Status of the Λ^0 hyperon analysis in the carbon beam

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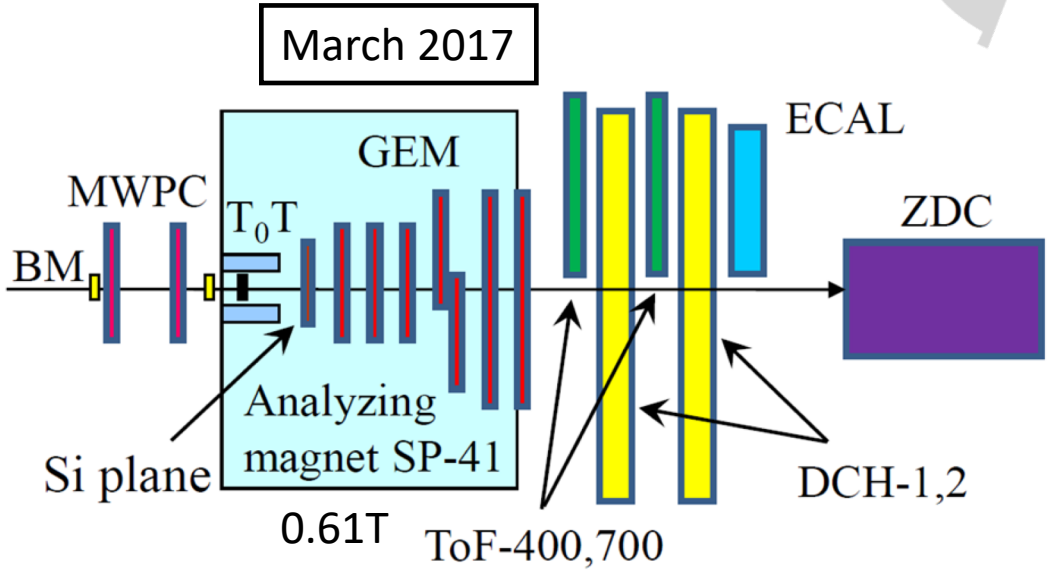
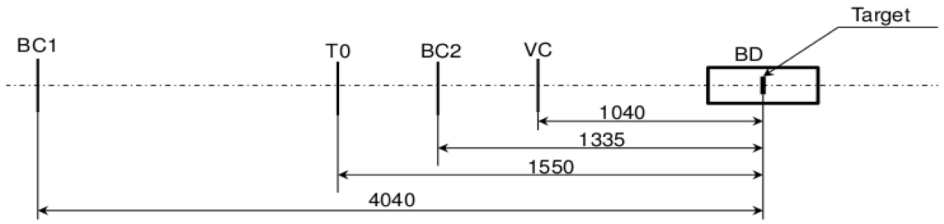
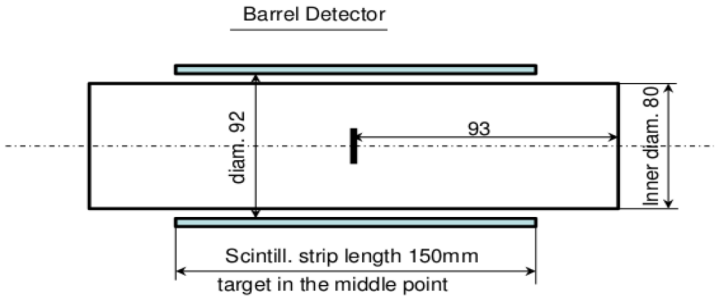
BM@N configuration in Run6

- Central tracker
  - One plane of a forward Si detector
  - 6 GEM stations
    - 5 GEM detectors (66x41 cm2)
    - 2 GEM detectors (163x45 cm2)
- Triggers: BD, BC1, BC2, T0, VETO
- Beam Ekin=4.0 and 4.5 GeV
  - Intensity 10^5 per spill
  - Spill duration 2-2.5 sec.
- <u>Physics</u>: measure inelastic reactions C+A→X
  - Targets: C, Al, Cu, Pb



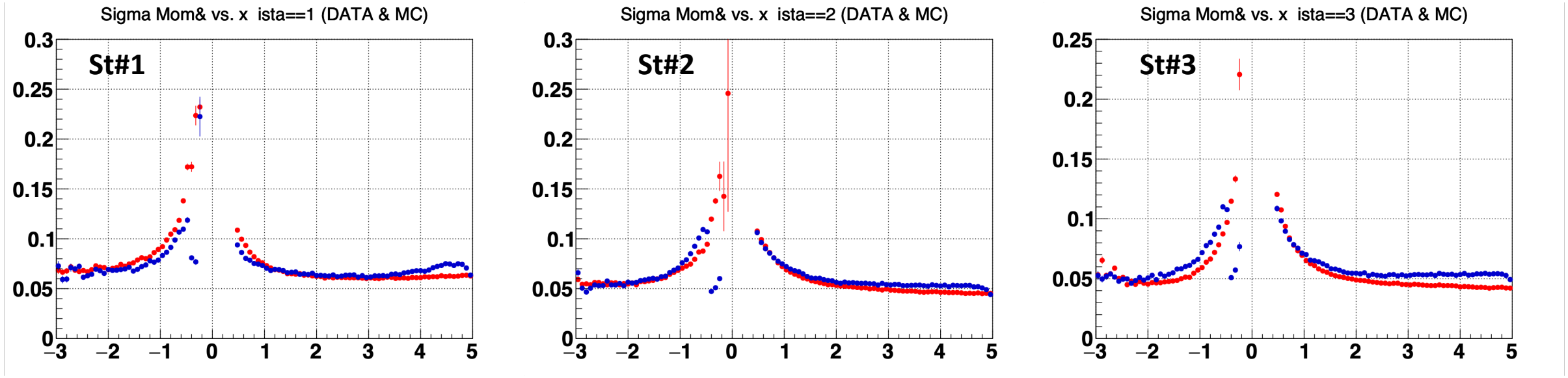


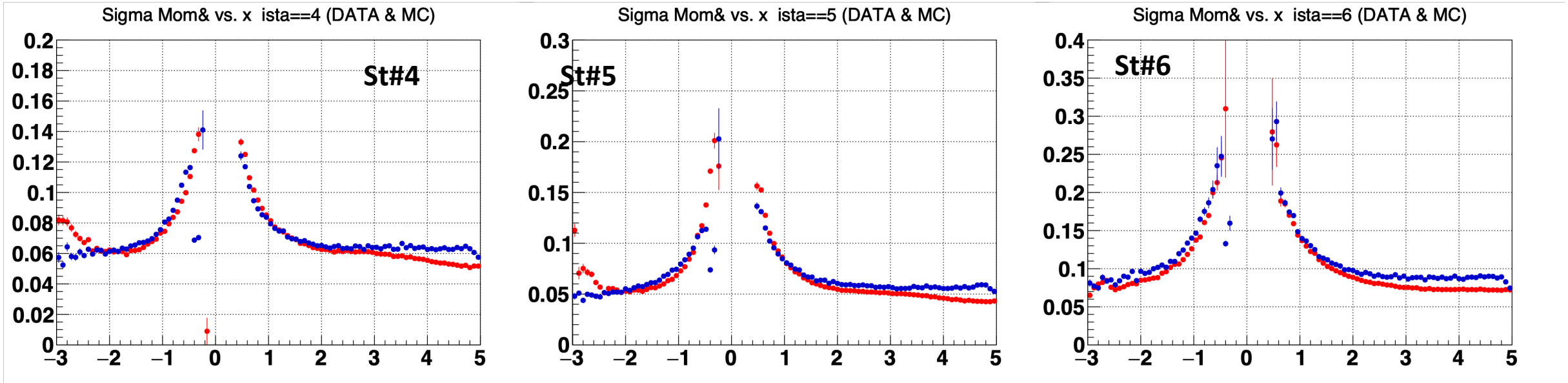


Analysis current status

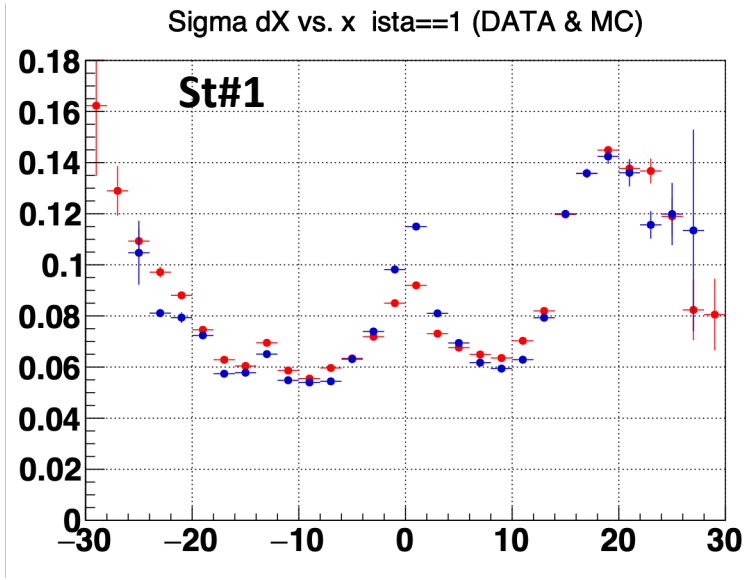
- **Main goal of current analysis** – cross-check with previous analysis (was performed by Gleb Pokatashkin)
- **From previous analysis status:**
  - Check residuals for MC & Data ✅
    - Make corrections for residuals in Data & MC ✅
    - Momentum smearing procedure for MC simulation ✅
  - Check GEM efficiencies for MC & Data ✅
  - Apply efficiencies for MC simulation ✅
- **Analysis:** compare distributions MC/Data for pt/momentum/etc. ⚠️
  - **X/Y residuals smearing** ✅
  - **MC Pools tuning (in progress)** ⚠️
  - **Control plots (very preliminary)** ⚠️
- **Measure cross-sections of the Λ^0's hyperon**

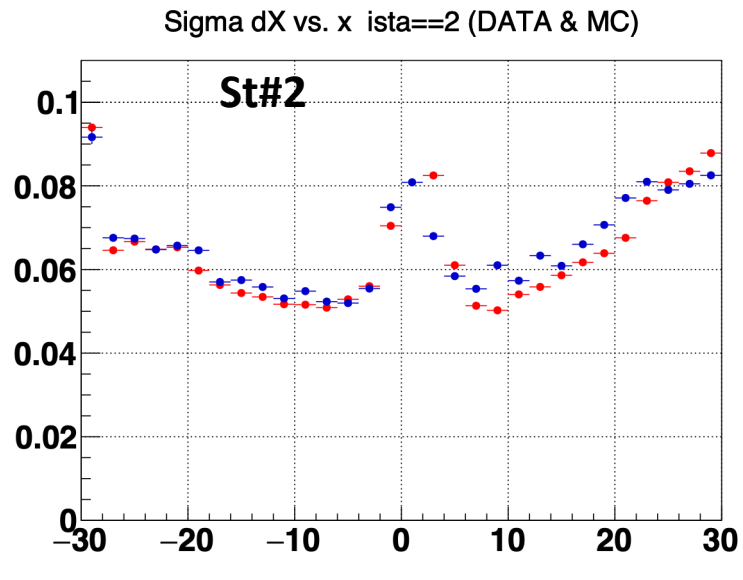
Mean Dx vs Momentum (DATA & MC 4.0GeV C+Cu)

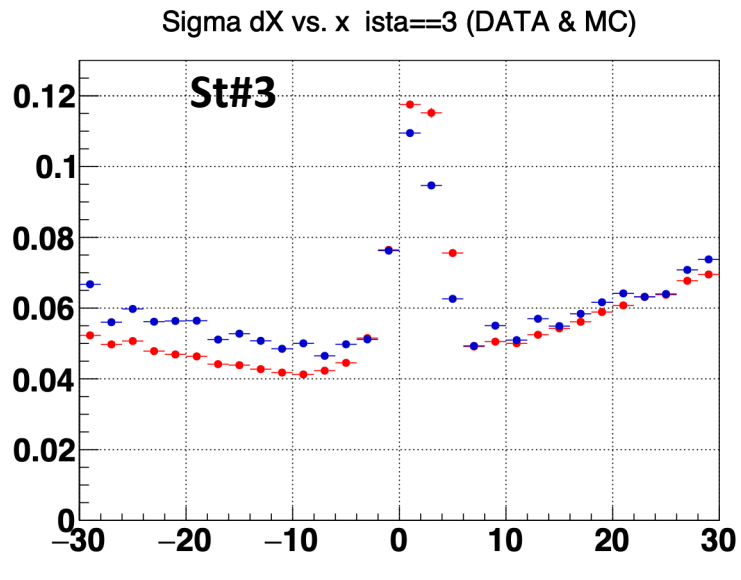


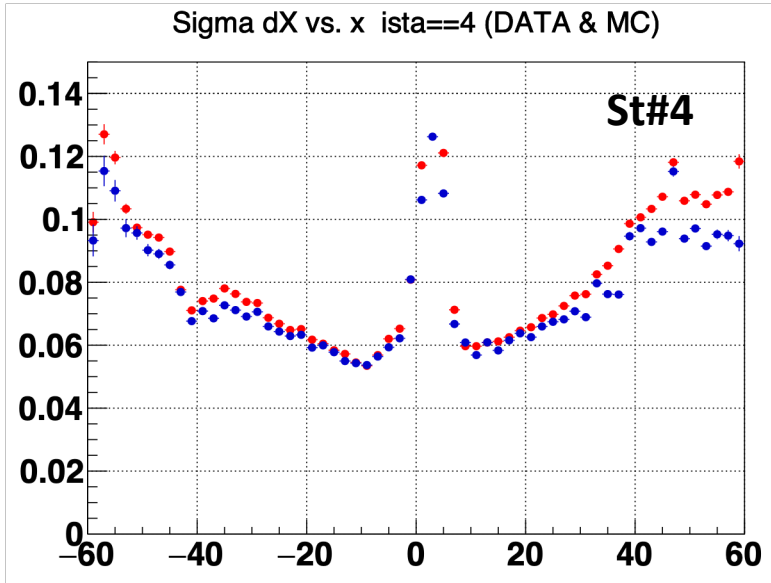


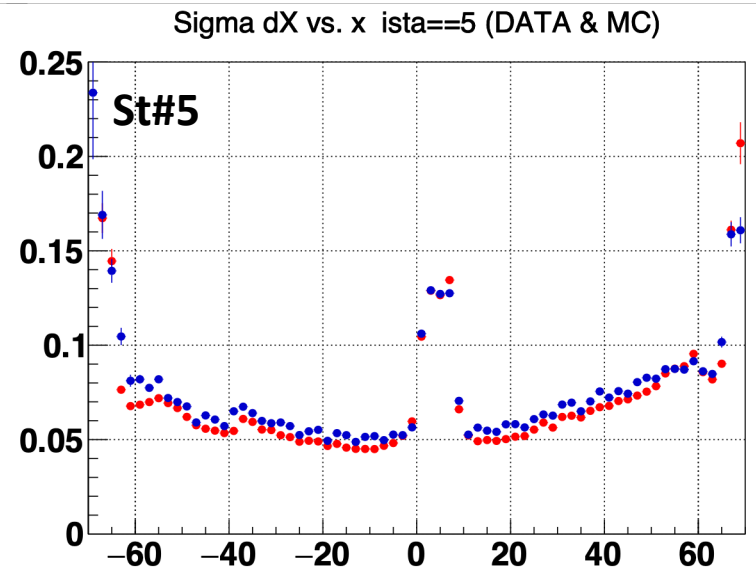
Sigma Dx vs x (DATA & MC 4.0GeV C+Cu)

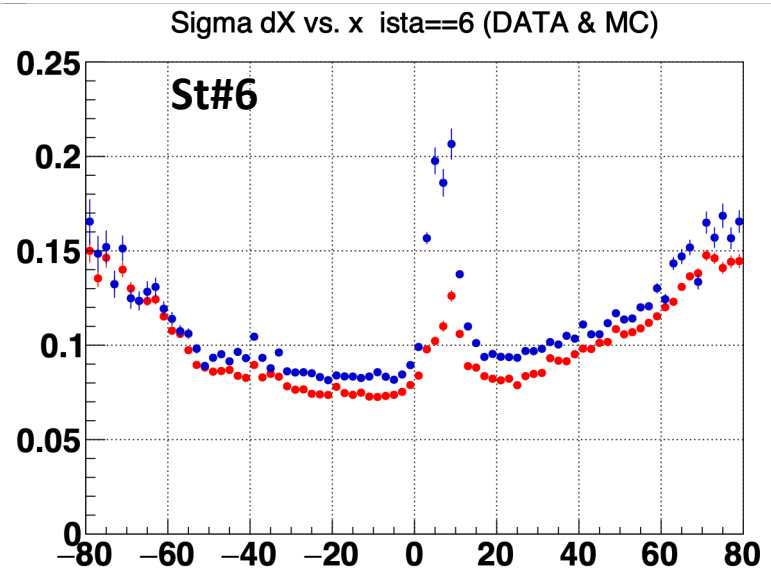




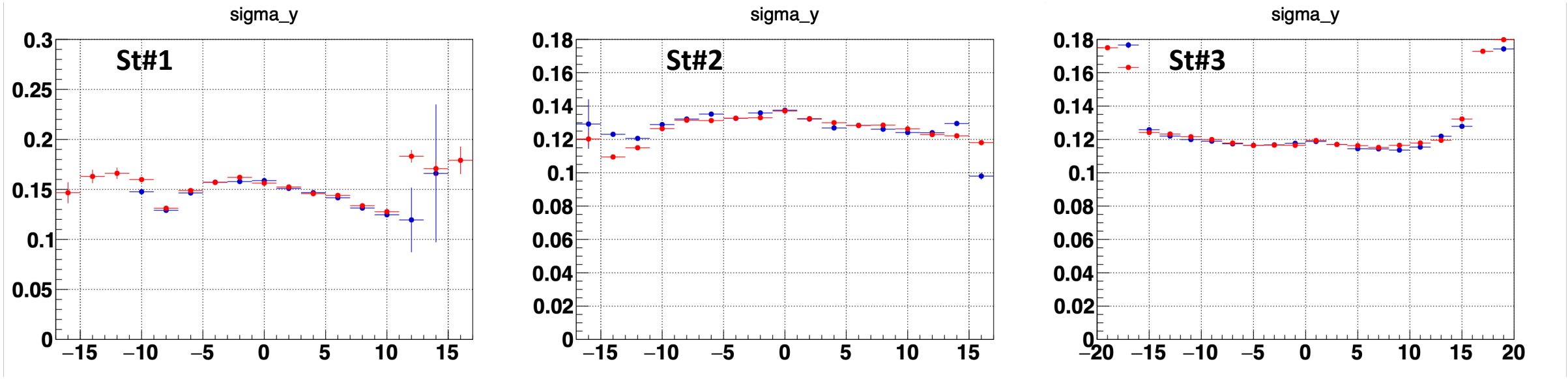


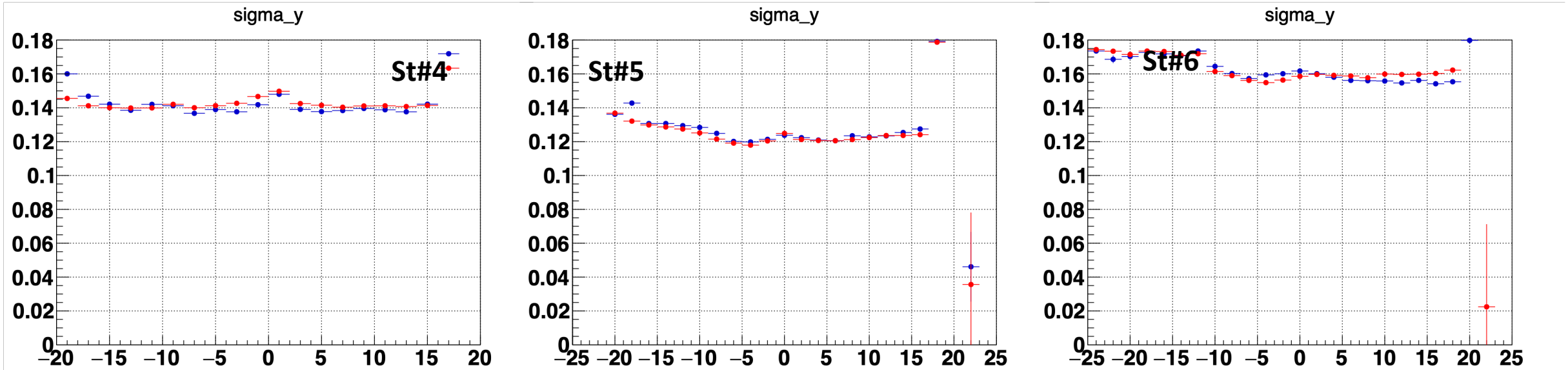






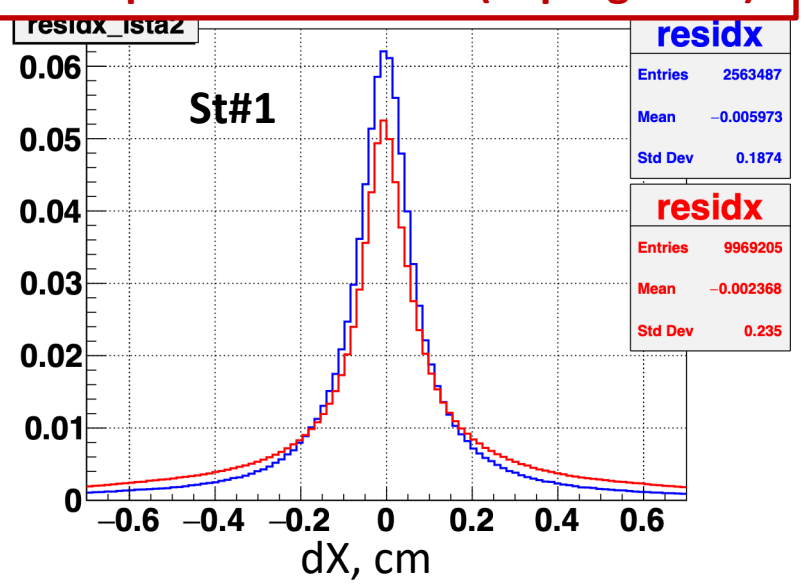
Sigma Dx vs x (DATA & MC 4.0GeV C+Cu)

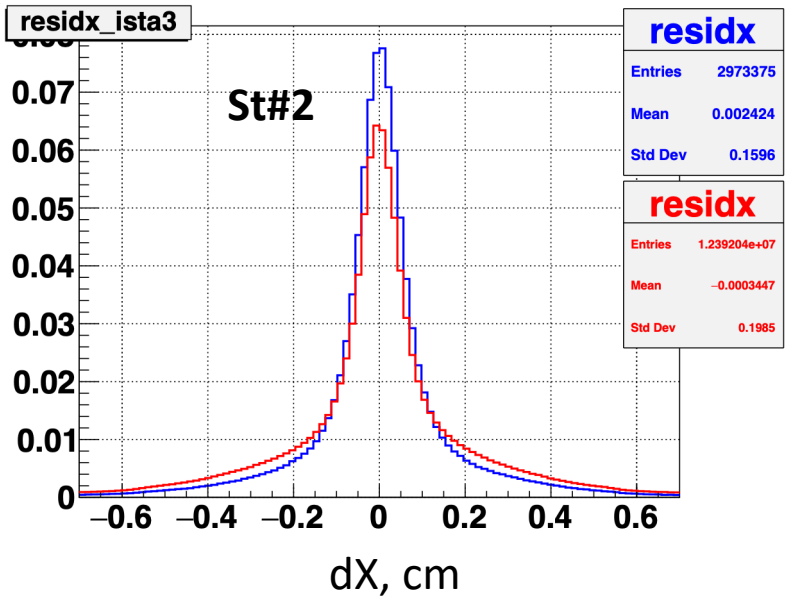


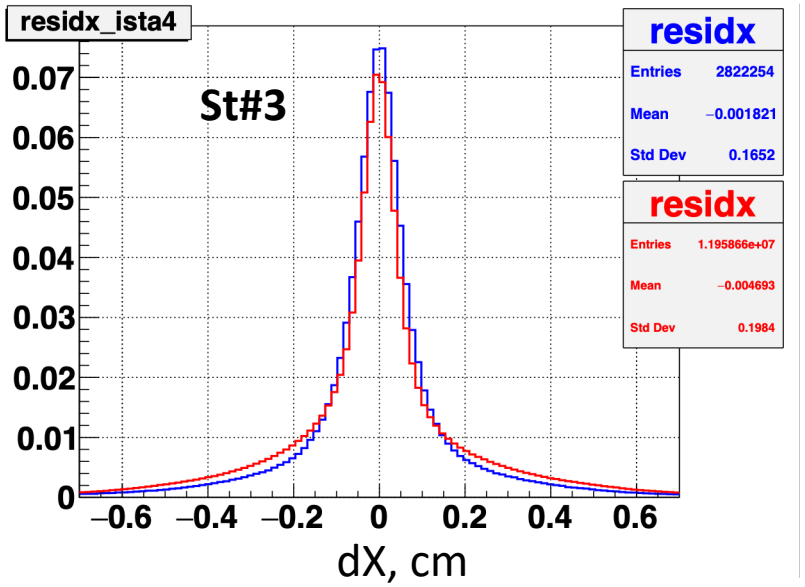


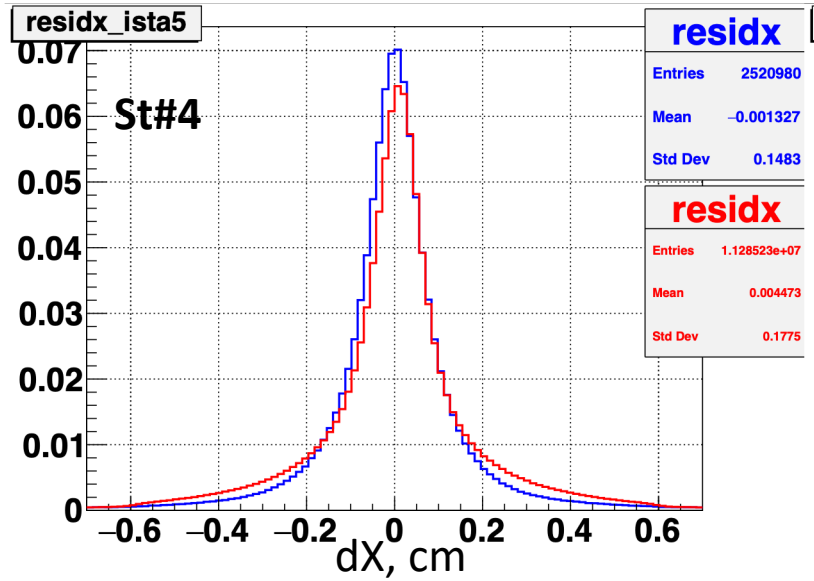
Sigma Dx vs x (DATA & MC 4.0GeV C+Cu)

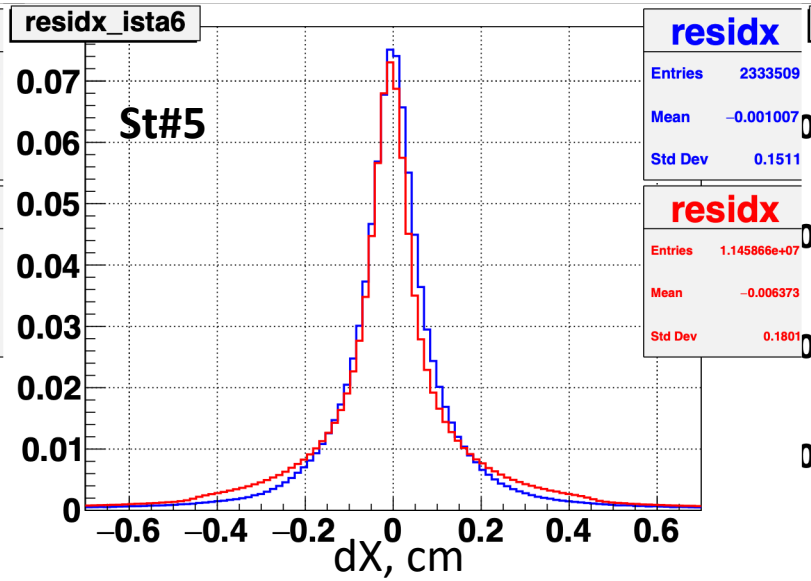
Need X pools corrections (in progress…)

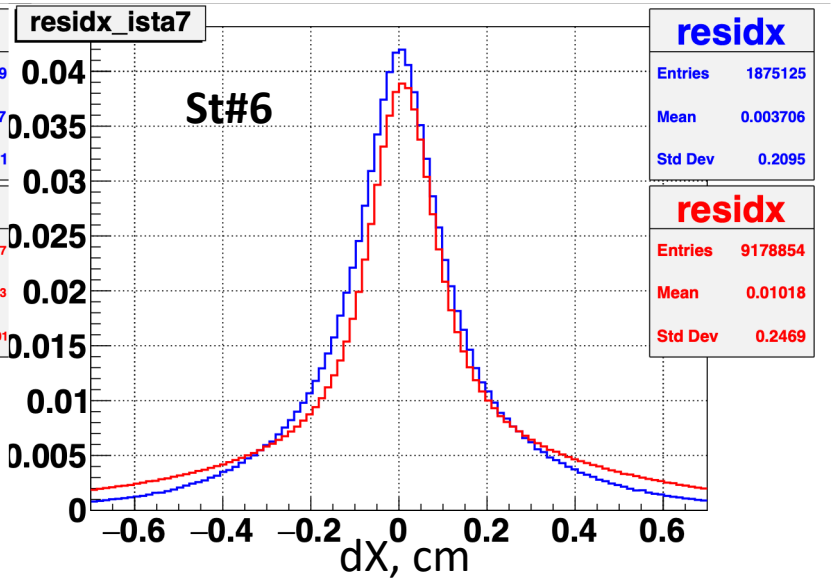






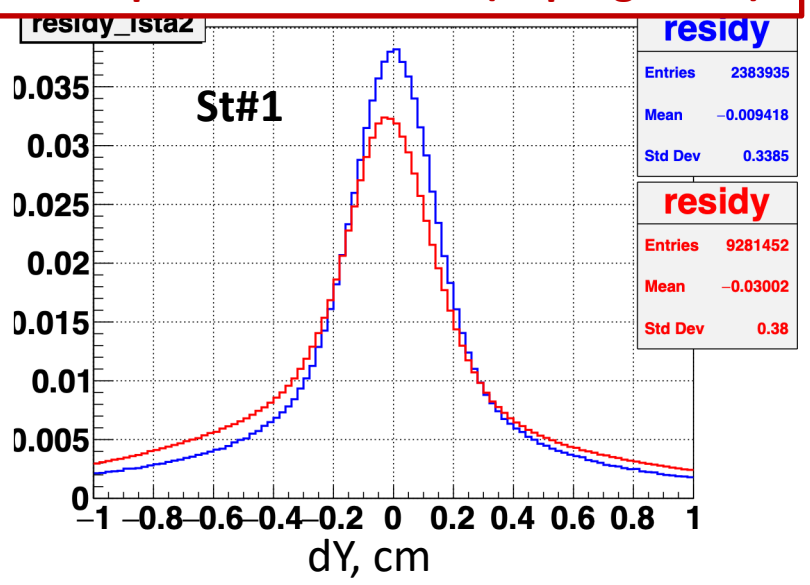


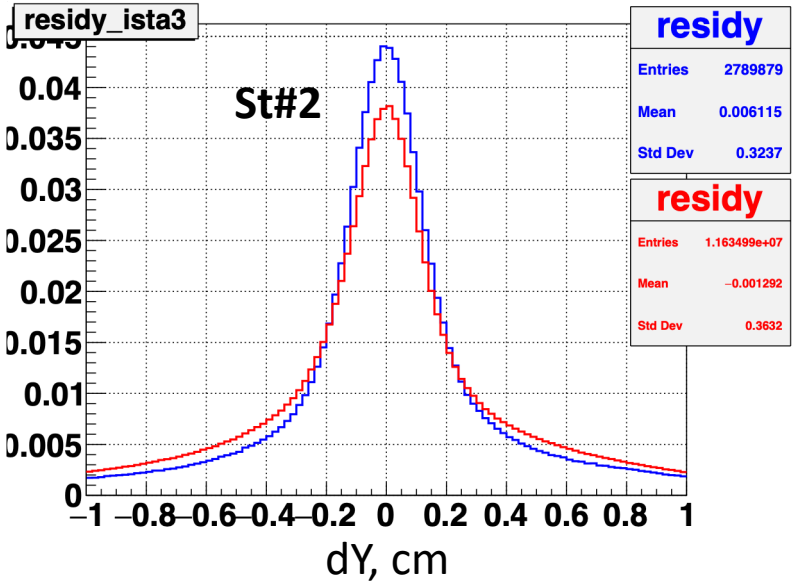


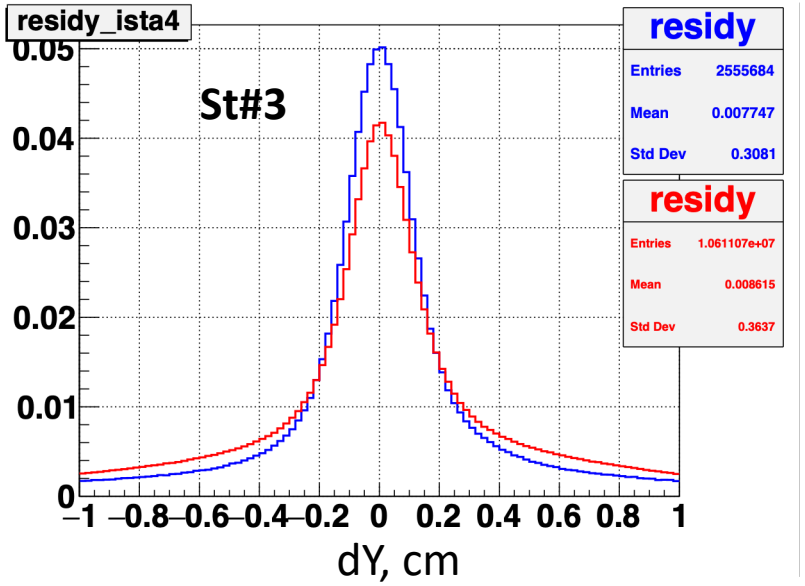


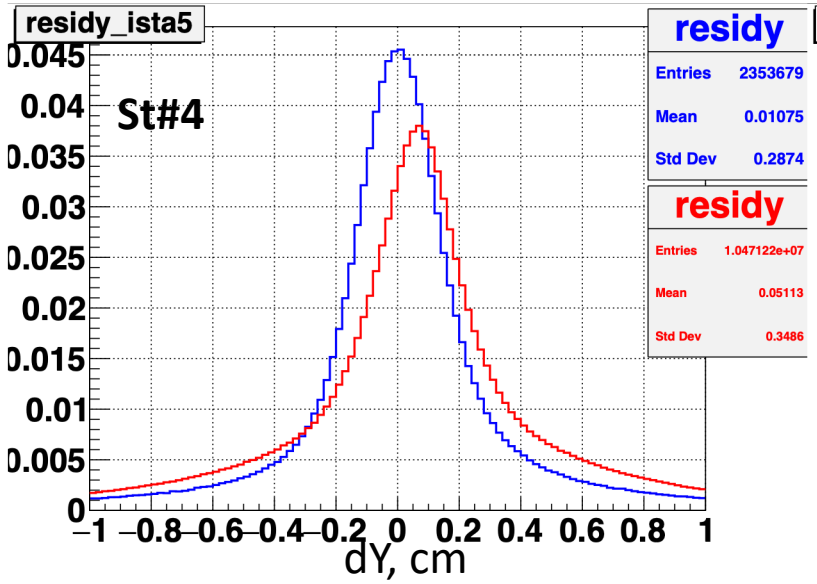
Sigma Dx vs x (DATA & MC 4.0GeV C+Cu)

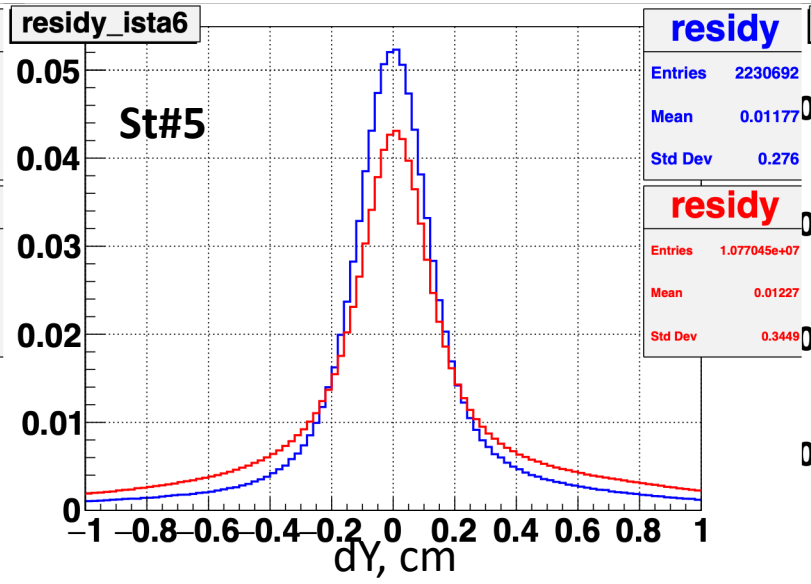
Need Y pools corrections (in progress…)

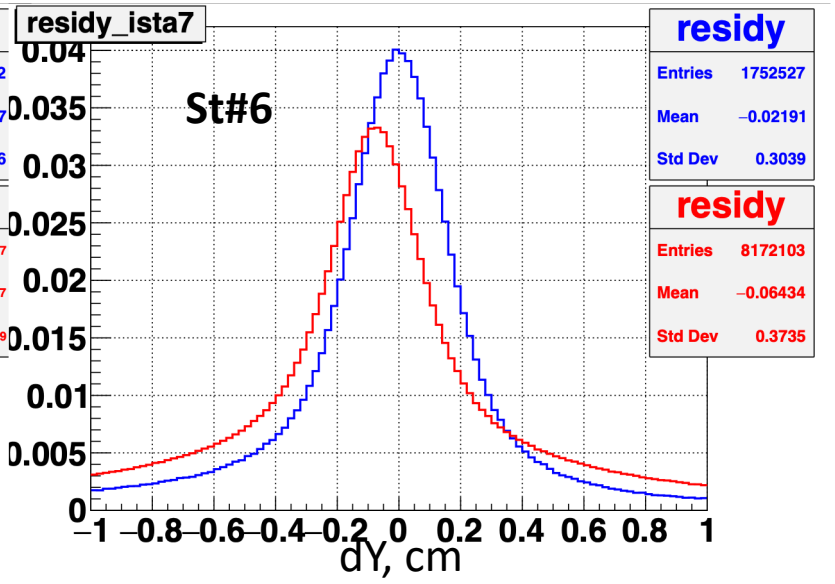








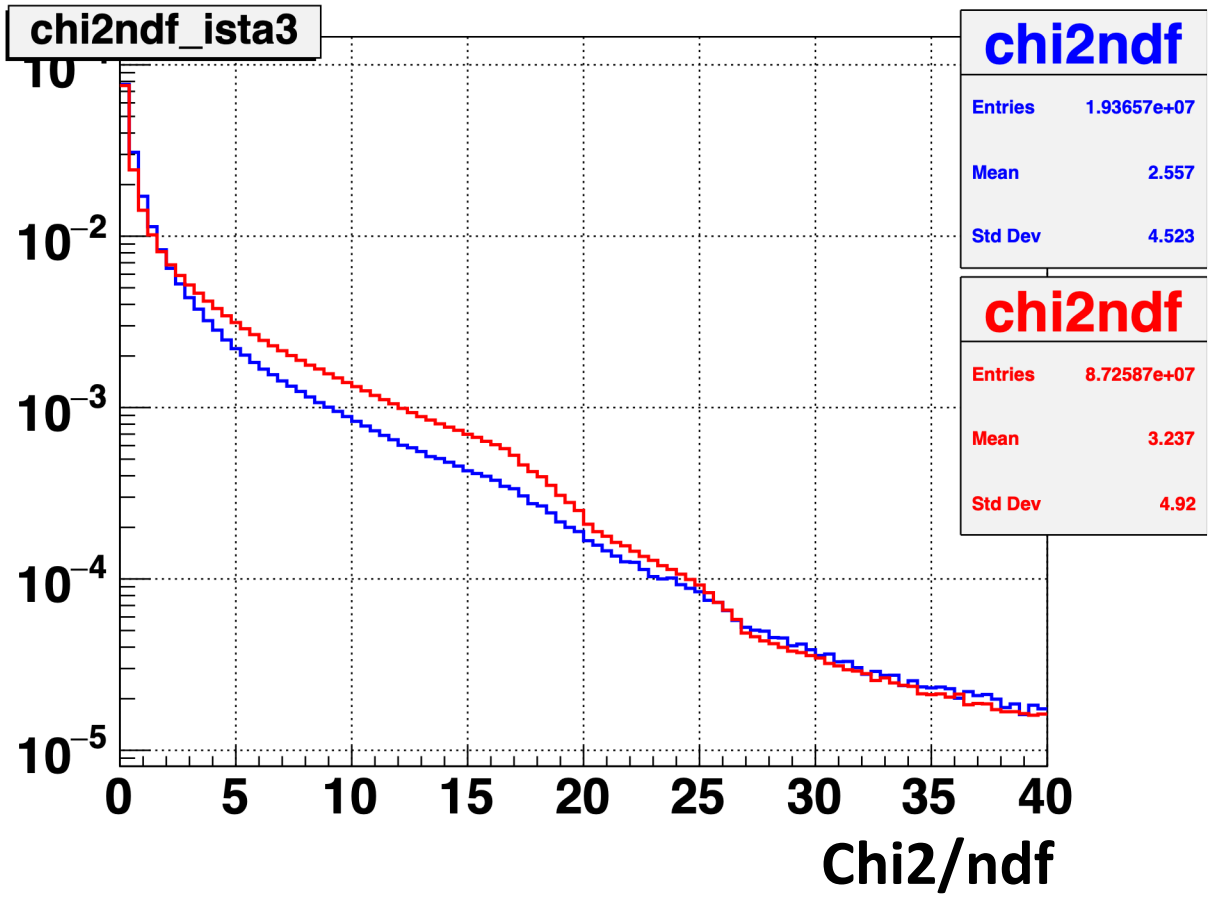


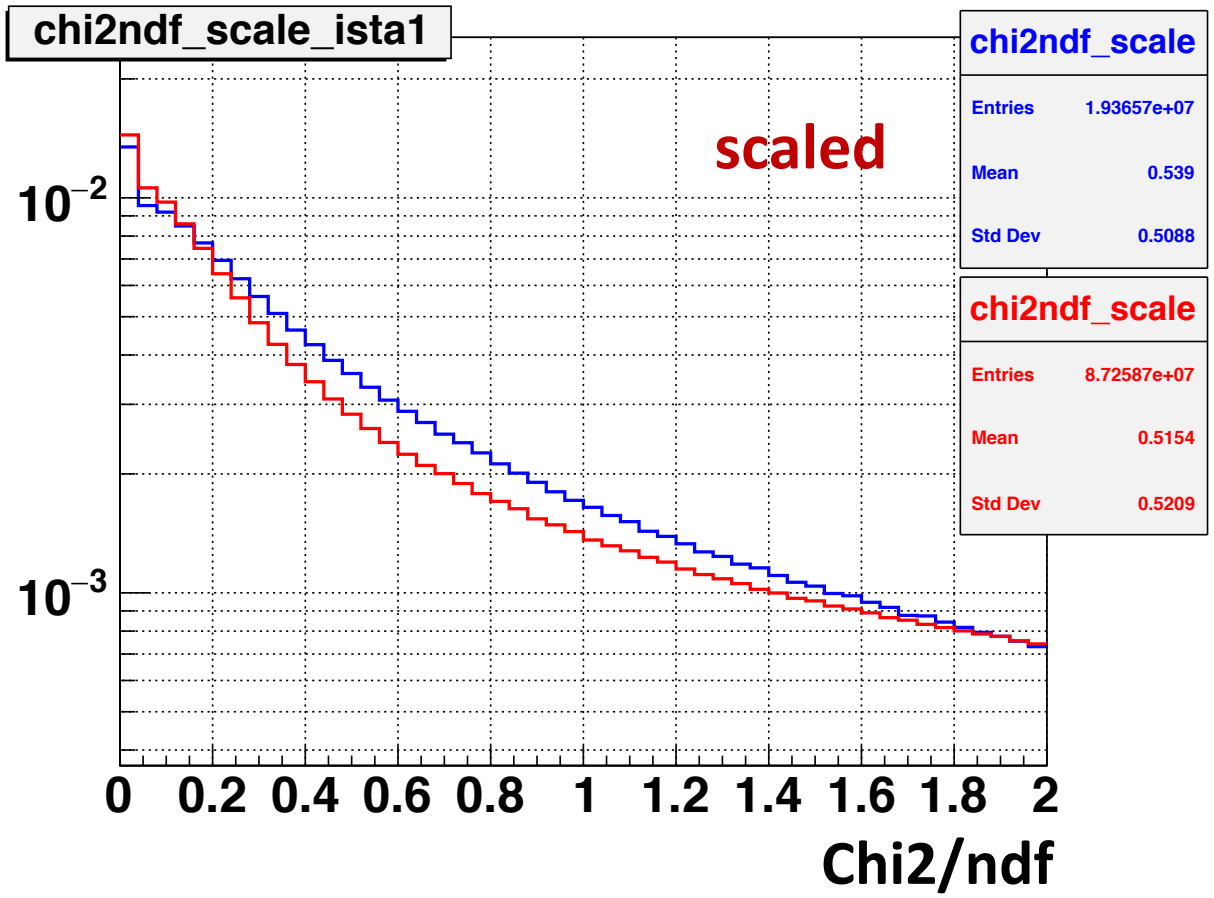


Blue: MC

Red: DATA

Chi2/ndf of tracks

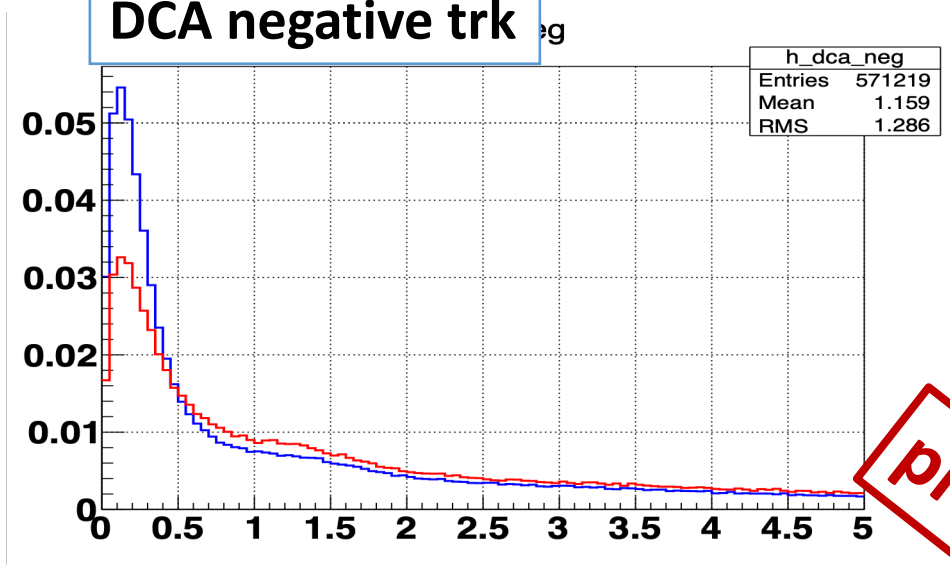




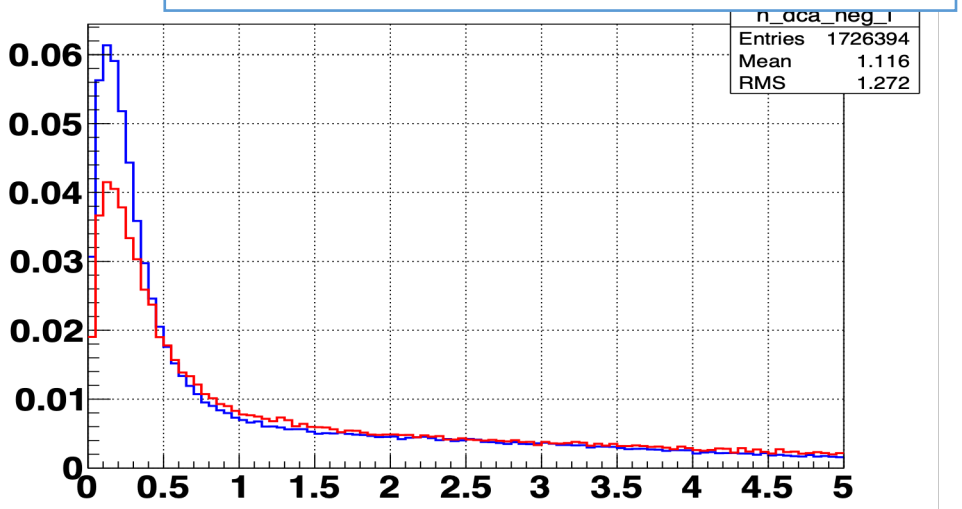
C+Cu (4.0 GeV) **Control plots (DCA tracks to PrimVtx)**

Red: Data: Blue: MC:

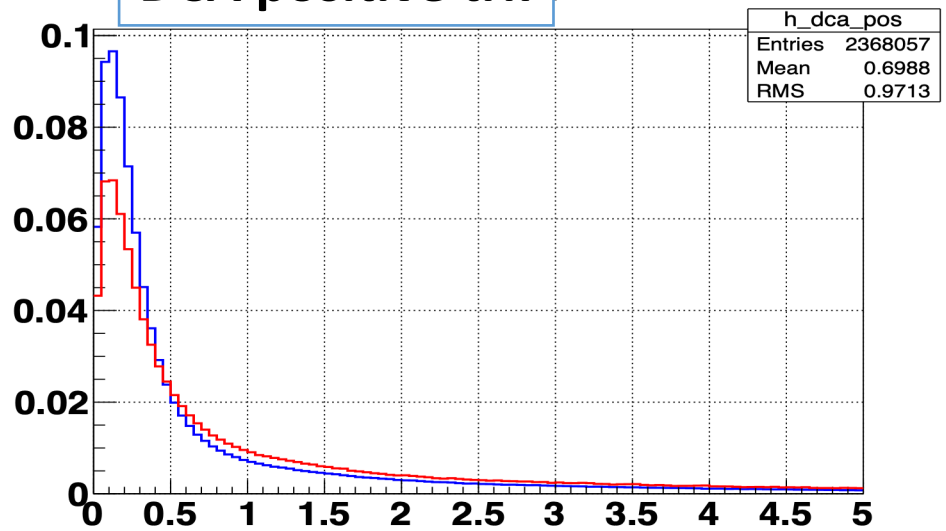
DCA negative trk



DCA negative trk from Lambda

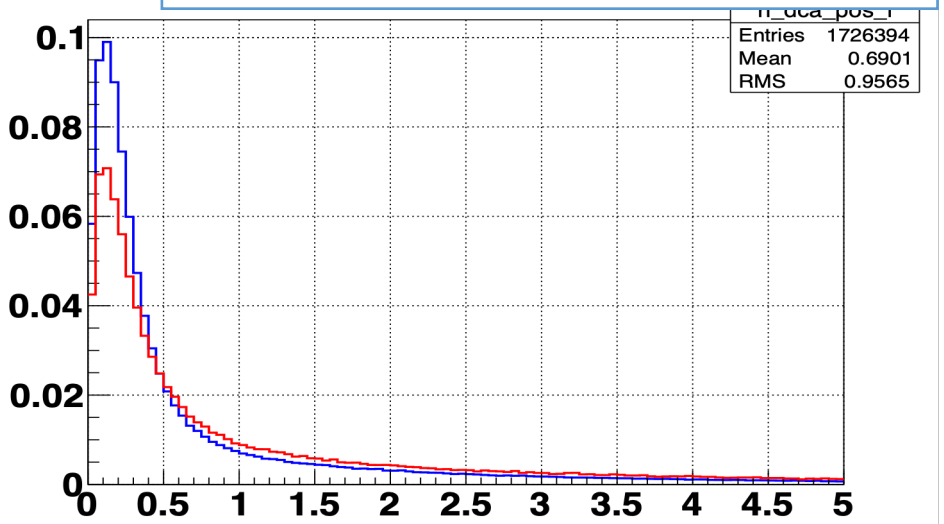


DCA positive trk



preliminary

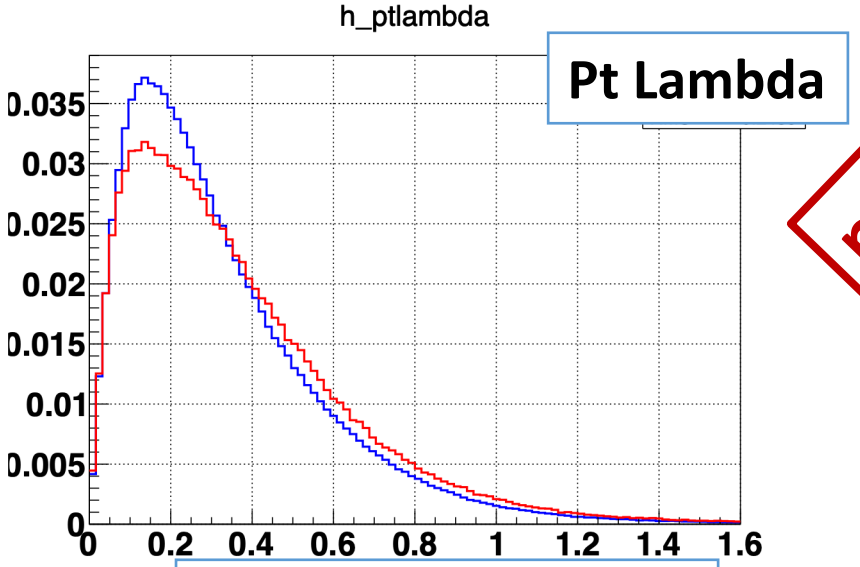
DCA positive trk from Lambda

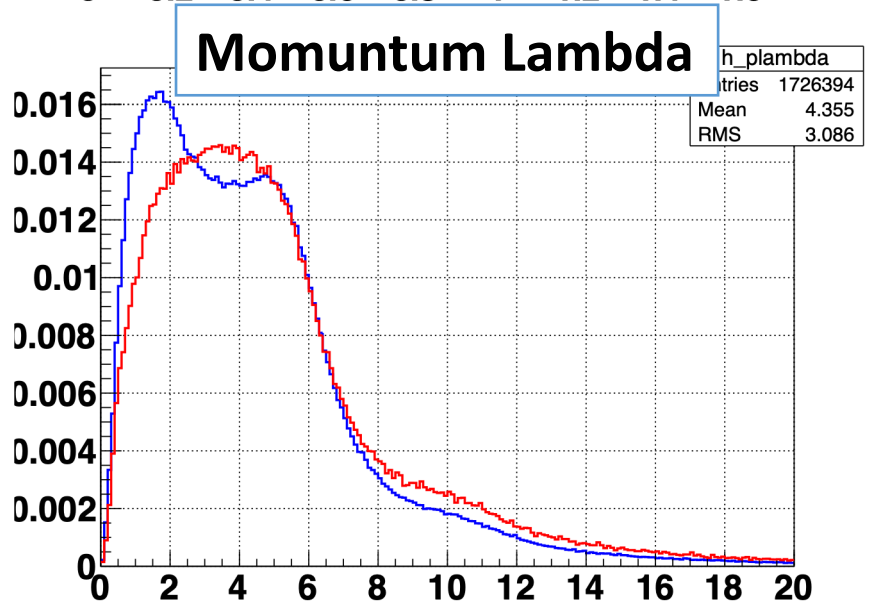


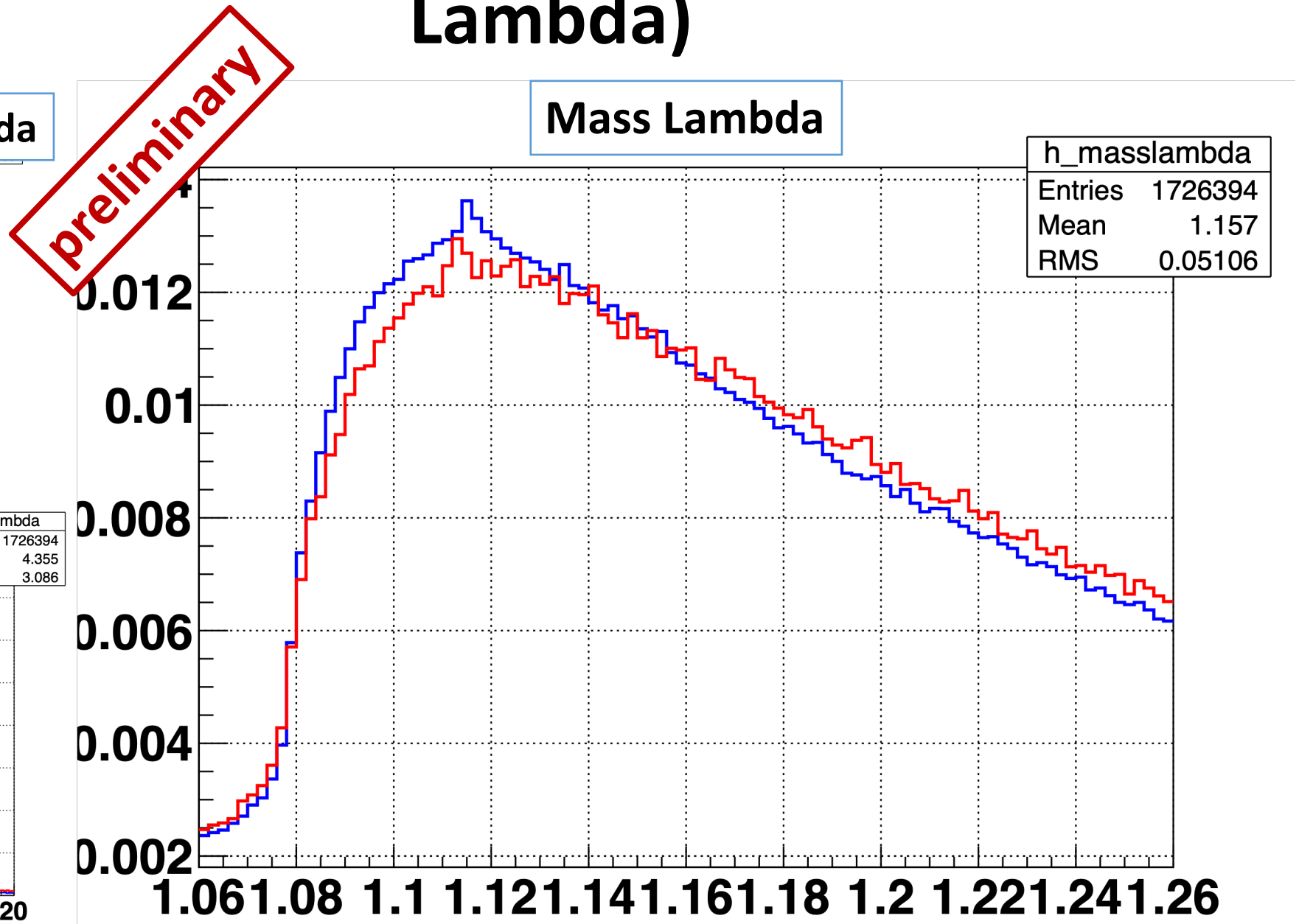
Control plots (Pt, Momentum & Mass of Lambda)

C+Cu (4.0 GeV)

Red: Data; Blue: MC;



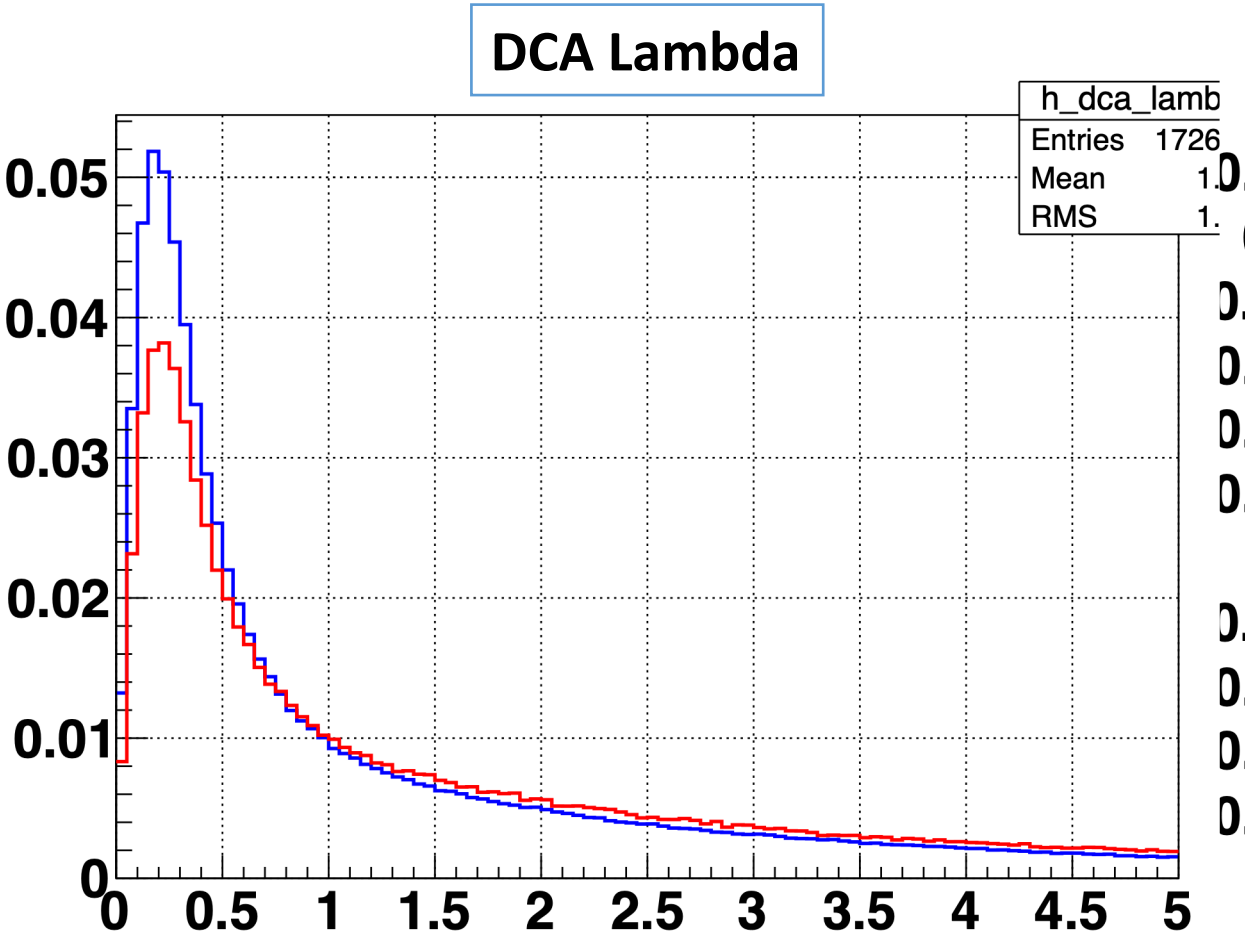


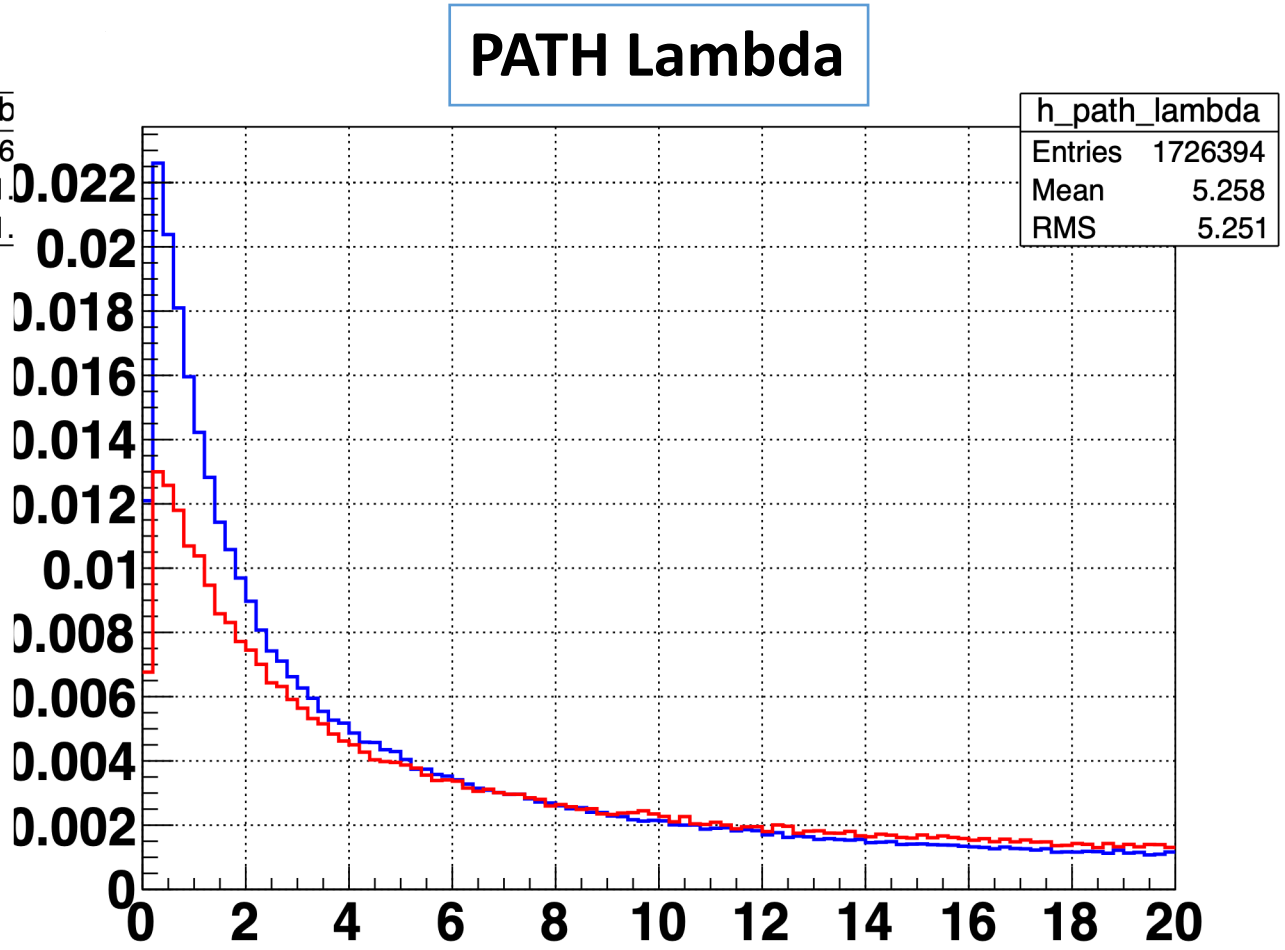


C+Cu (4.0 GeV)

Control plots (DCA & PATH of Lambda)

Red: Data; Blue: MC;





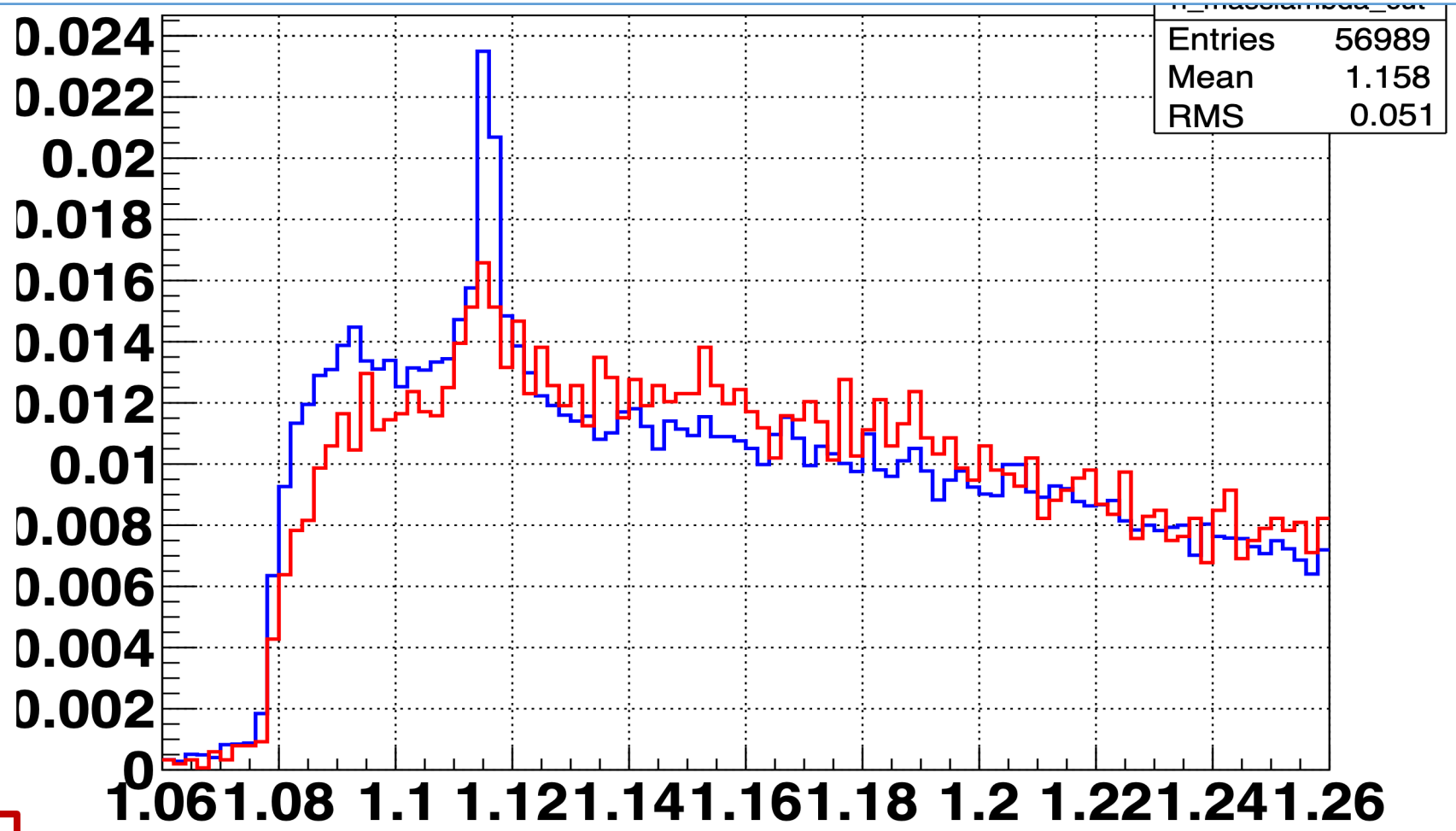
preliminary

C+Cu (4.0 GeV)

Control plots (Mass L0)

Red: Data; Blue: MC;

Mass Lambda after more tight cuts (dca, path, momentum)



preliminary

Next steps…

- Applying X/Y pools corrections for MC
  - => Expect more better agreement in residuals shapes, chi2/ndf & control plots distributions
  - => Re-check GEM efficiencies for MC
- Comparing DATA/MC control distributions (PATH, DCA, Pt, P, Mass, etc..)
- Measuring cross-sections of the Λ^0's hyperon

Thank you for your attention!

BM@N

Baryonic Matter at Nuclotron