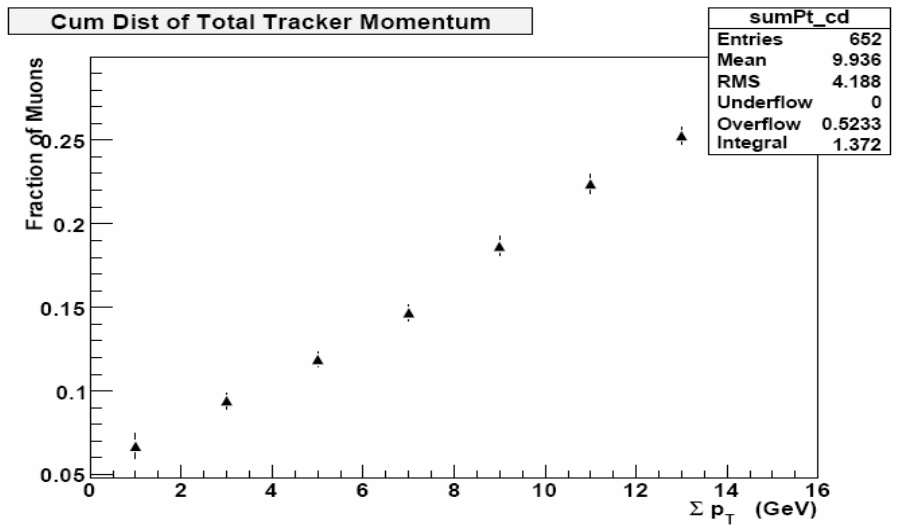
Consistency check: 167 vs 200(p6)

Good consistency in general for b-jet



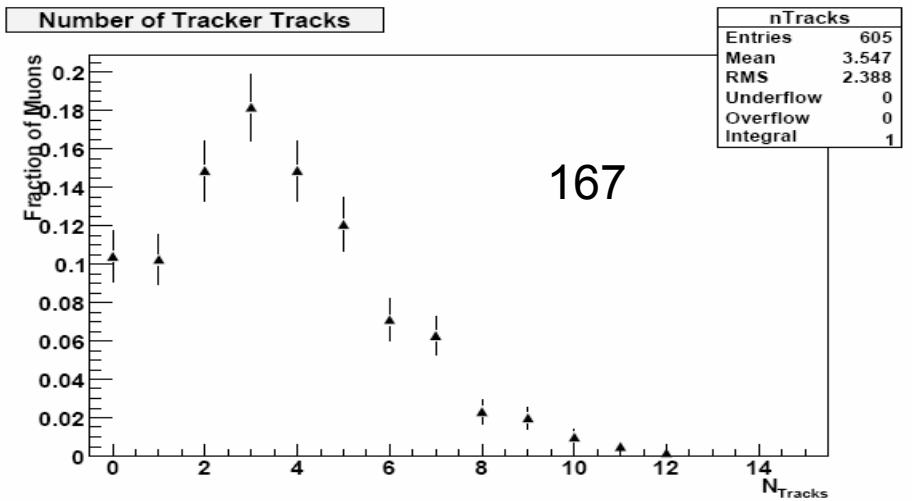


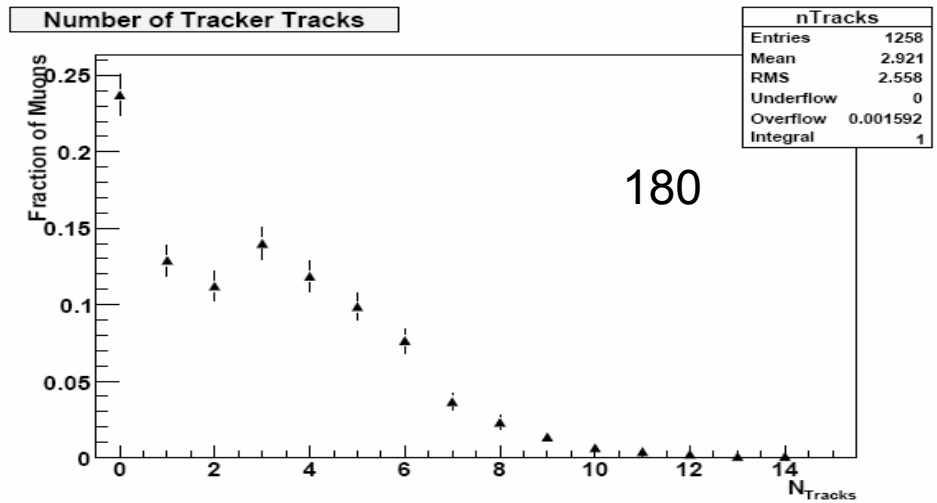


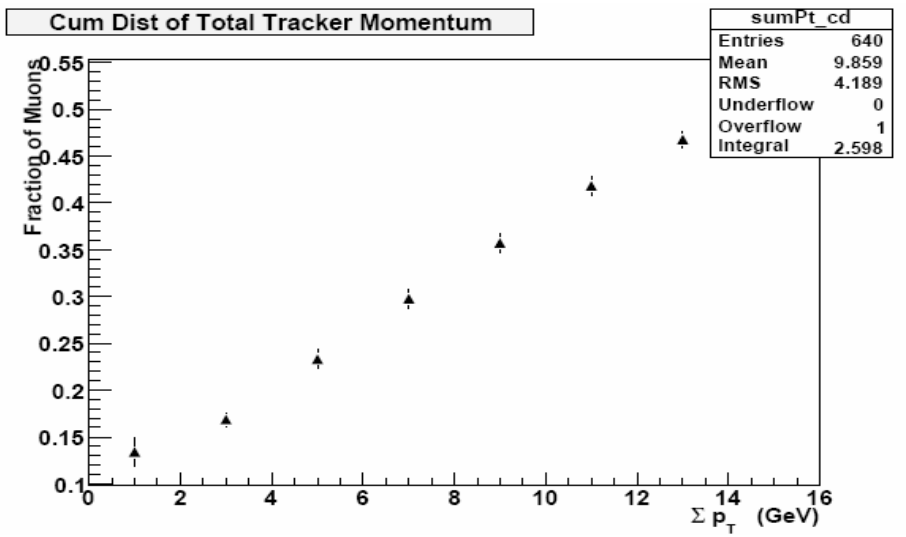


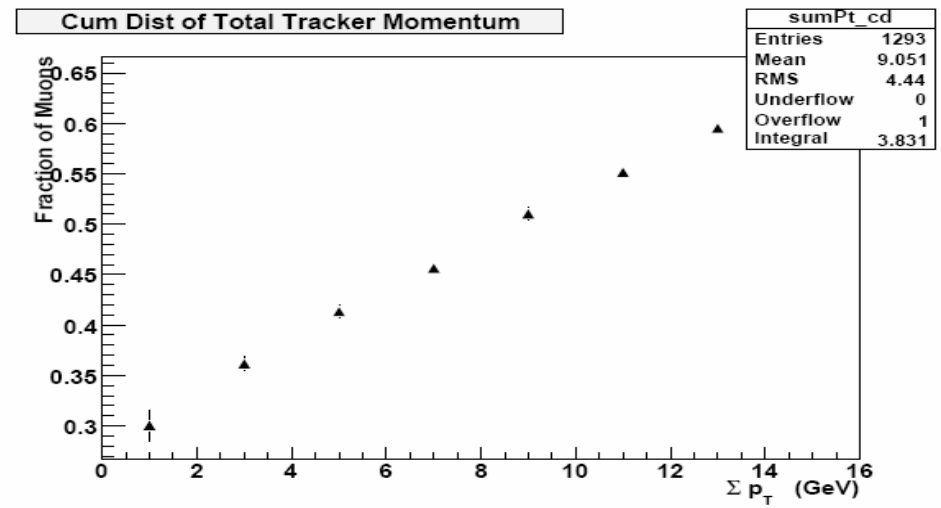
Consistency check: 167 vs 180

Large discrepancy for b-jet: more muons with better isolation for 180









Conclusions

- Easy part (getting things compiling, running) basically done
- Hard part (understanding version-to-version behavior) underway
- Next steps:
  - Documentation
  - Automation of histogram plotting
    - Comparisons with reference histograms