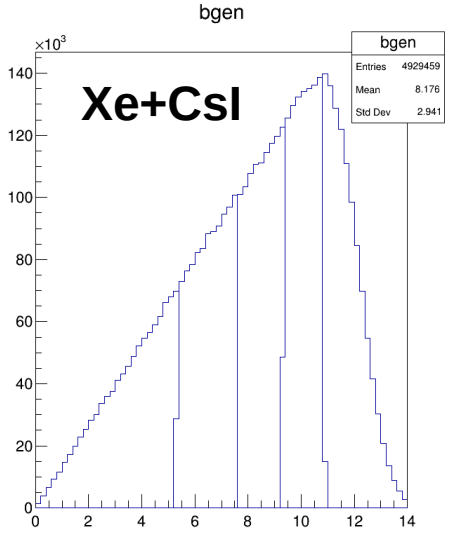
On the measurement of p,d in Xe+CsI interactions

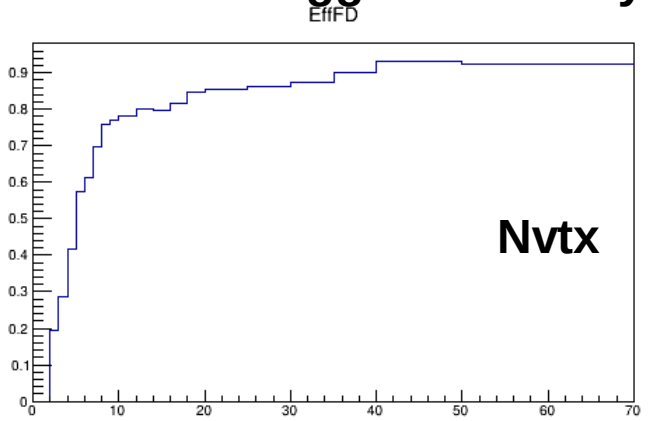
M.Kapishin, L.Kovachev

- **Data set: runs 7873,77,78,84,87,91-93, 5.1M reconstructed events**
- **Simulation: DCM-SMM model → 5M generated events, 4.45M reconstructed events, vertex reconstruction efficiency ~1.0 for centrality 0-60%, 0.95 for centrality 60-80%, 0.57 for centrality 80-100%**
- **Data correction for trigger efficiency** $\rightarrow 1/\varepsilon_{trig}(Nvtx)$



- **Pile up events suppressed by condition: Nhits(ToF-400,700)<10 in time slices of 50 ns outside event time window (0-70 ns)**

BD·FD trigger efficiency

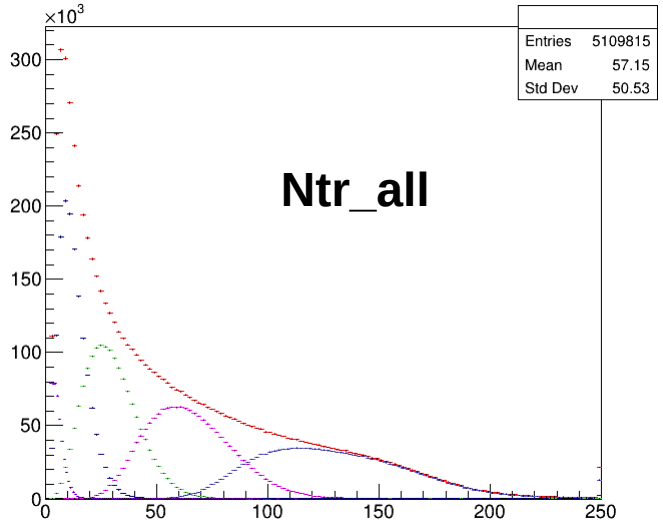


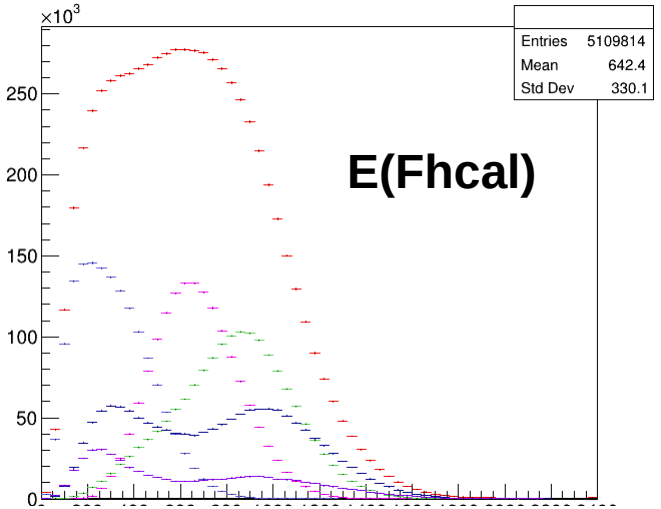
Define centrality ranges from impact parameter distribution (DCM-SMM): 0-20%, 20-40%, 40-60% 60-80%, 80-100% (plot)

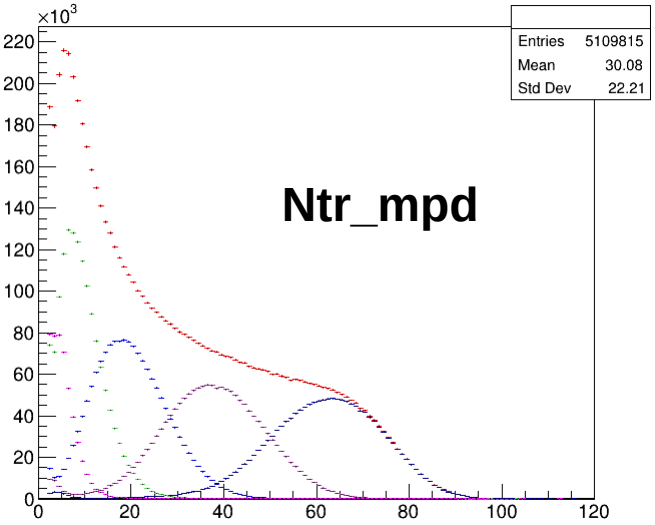
Parameterization of m_T spectra to extract inverse slope T_0 and dN/dy

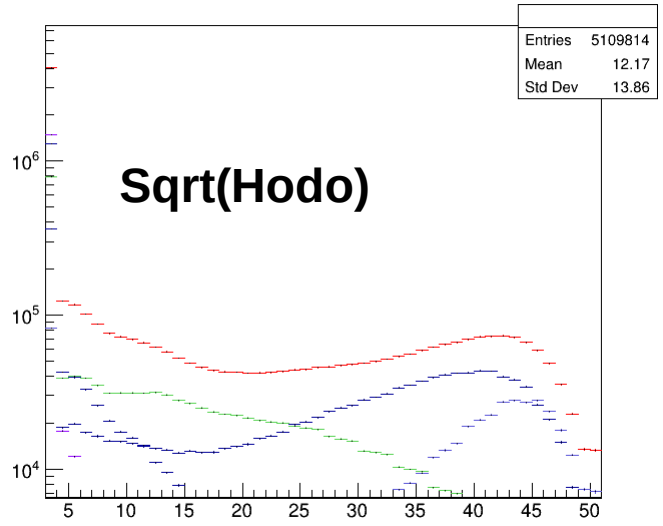
$$\frac{1}{m_T} d^2N/dydm_T = \frac{dN/dy}{T_0(T_0+m)} \exp(-(m_T-m)/T_0)$$

Data: Ntr_all, Ntr_mpd, E(Fhcal), Sqrt(Hodo) , cent 0-20-40-60-80-100%



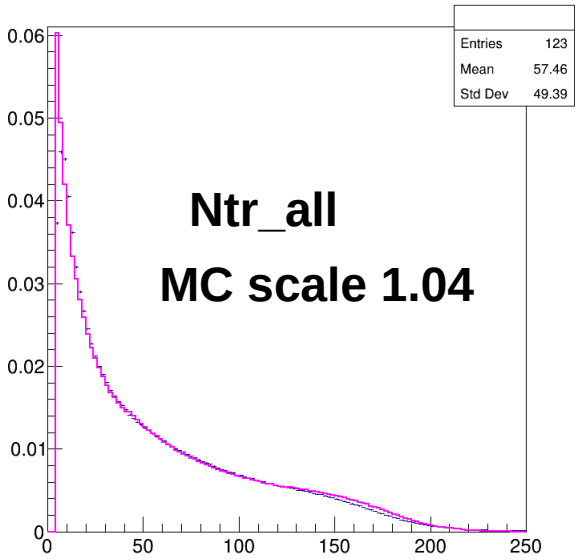


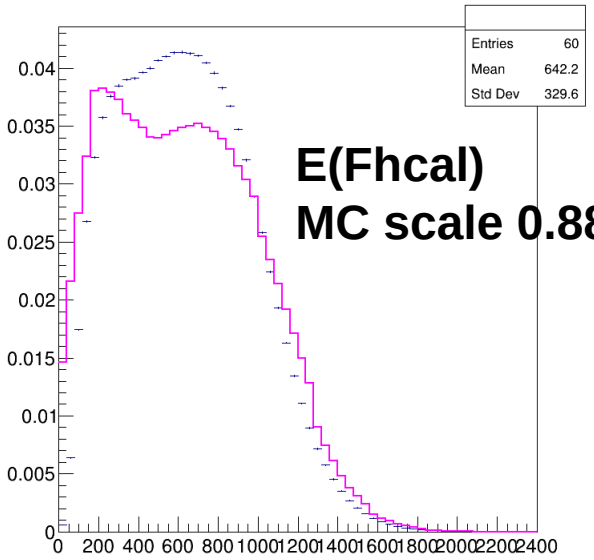


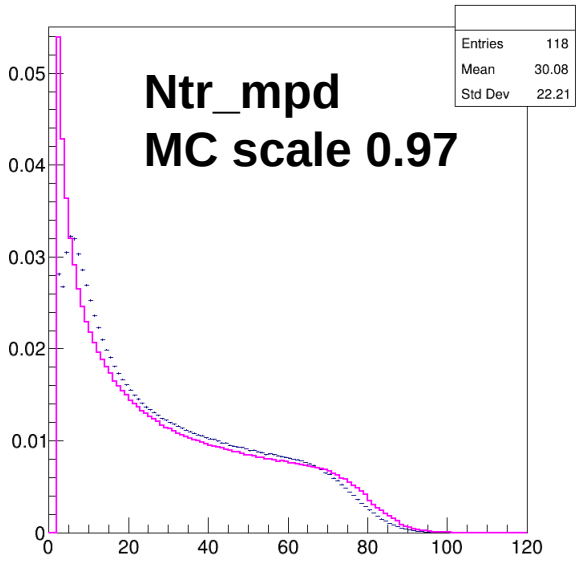


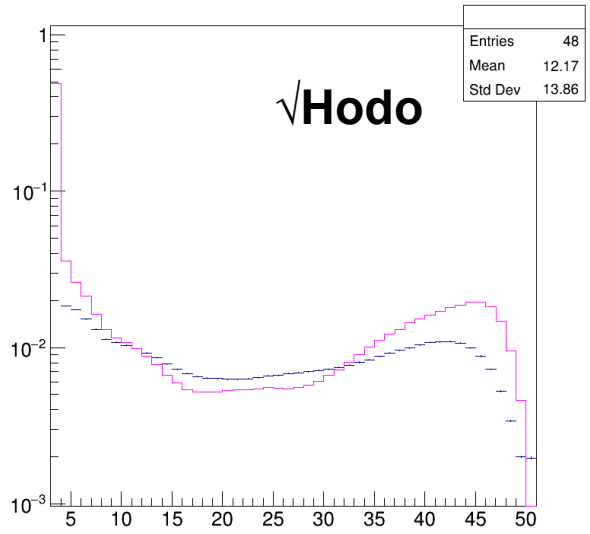
MC probability belonging to a centrality class, defined as a function of (Ntr_all,Efhcal,Hodo) is used as an event weight in Data

Ntr_all, Ntr_mpd, E(Fhcal), Sqrt(Hodo) distributions: Data vs DCM_SMM









DCM-SMM

Hist Data

Systematics of centrality definition:
→ Use different combinations of variables to define centrality

(Ntr_all,Efhcal,Hodo)

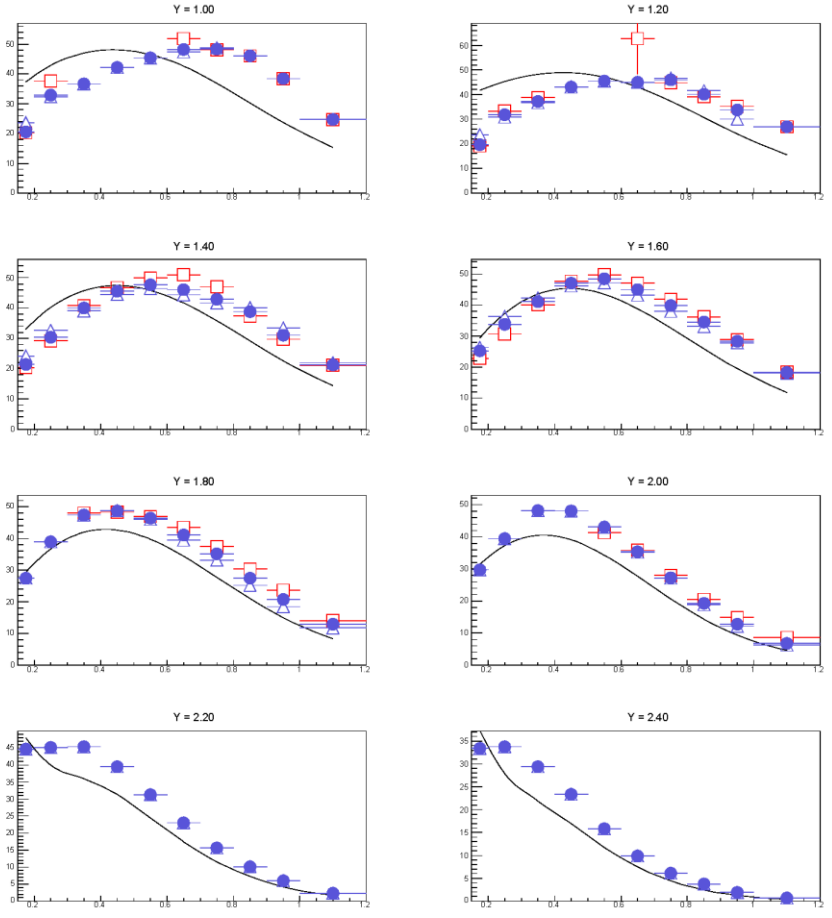
(Ntr_mpd,Efhcal,Hodo)

Ntr_all, Ntr_mpd,

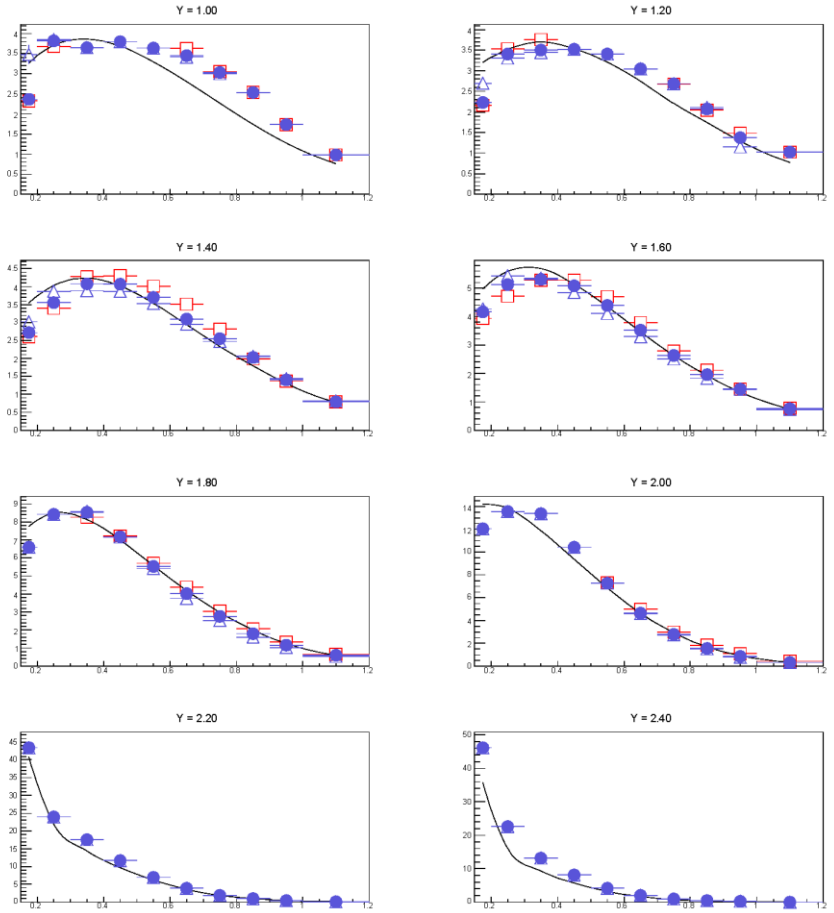
(Efhcal,Hodo)

Proton p_T spectra in y bins, cent 0-20, 60-80%

Cent 0-20%



Cent 60-80%



p_T p_T

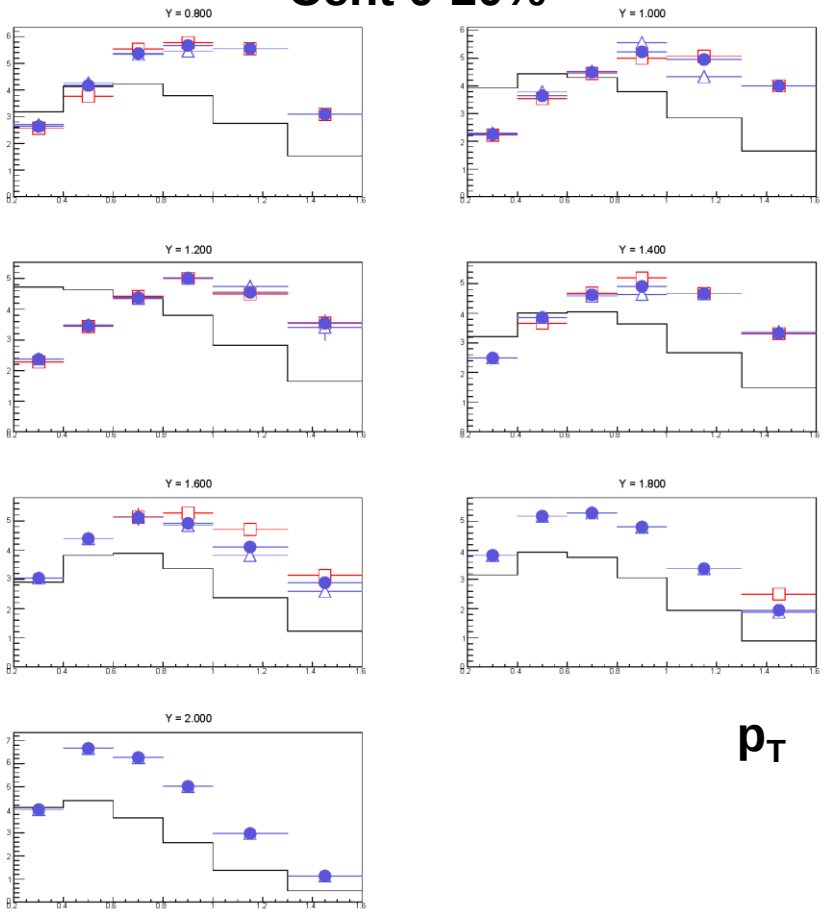
—— DCM-SMM

□ ToF400 Δ ToF700 ● Combined

Acceptance, track reconstruction and ToF matching efficiency applied

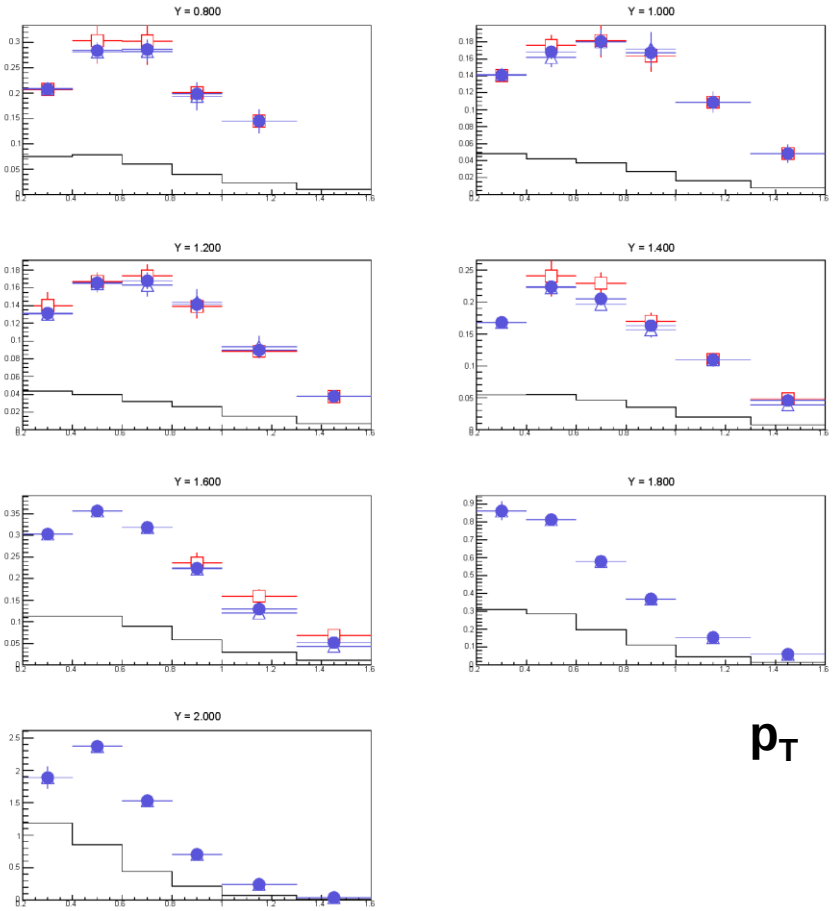
Deuteron p_T spectra in y bins, cent 0-20, 60-80%

Cent 0-20%



p_T

Cent 60-80%



p_T

□ **ToF400** Δ **ToF700** ● **Combined**

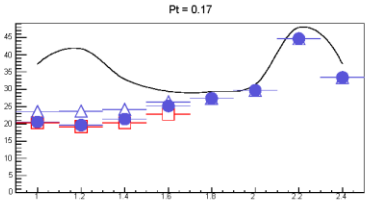
—— **DCM-SMM**

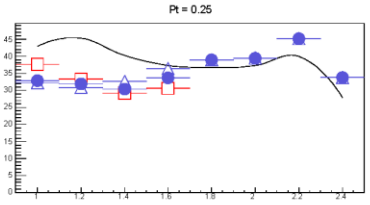
Proton y spectra in p_T bins, cent 0-20, 60-80%

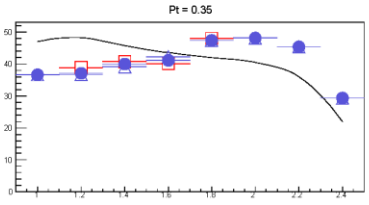
□ ToF400 Δ ToF700 ● Combined

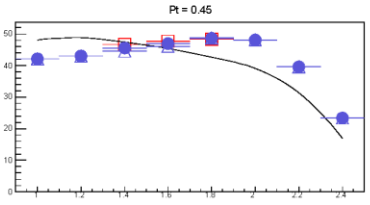
—— DCM-SMM

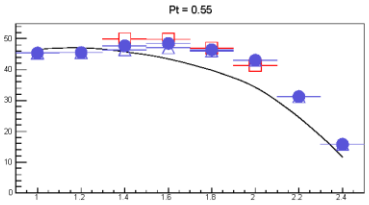
Cent 0-20%

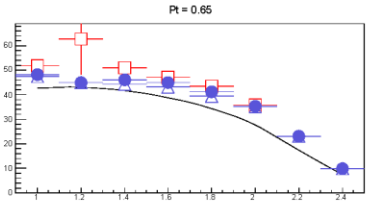


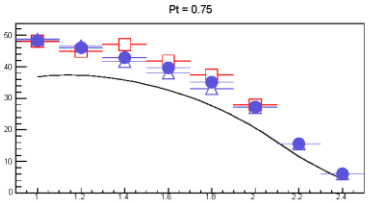


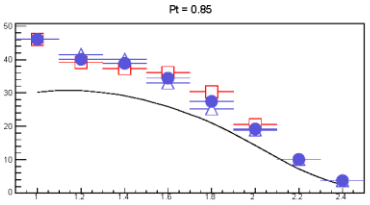


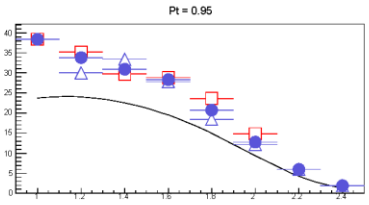


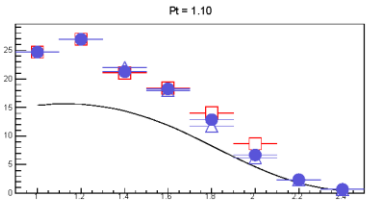






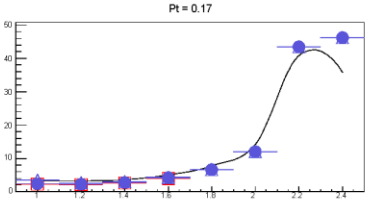


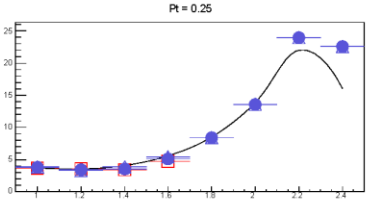


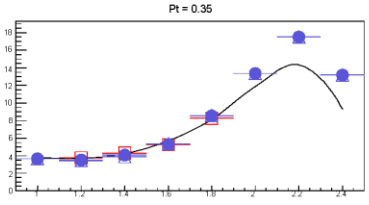


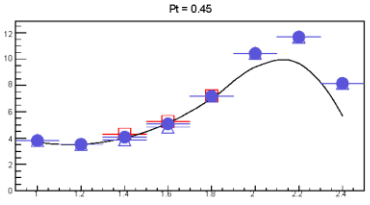
y

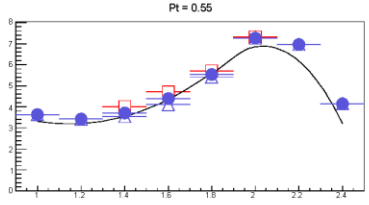
Cent 60-80%

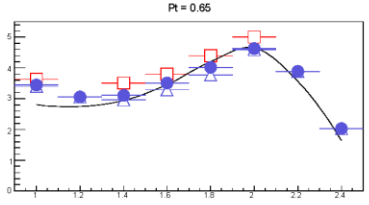


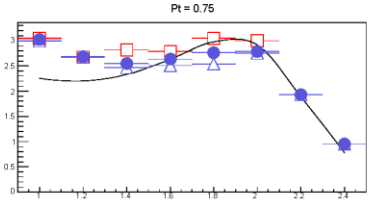


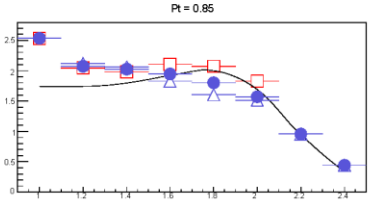


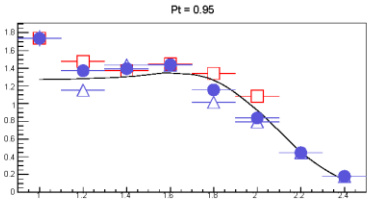


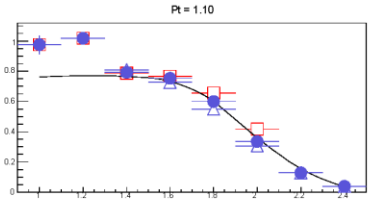








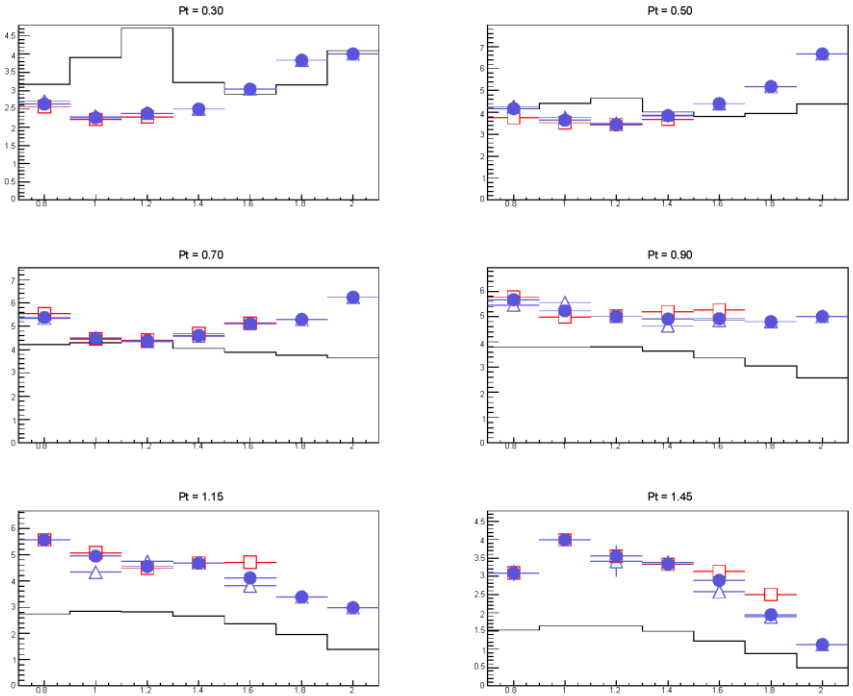




y

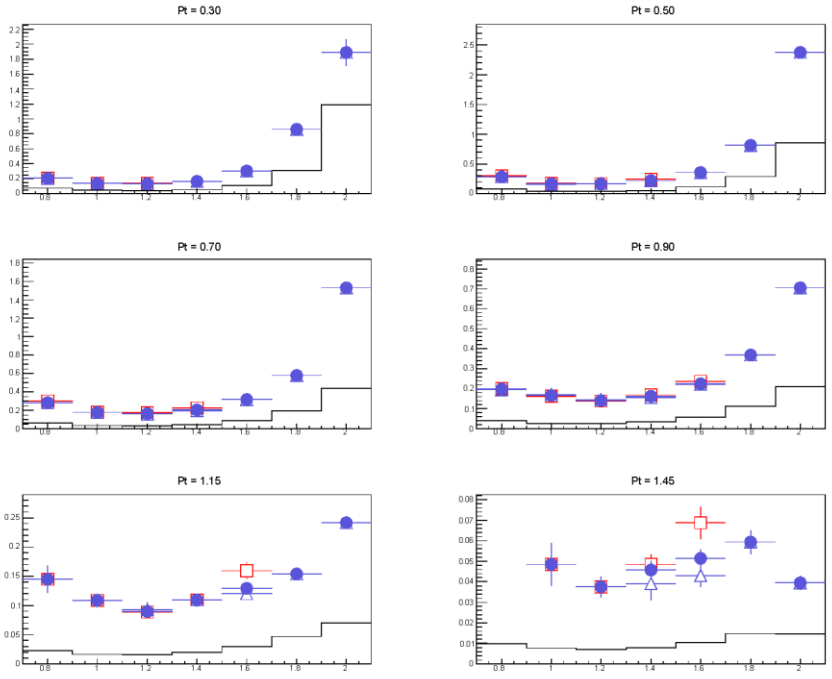
Deuteron y spectra in p_T bins, cent 0-20, 60-80%

Cent 0-20%



y

Cent 60-80%

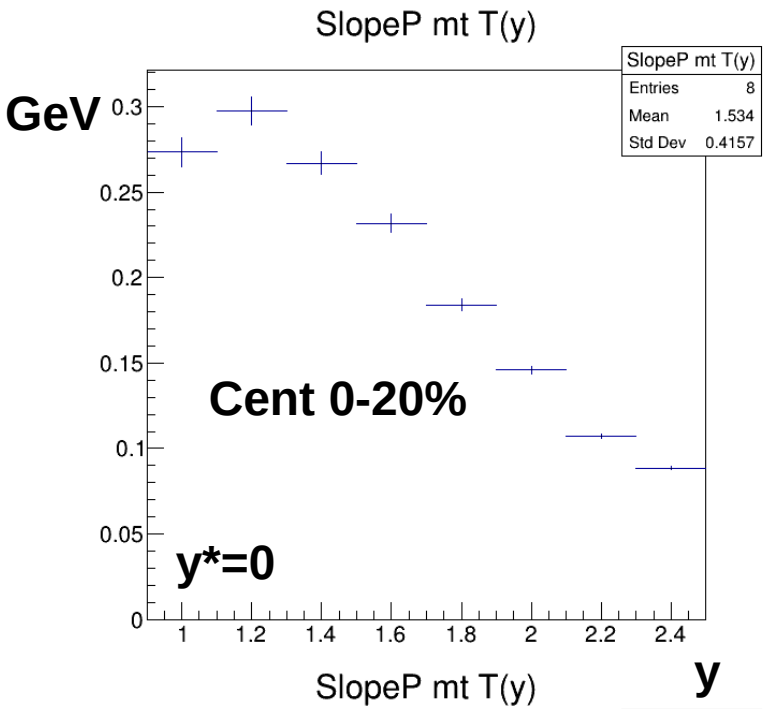


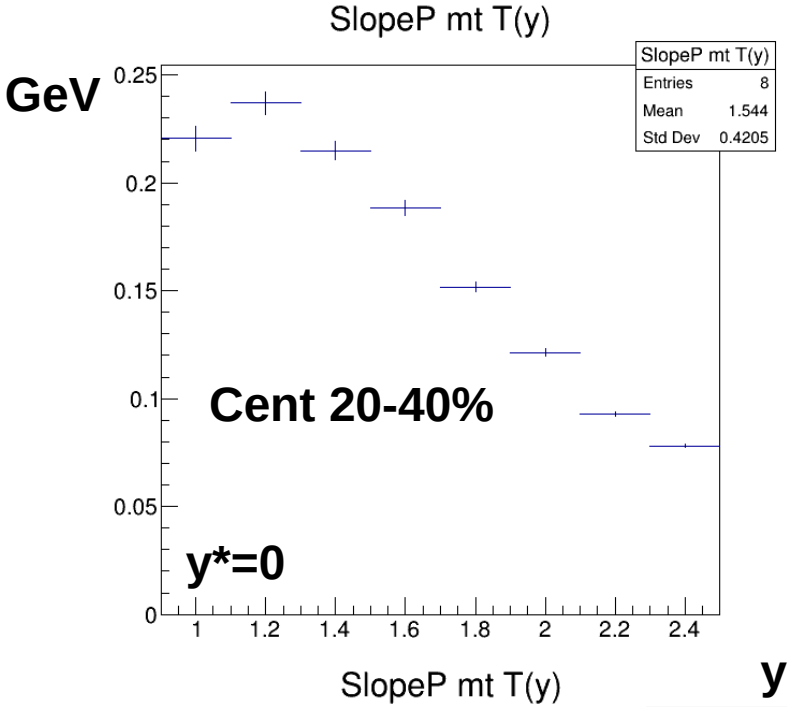
y

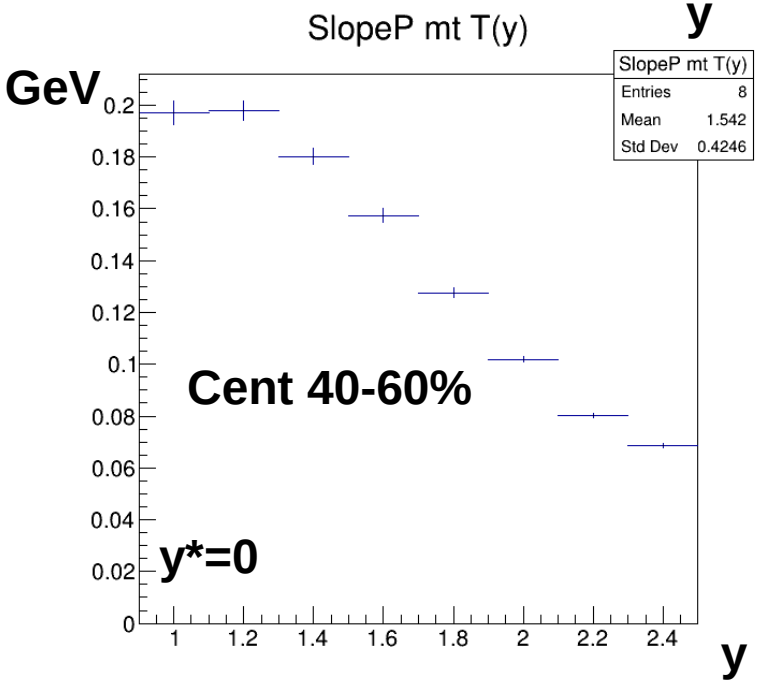
□ ToF400 △ ToF700 ● Combined

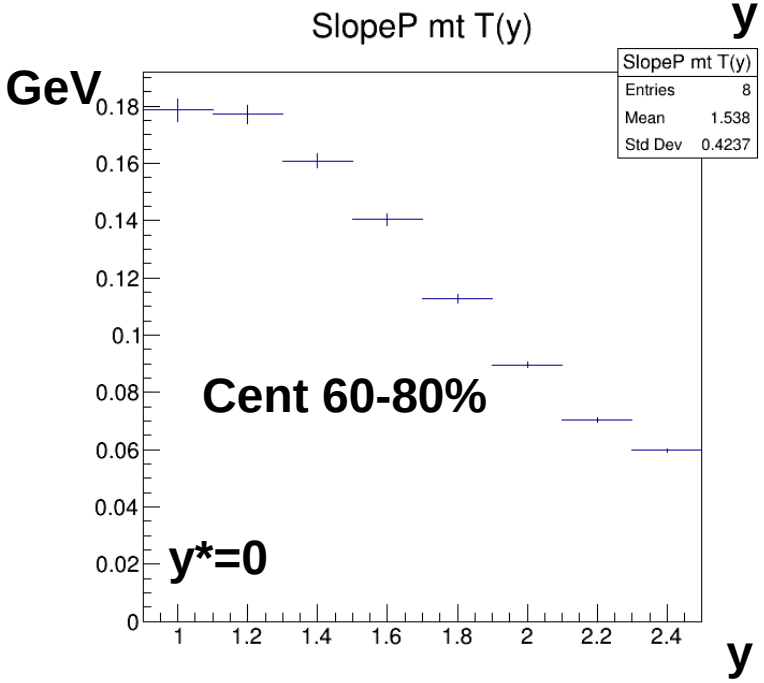
—— DCM-SMM

$T_0(y)$ slope of proton m_T spectra, cent 0-20-40-60-80%

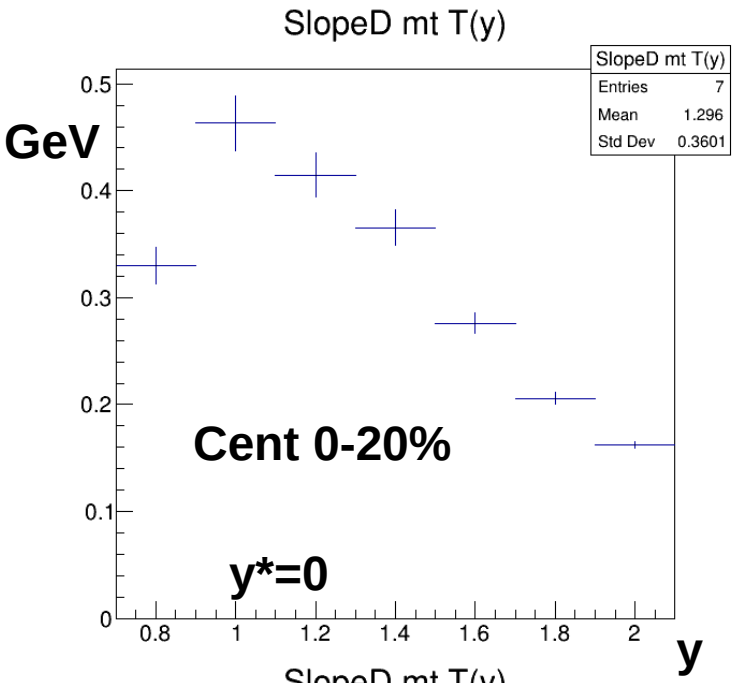


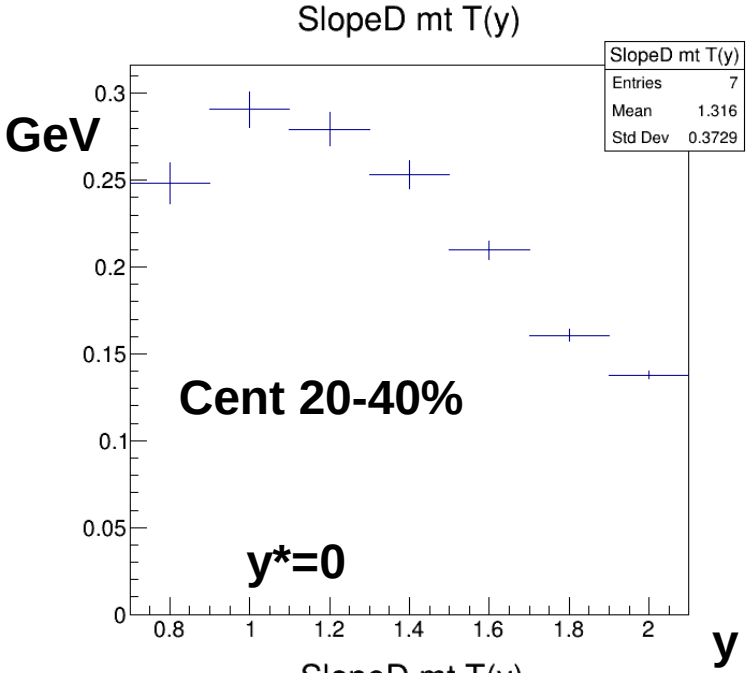


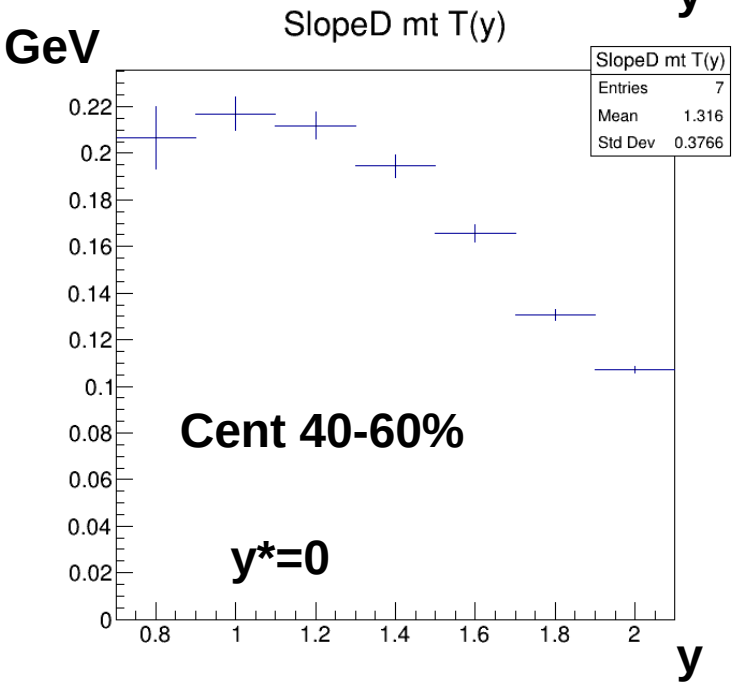


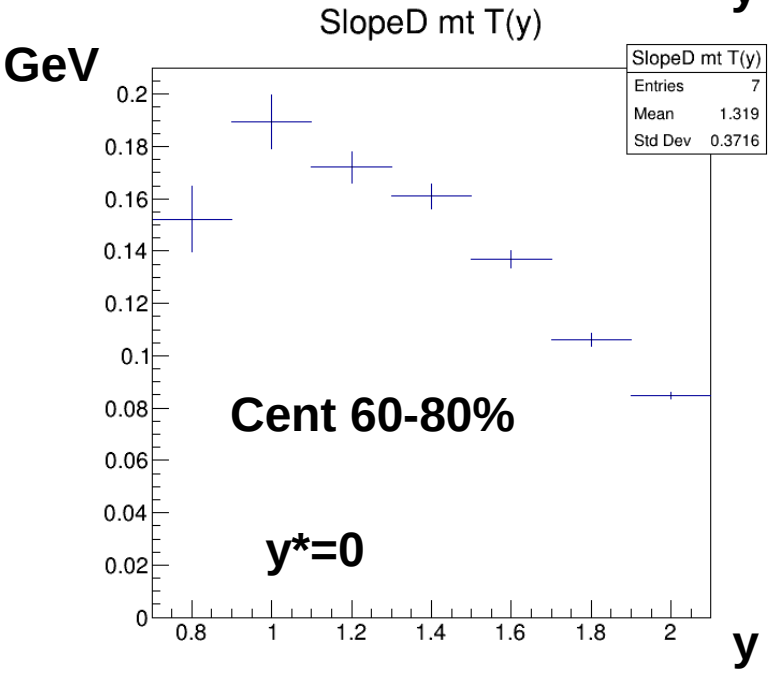


$T_0(y)$ slope of deuteron m_T spectra, cent 0-20-40-60-80%

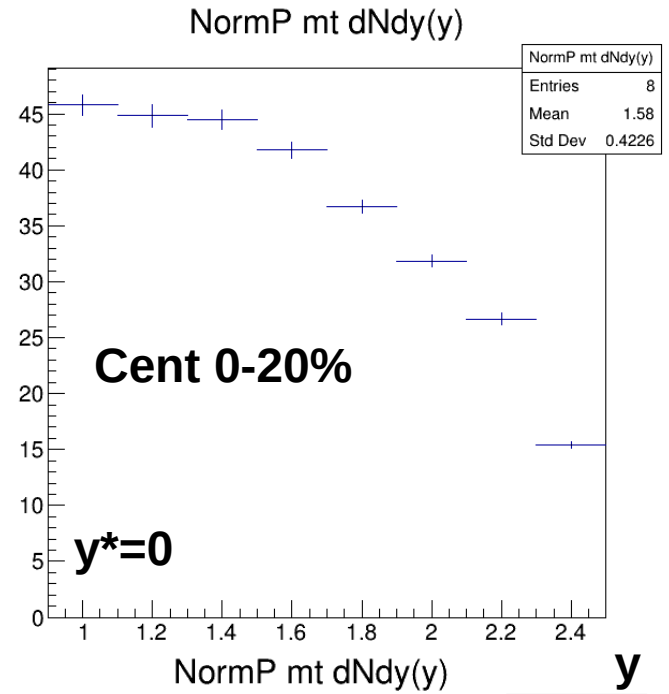


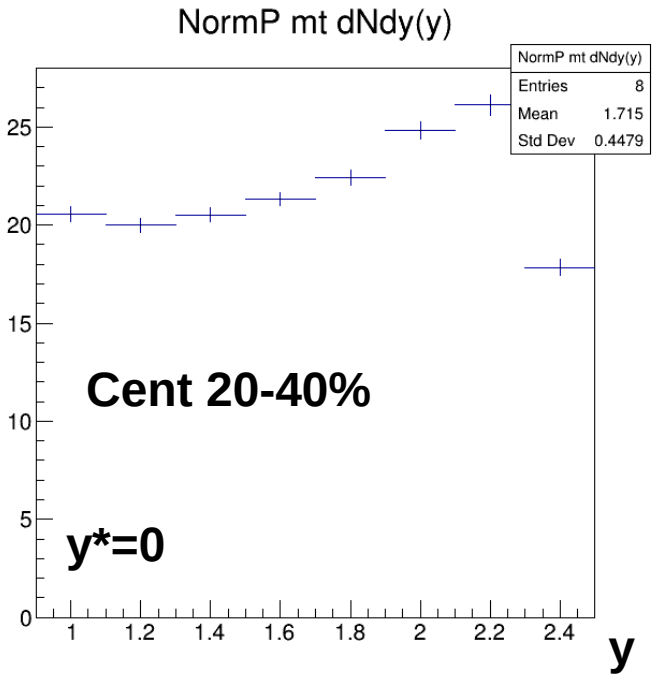


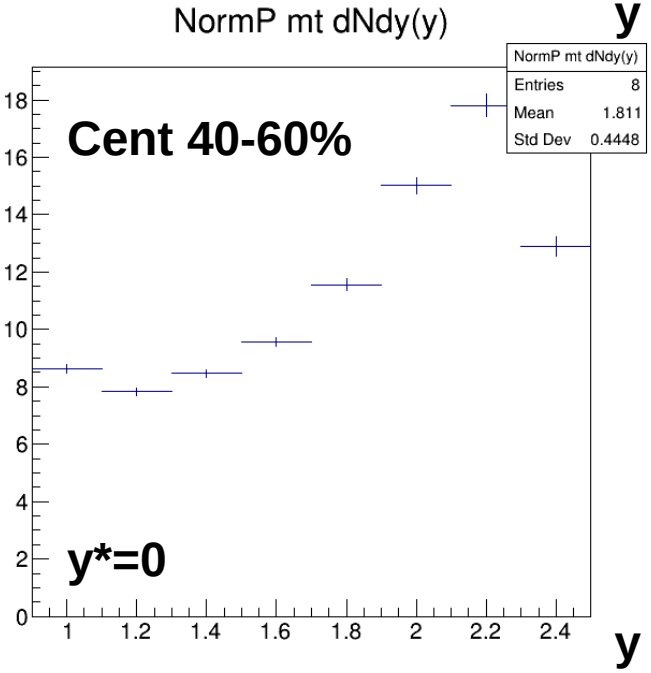


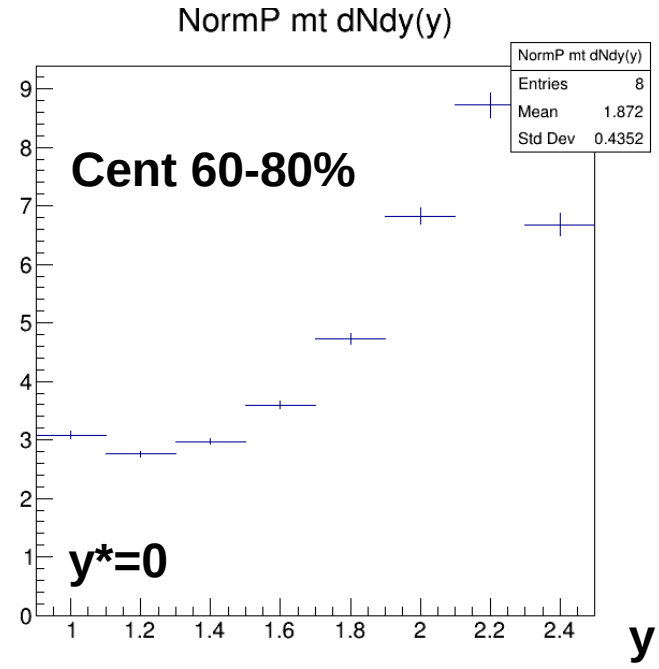


Proton yield dN/dy, cent 0-20-40-60-80%

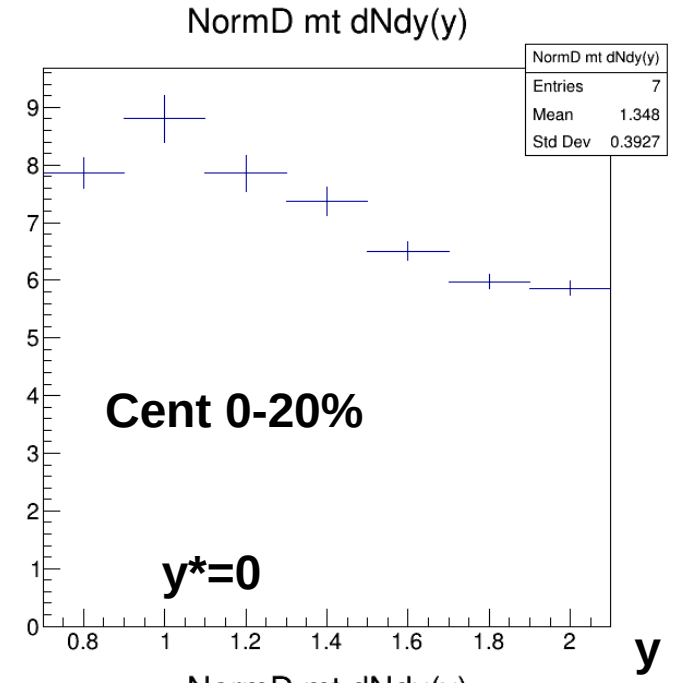


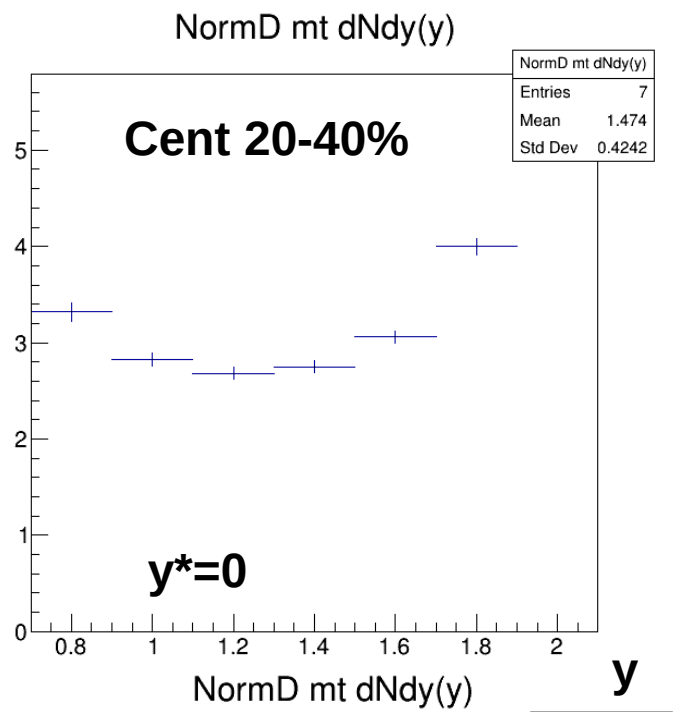


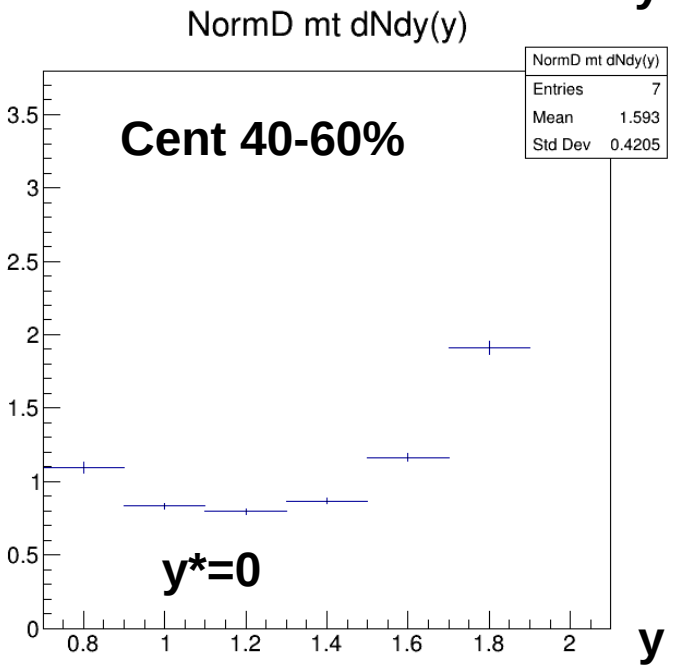


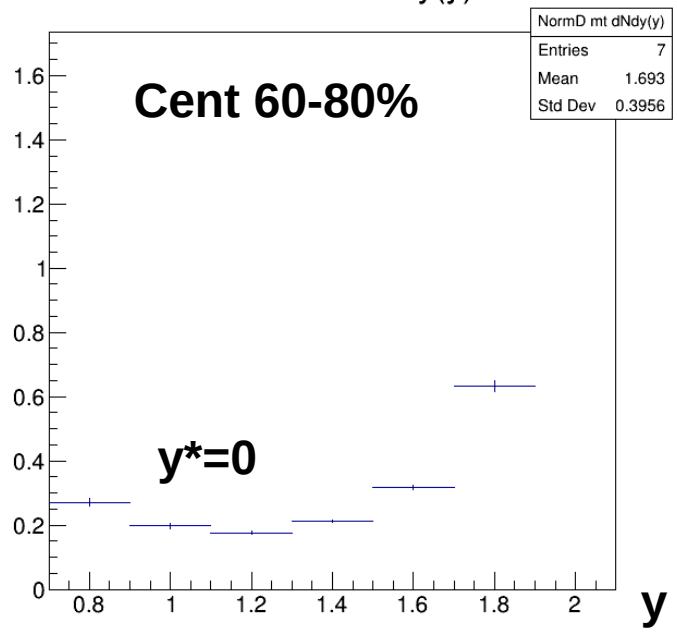


Deuteron yield dN/dy, cent 0-20-40-60-80%

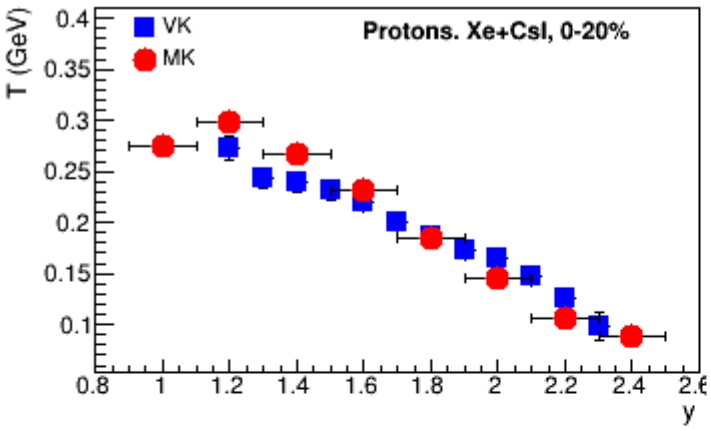


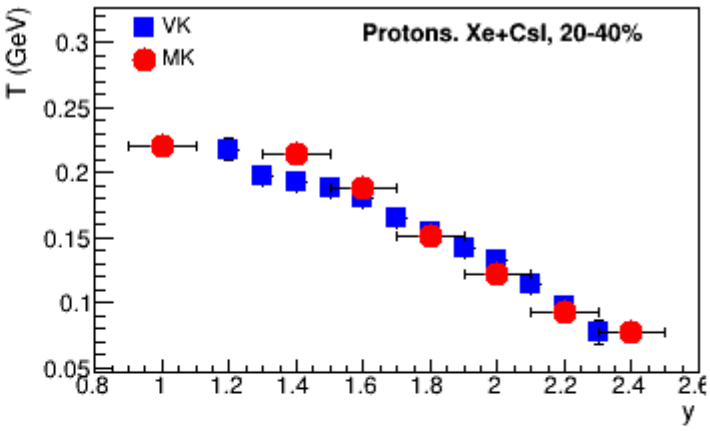


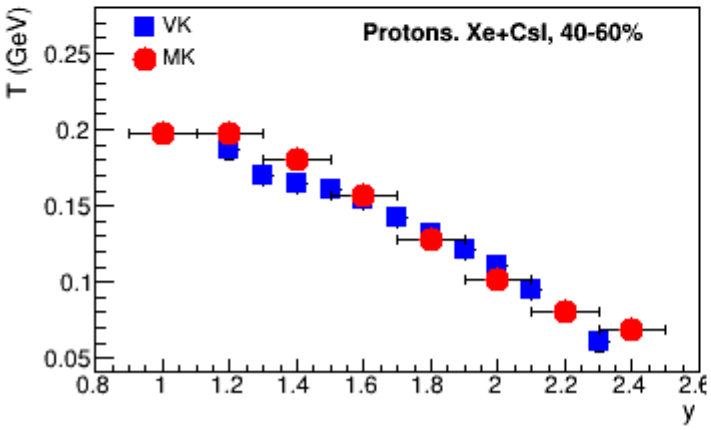


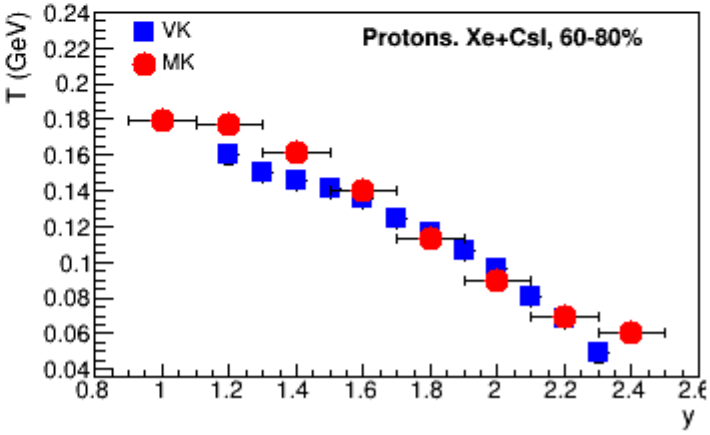


Comparison with V.Kolesnikov: T slopes of proton m_T spectra in y bins



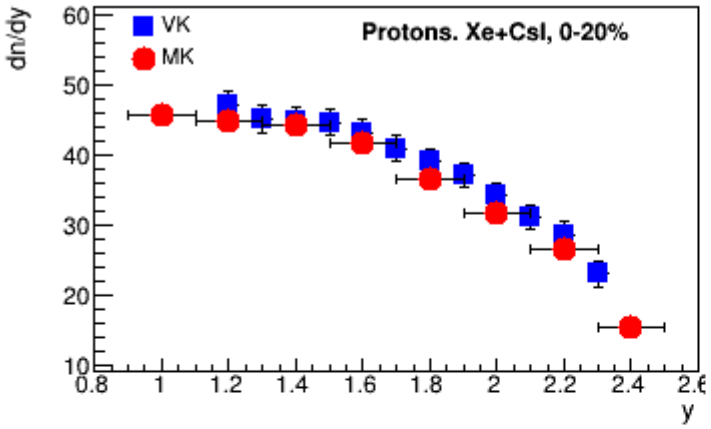


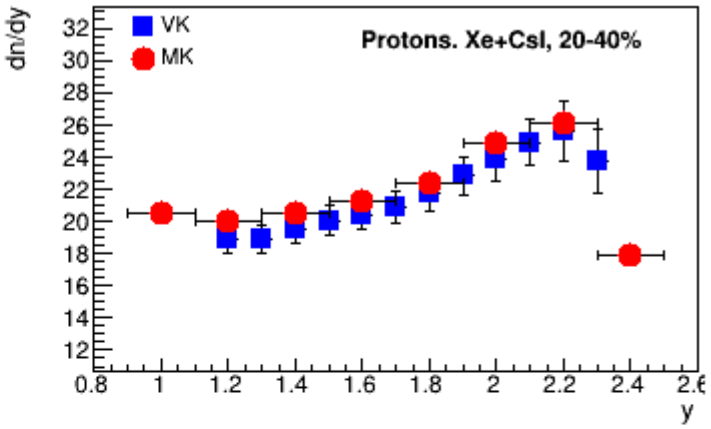


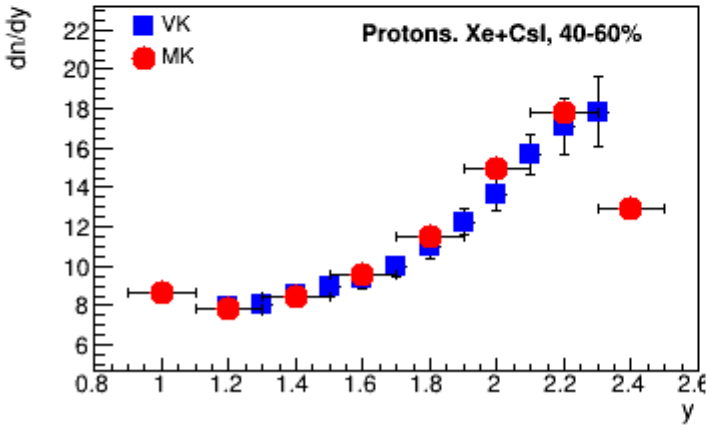


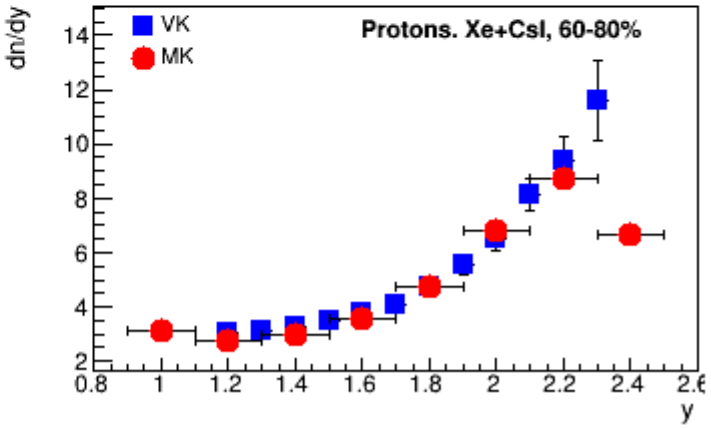
VK vs MK: different analysis chains, selection criteria, different definition of centrality

Comparison with V.Kolesnikov: Proton yields dN/dy in y bins









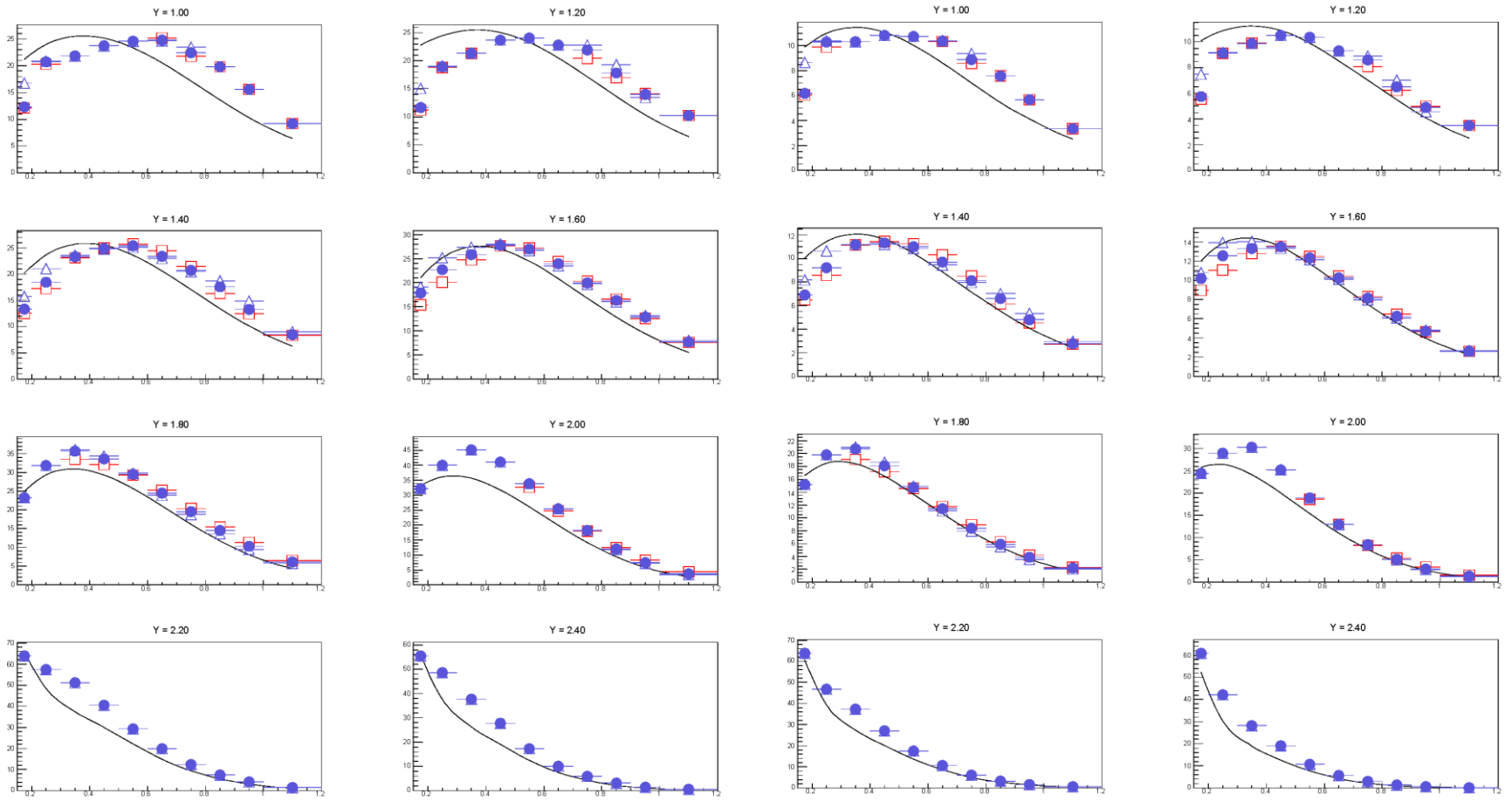
VK vs MK: different analysis chains, selection criteria, different definition of centrality

Next plans

- **Analysis with larger statistics: include *t, He3, He4***
- **Systematics of centrality definition based on combination of variables: Ntr_all, Ntr_mpd, E(Fhcal), Hodo**
- **Involve a new PosDoc into analysis**

Proton p_T spectra in y bins, cent 20-40, 40-60%

Cent 20-40% **Cent 40-60%**



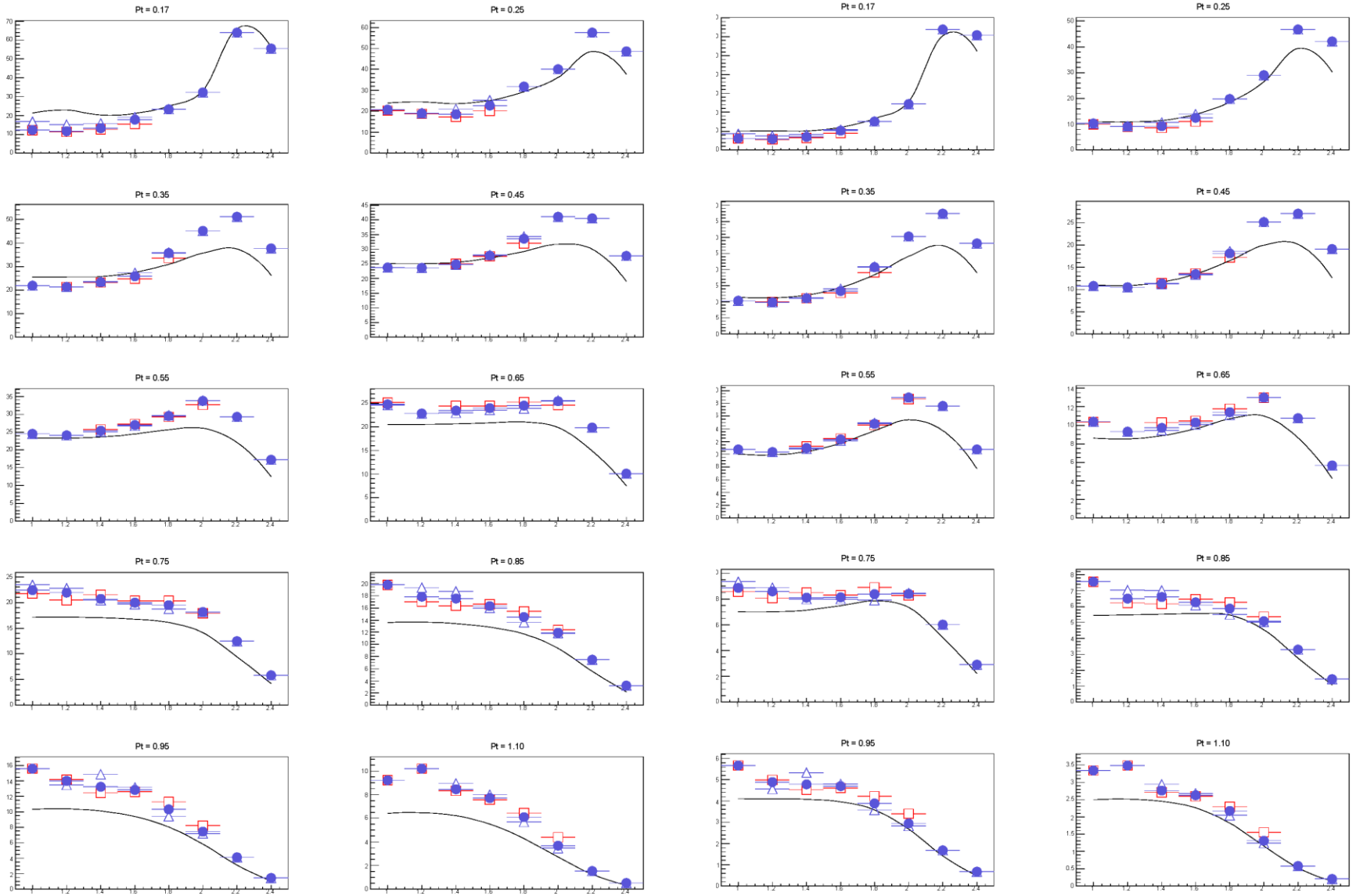
p_T p_T

—— DCM-SMM

□ ToF400 Δ ToF700 ● Combined

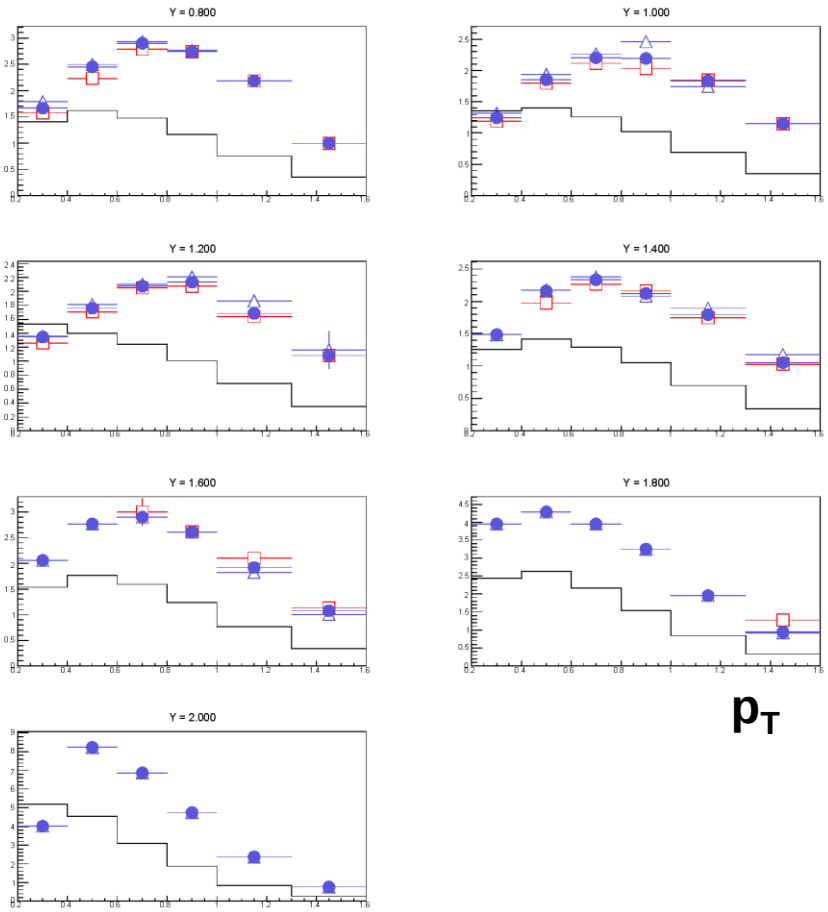
Proton y spectra in p_T bins, cent 20-40, 40-60%

Cent 20-40% □ **ToF400** Δ **ToF700** ● **Combined** **Cent 40-60%**



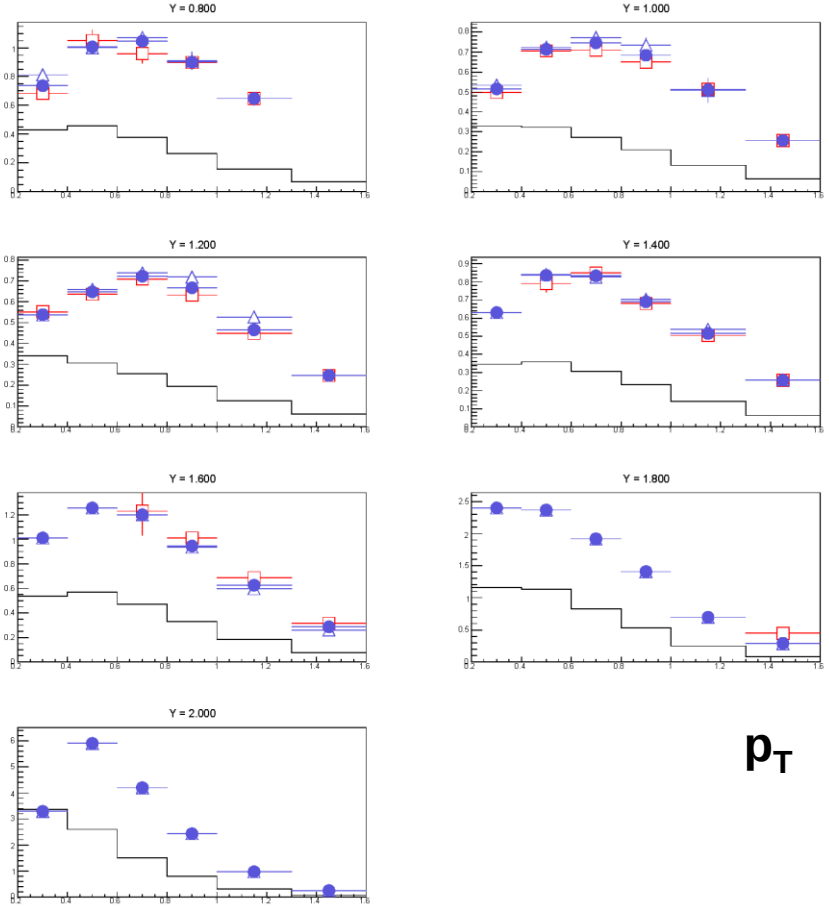
Deuteron p_T spectra in y bins, cent 20-40, 40-60%

Cent 20-40%



p_T

Cent 40-60%



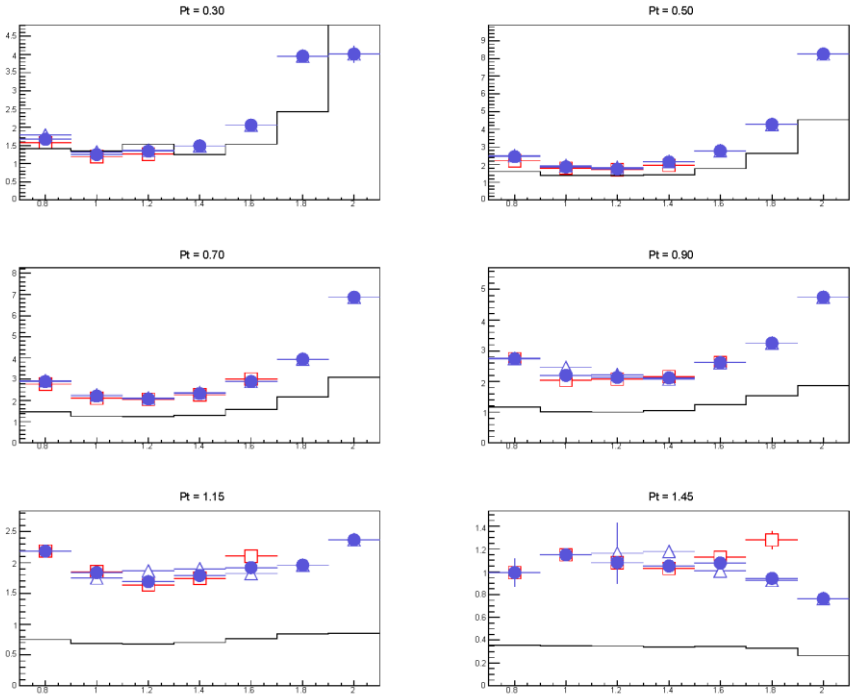
p_T

□ ToF400 Δ ToF700 ● Combined

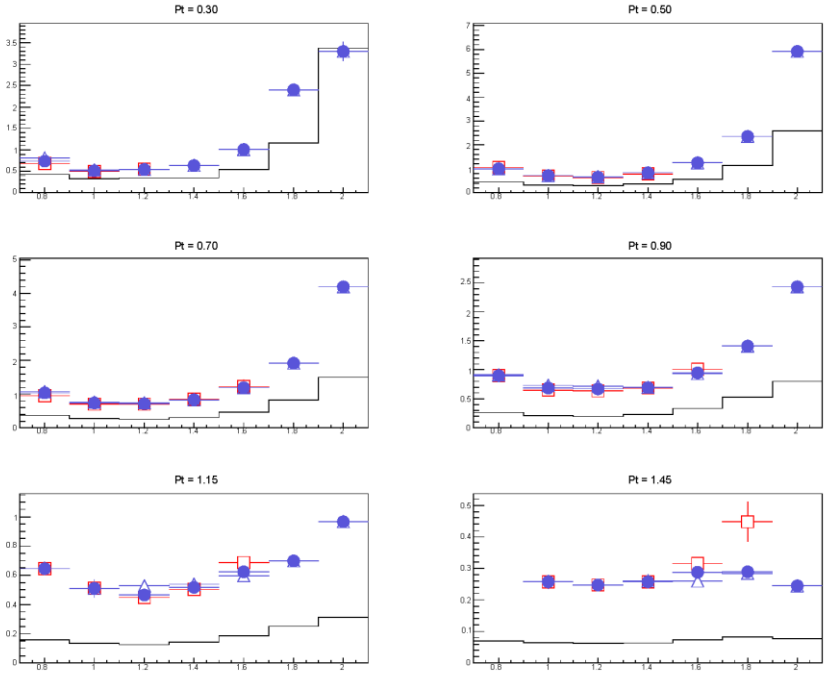
—— DCM-SMM

Deuteron y spectra in p_T bins, cent 20-40, 40-60%

Cent 20-40%



Cent 40-60%



y

y

□ **ToF400** Δ **ToF700** ● **Combined**

—— **DCM-SMM**