

Pass 4 Issues and Plots

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First, the Issues

- Incorrect RICH bad channel maps from 2005 were still in the table, caused complete loss of RICH info in some runs
 - Old entries removed, in the remaining runs <200 bad PMT's
 - No longer a problem for next pass 4
- TPC dE/dx has a “bi-modal” distribution
 - Some runs have normalized dE/dx , others don't
 - Next page for why this happened

TPC Calibration Path

- To get from raw ADC to well-calibrated dE/dx , for each run we need
 - Get anode gain $\sim 20\%$ correction
 - pass3 job 1
 - Get drift attenuation corrections $< 10\%$ correction
 - pass3 job 2
 - Normalize to minimum ionizing peak (pass 4)
- Problem 1: subset of runs have anode and drift attenuation calibration
 - Not all runs were processed through pass 3
 - DB tables runnummin/runnummax were not adjusted to cover all runs

TPC (cont.)

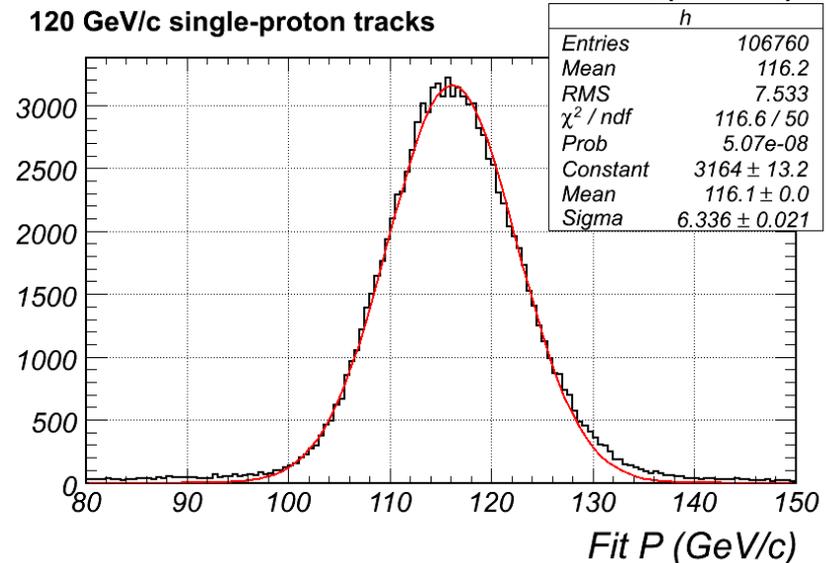
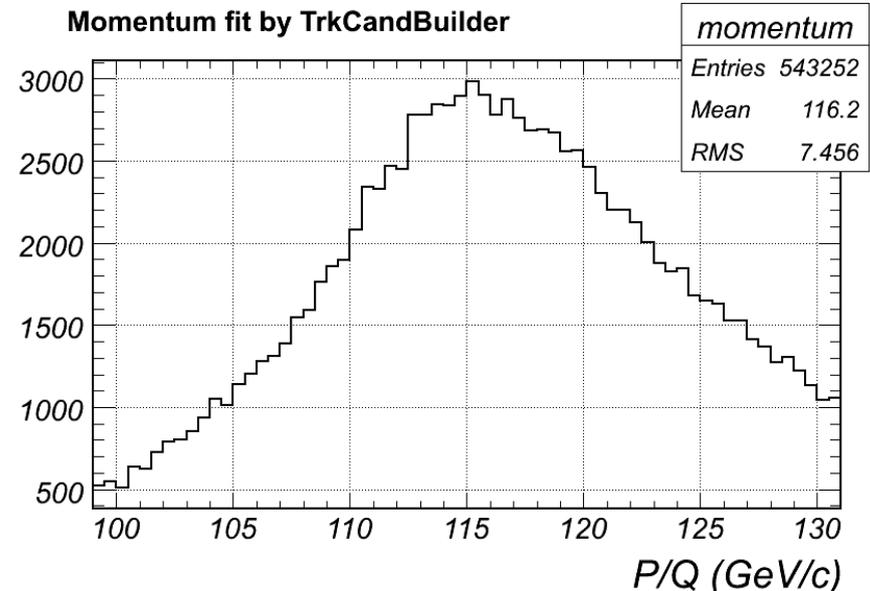
- Problem 2: dE/dx normalization table had 854 entries before pass4
 - Jenn was essentially planning to have pass4 jobs 1&2, but that's not what we configured
 - Calibration constants were computed at the end of each job, but not picked up **before** the job started
 - dE/dx in DST's is not normalized in most runs
 - anode/drift corrections are inconsistent from run to run
 - dE/dx table is not equipped to handle multiple subruns for a run

TPC Solution with 2x pass4

- Jenn will modify dE/dx calibration table to handle subruns
 - May not be necessary, but it's nice to have the flexibility
- Pass 4 will be modified to have only one version of TPCRPid module
- First set of jobs will compute dE/dx calibration
 - The constants will be looked at and verified
- Second set of jobs will fill calibrated dE/dx into DST's
- This is slower than pass 4 job 1+2, but seems worth the time
 - Alternative is to pull in dE/dx normalization at analysis stage

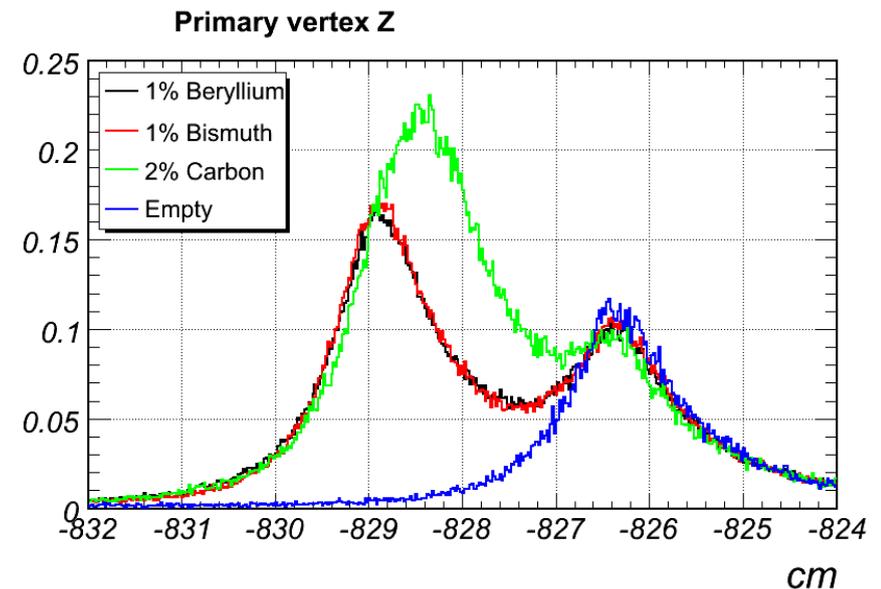
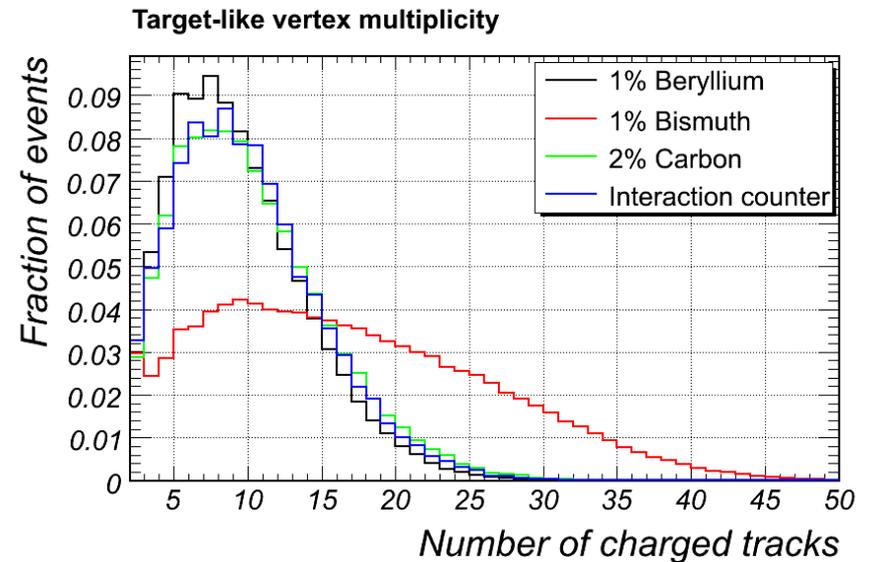
Pass 4 – Momentum Fit

- ~6.3-6.5 GeV/c sigma
- ~3.7 GeV/c bias
 - Assume 119.7 GeV/c with ~100 MeV loss
 - Similar with chambers only (TrkCand's)
- The 2 sources I can think of are
 - Alignment
 - Magnetic field
- Preliminary MC studies do not have a 3% bias



Pass 4 – Vertex Fitting

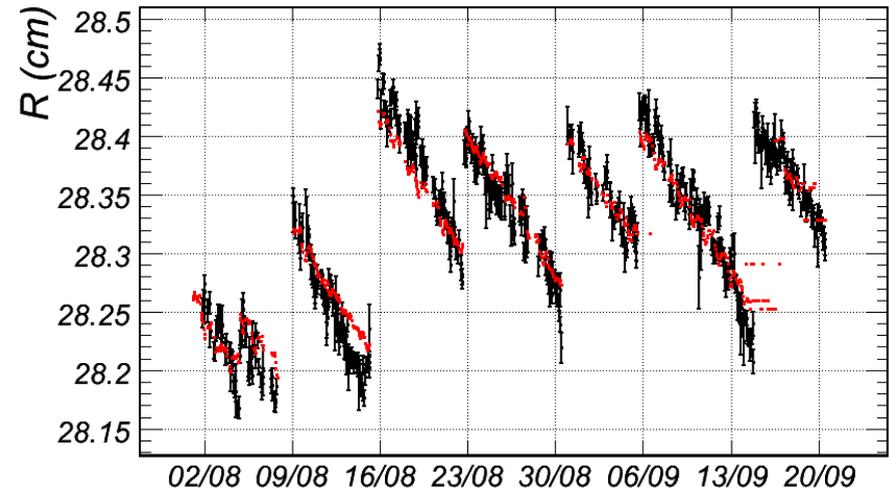
- Nice to see a clear difference between the different targets
- Resolution in Z as measured by scint is 6mm
 - Tails are non-Gaussian
 - Target-out subtraction will be important for bismuth



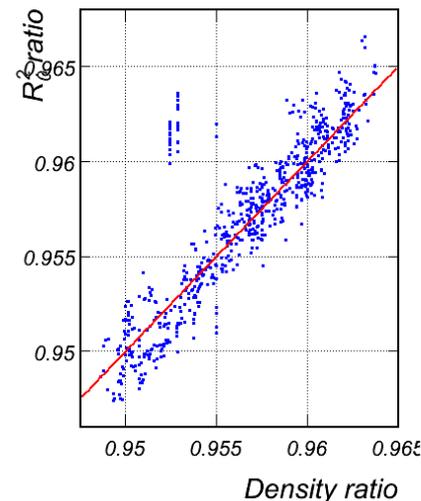
RICH Calibration (120 GeV/c only)

- Each subrun has ~ 1000 clean protons
 - Compute mean R and RMS, use RMS/\sqrt{n} as error
- Spread in radius is appreciable
- Correlation of R_0^2 with computed CO_2 density is linear as expected
- Seems like we know R_0^2 to 0.1%

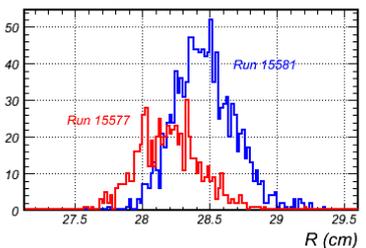
Measured proton ring radius (black) and scaled square root of CO_2 density



R_0^2 vs Density, scaled by STP values



RICH 120 GeV proton radius



R_0^2 / density ratio

