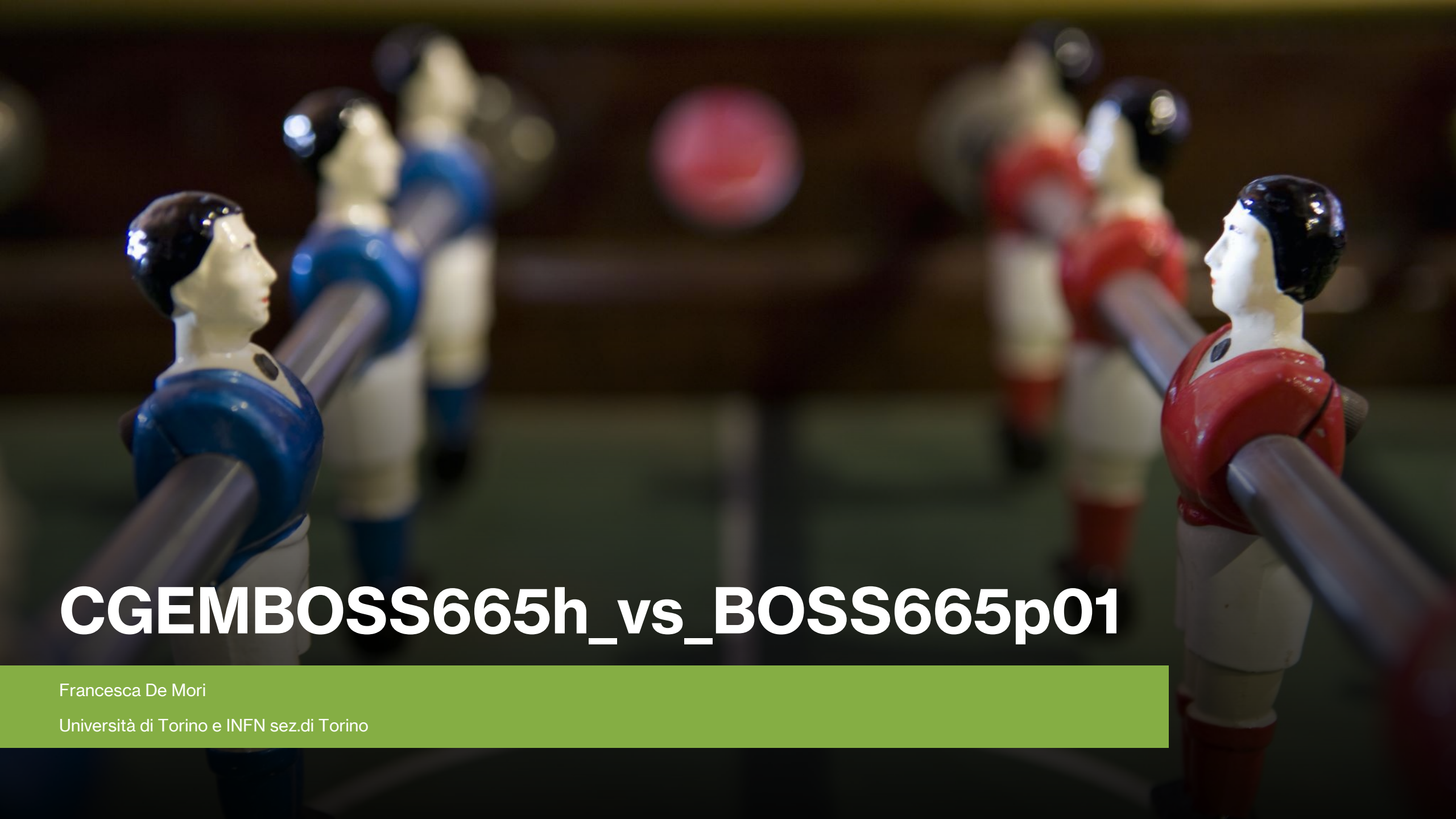




CGEMBOSS665h_vs_BOSS665p01

Francesca De Mori

Università di Torino e INFN sez.di Torino

Benchmark channel

- I analysed the channel

$$e^+ e^- \rightarrow p \bar{p} (\gamma)$$

@J/ψ

GENERATOR: KKMC+EVTGEN (J2BB1 MODULE)

BOSS versions:

CGEM-CgemBoss665h

MDC-Boss665p01

First Selections (@ALG level)

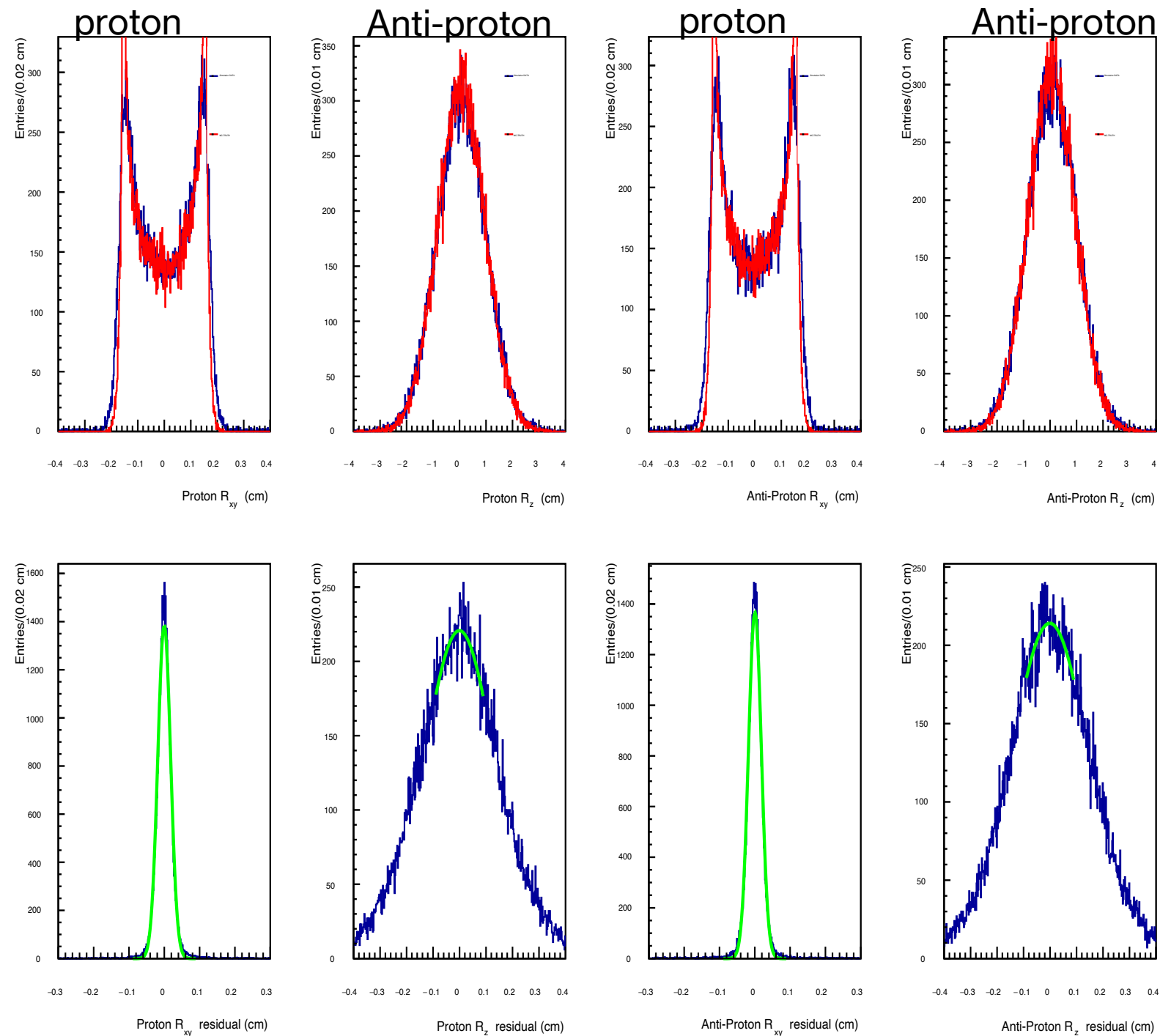
- 2 good tracks (Kalman track valid) with net charge 0
- $Abs(R_{xy}) < 1$ & $abs(R_z) < 10$

What do I investigate?

- $XY_{\text{rec}} - XY_{\text{true}}$ (both from `helix->dr()`)
- $Z_{\text{rec}} - Z_{\text{true}}$ (both from `helix->dz()`)
- $p_{\text{rec}} - p_{\text{true}}$
- $p_t^{\text{rec}} - p_t^{\text{true}}$



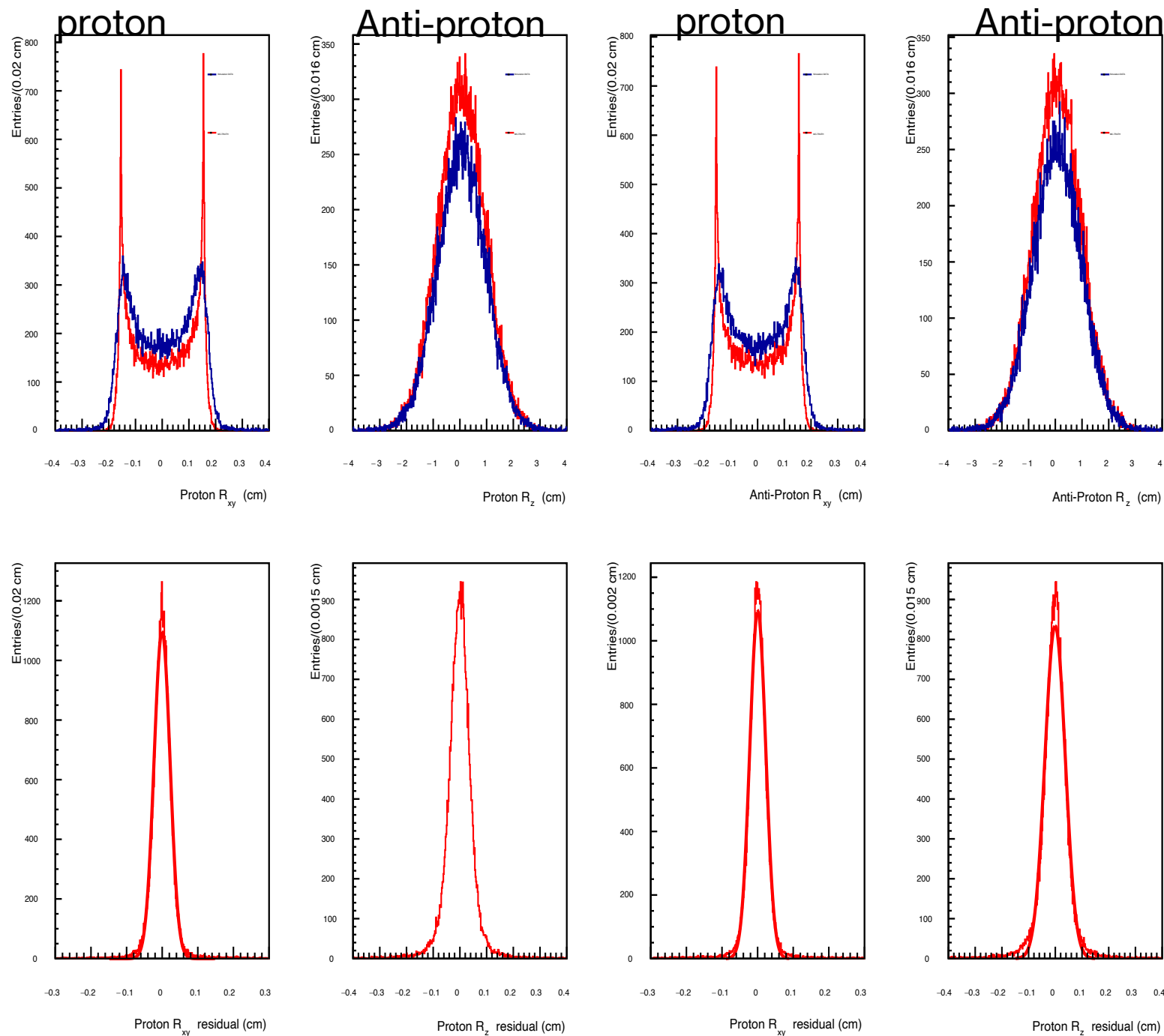
MDC POCA variables



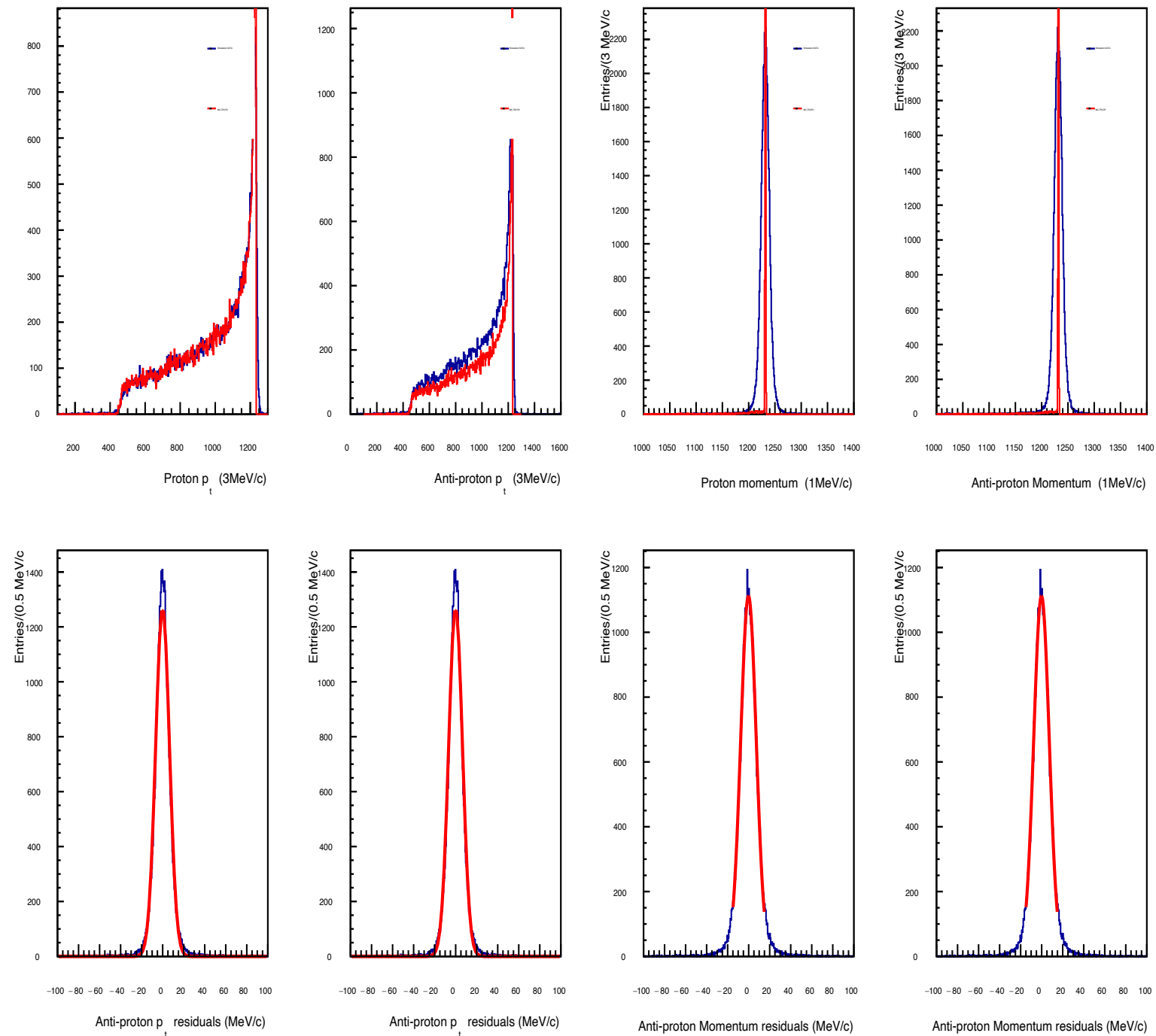


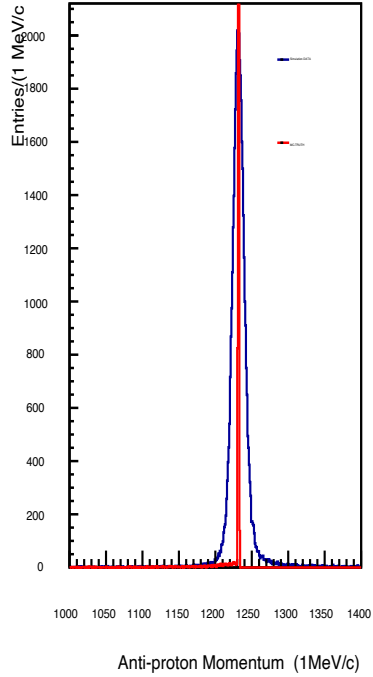
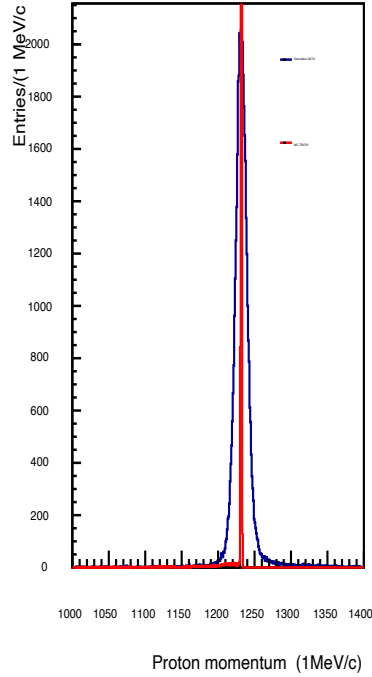
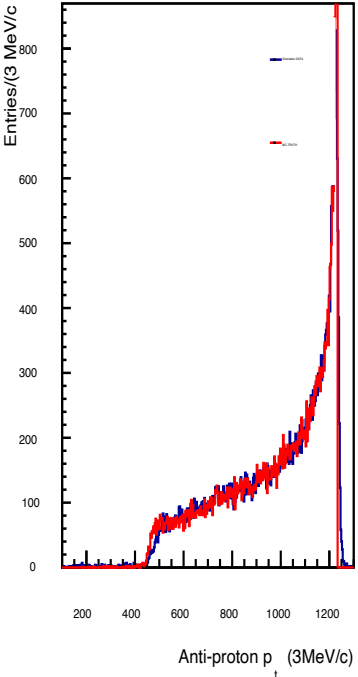
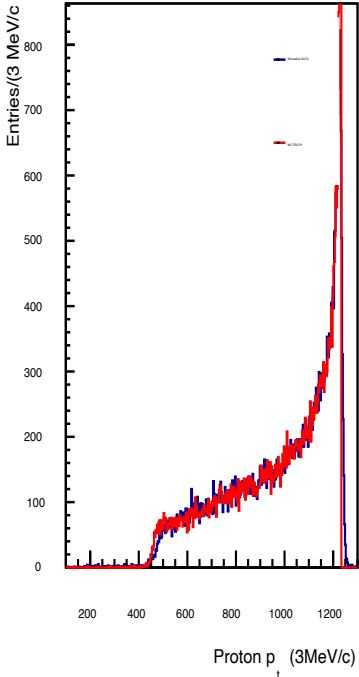
CGEM POCA variables

RES→

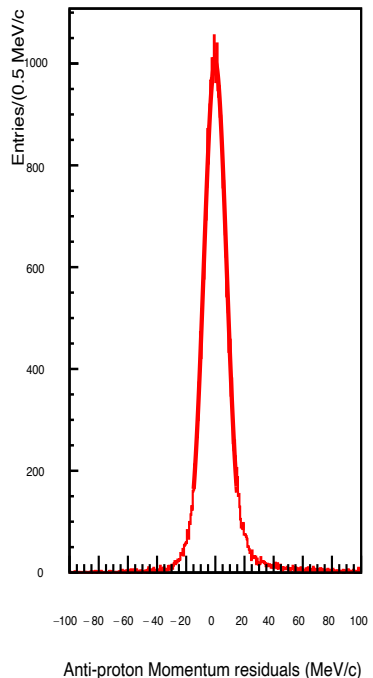
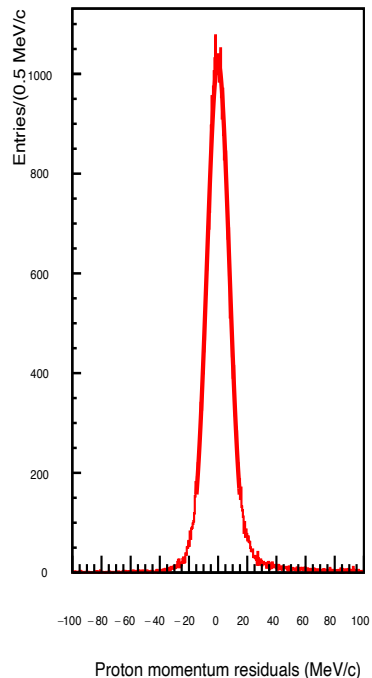
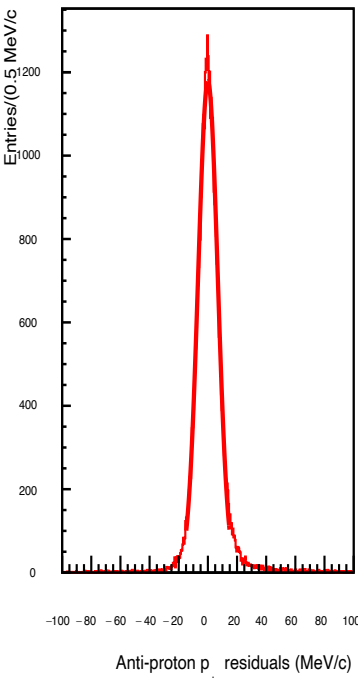
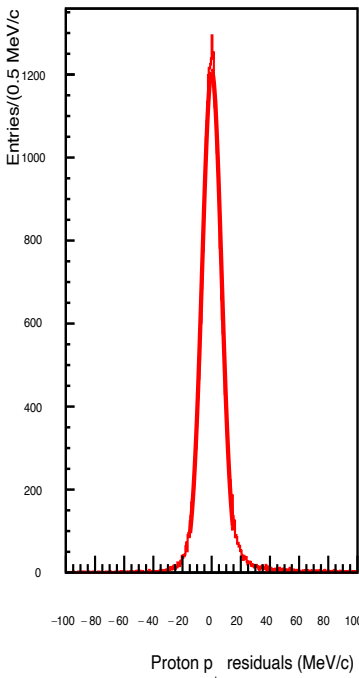


MDC Momenta related variables



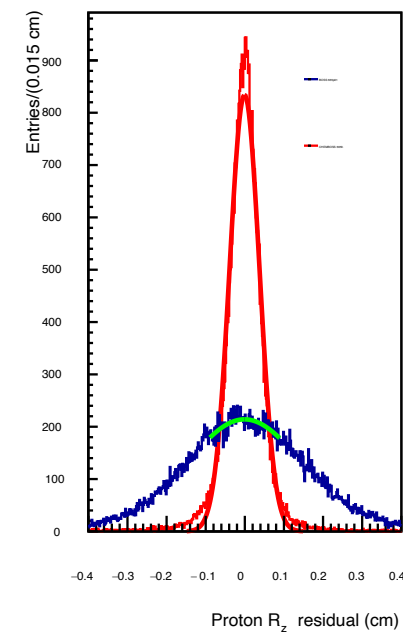
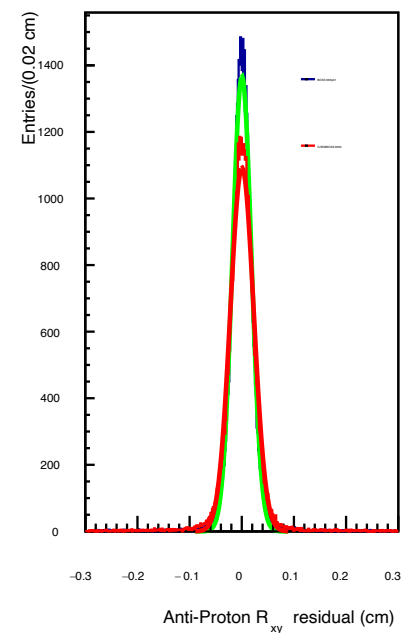
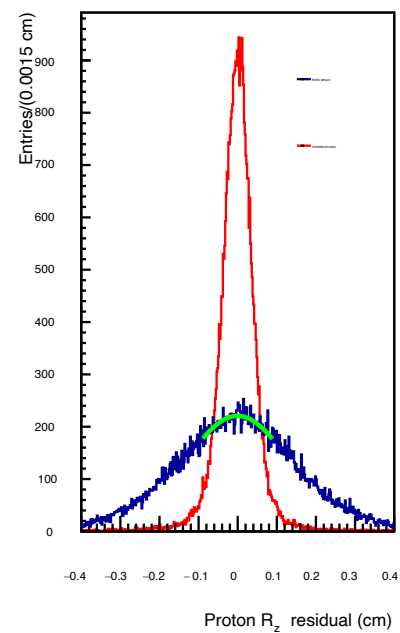
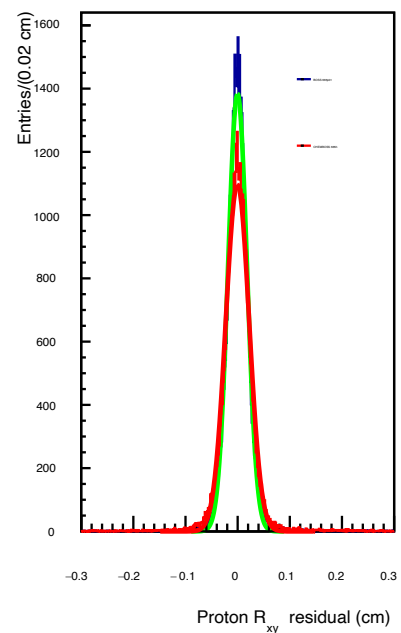
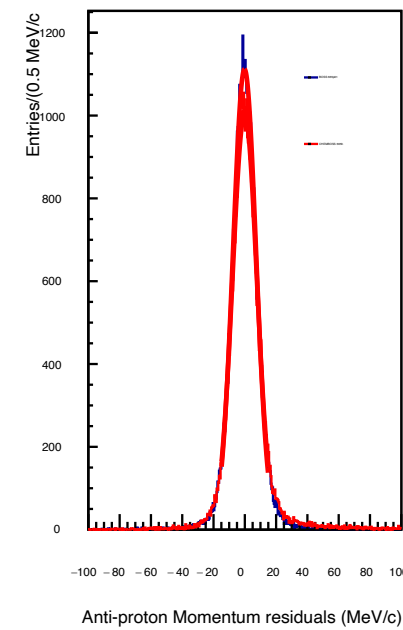
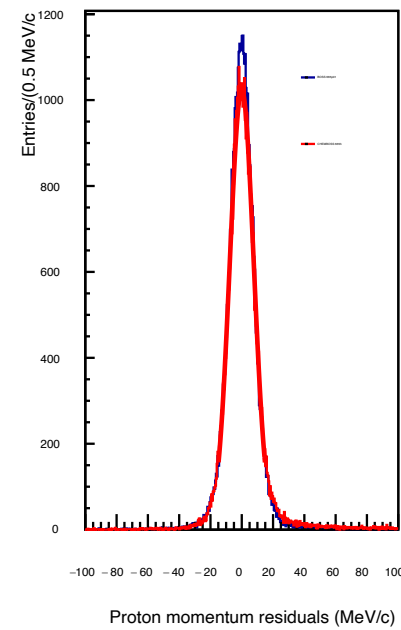
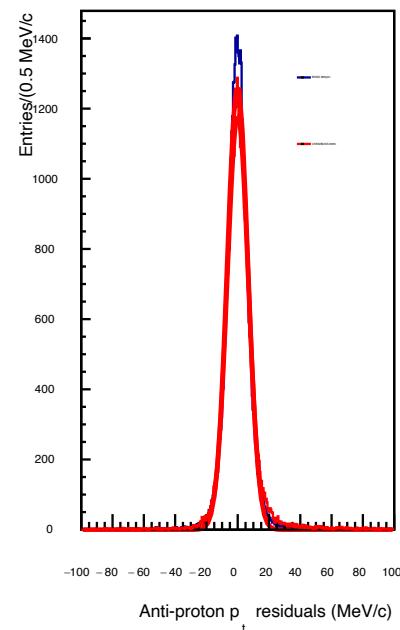
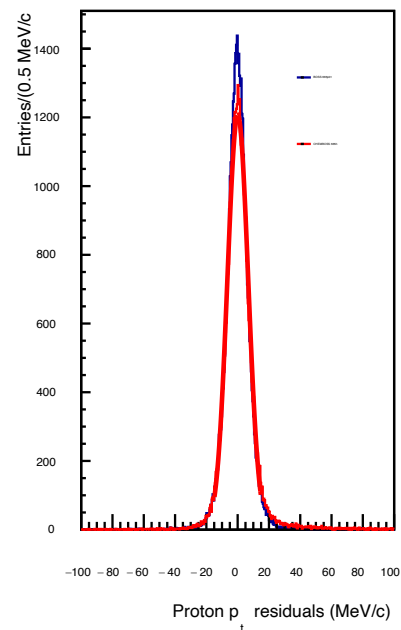


CGEM Momenta related variables



Comparison “residuals” CGEM-MDC

Fair agreement,
Large difference in
Z-residuals, smaller
For CGEM





P_t dependence study

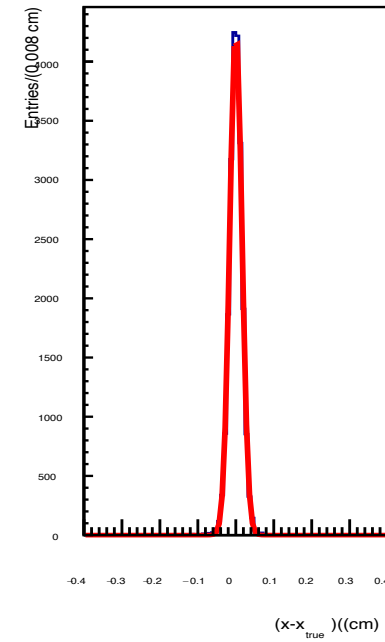
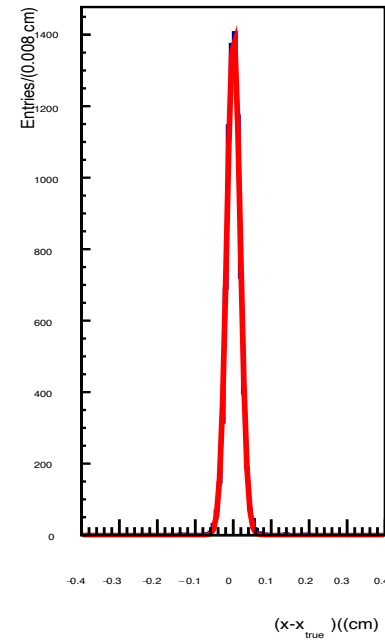
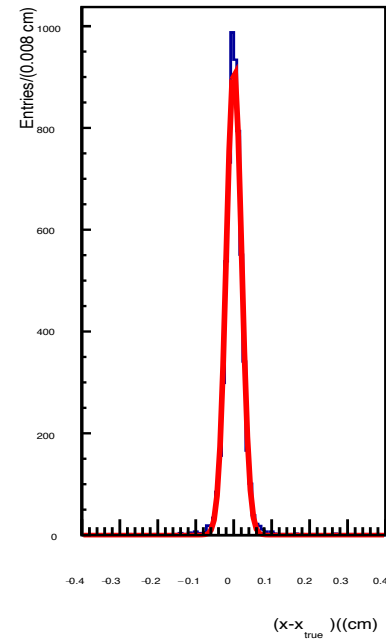
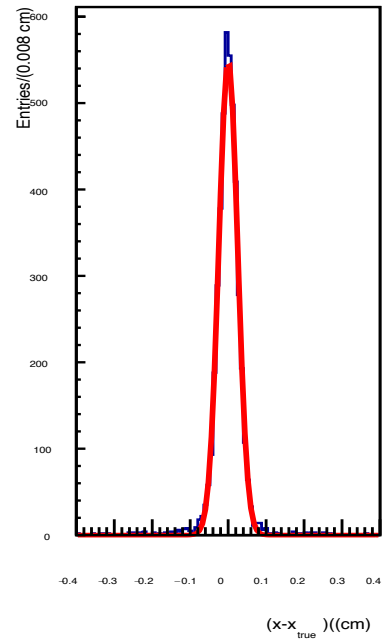
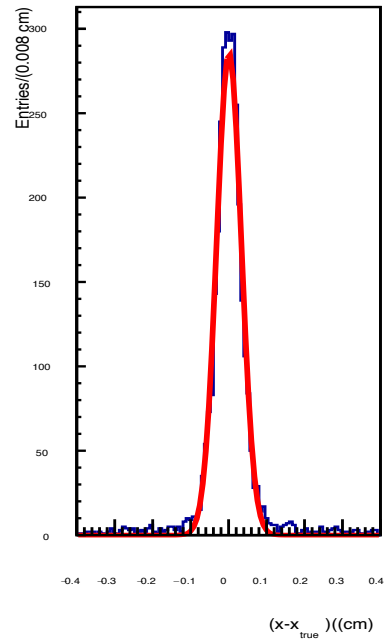
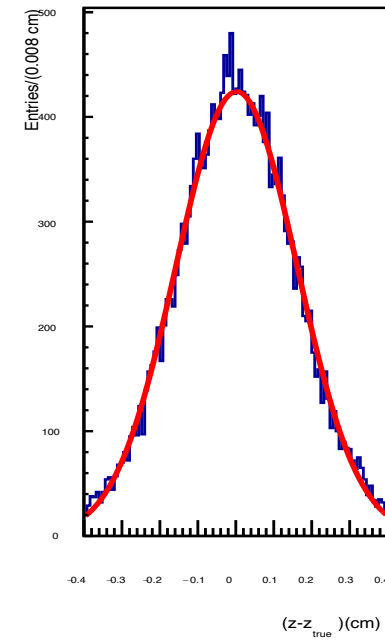
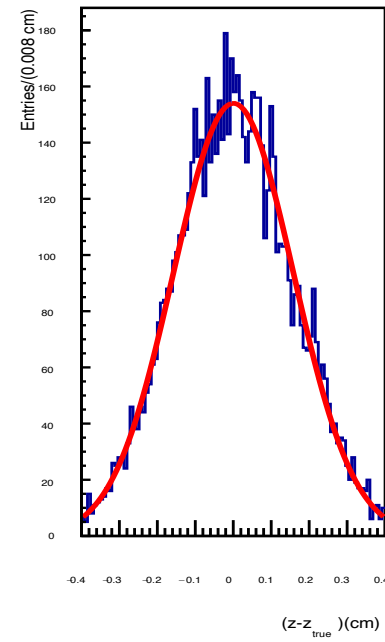
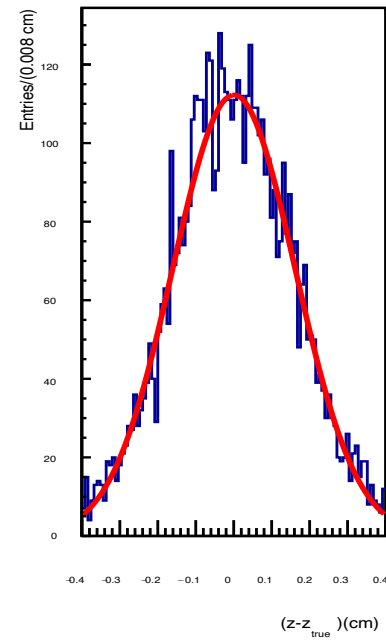
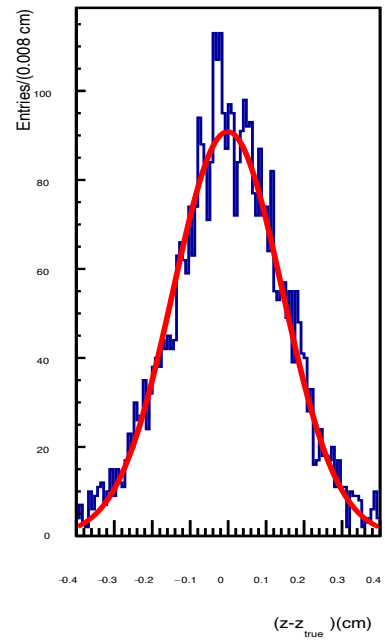
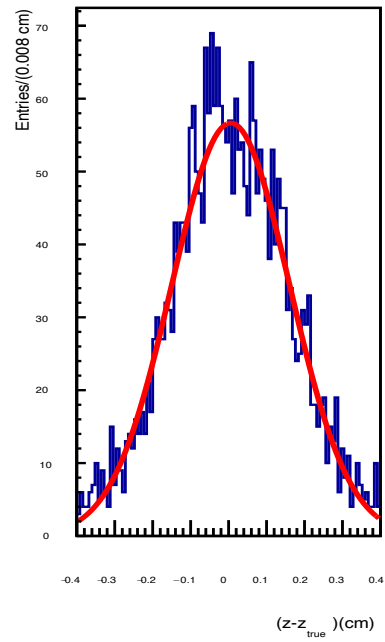
How

The p_t spectrum was divided in 5 bins:

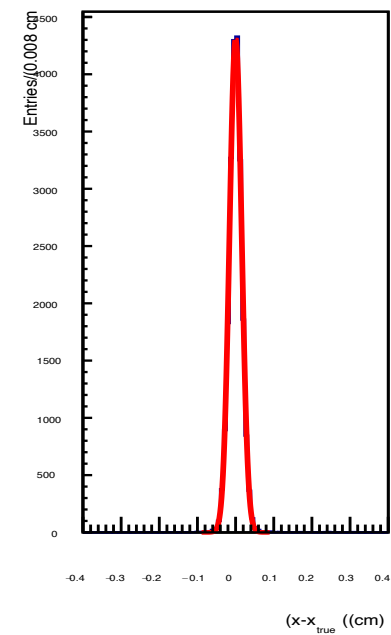
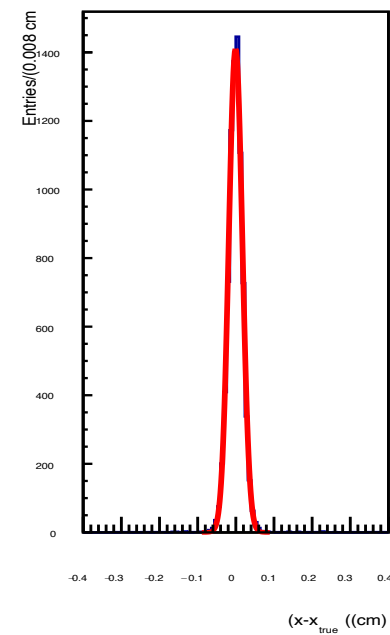
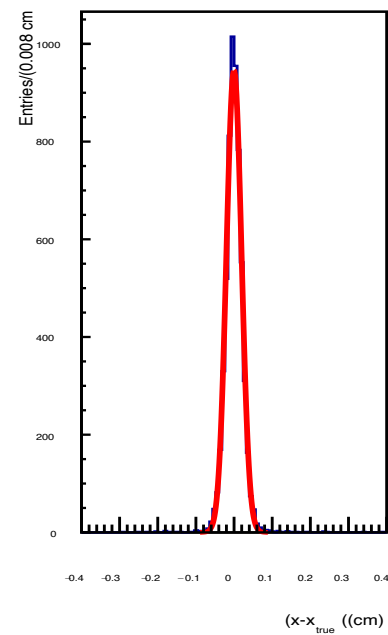
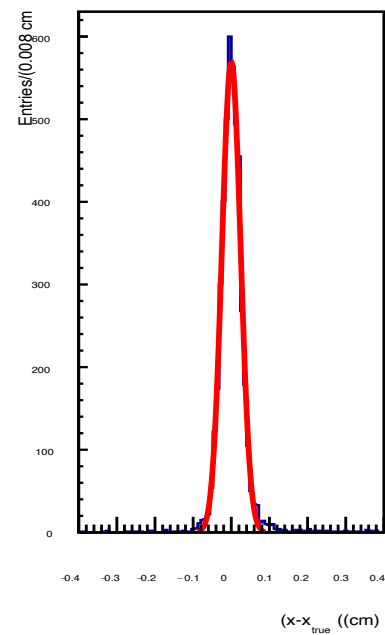
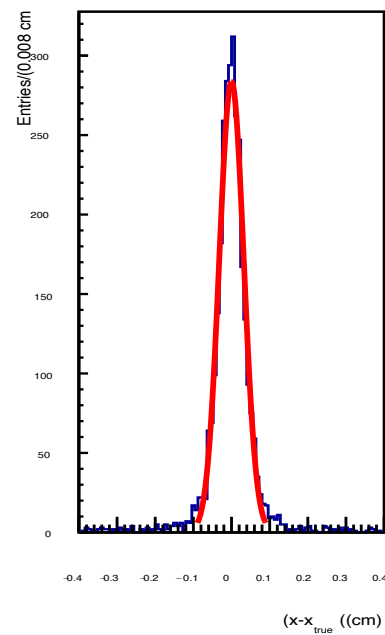
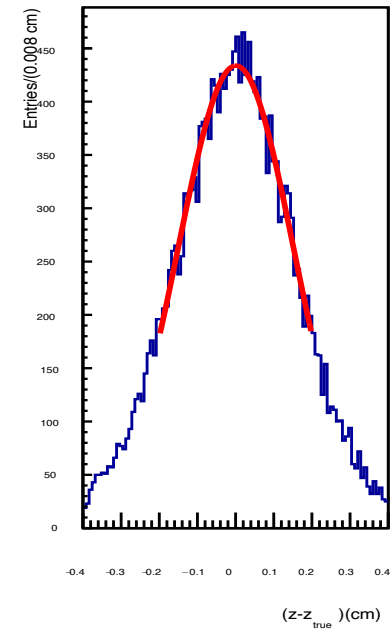
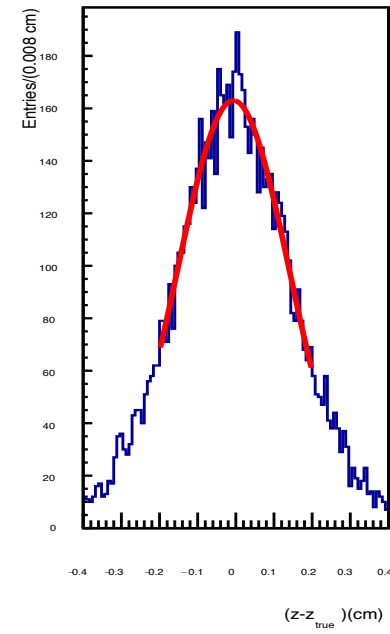
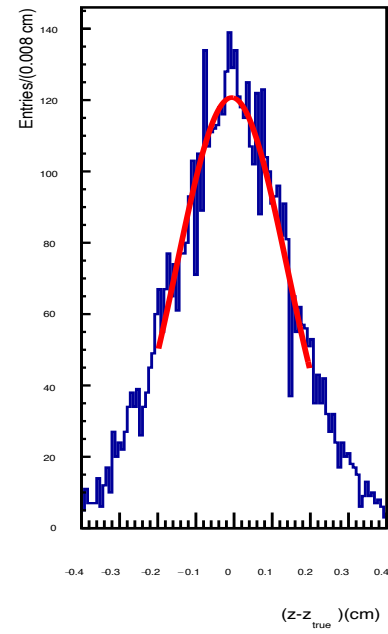
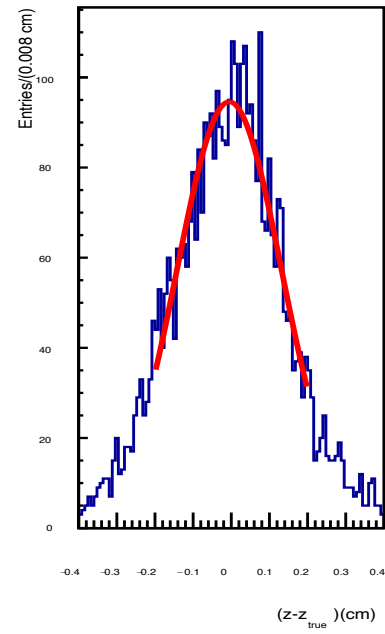
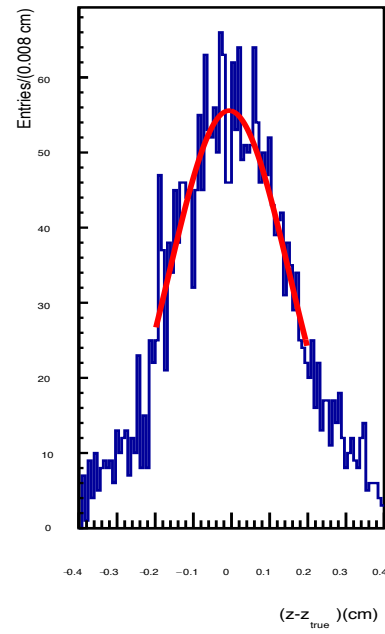
- $P_t < 600$
- $600 \leq P_t < 750$
- $750 \leq P_t < 900$
- $900 \leq P_t < 1050$
- $P_t \geq 1050$

The histos (5X) were fitted $\rightarrow$ the resolution $= \sigma$

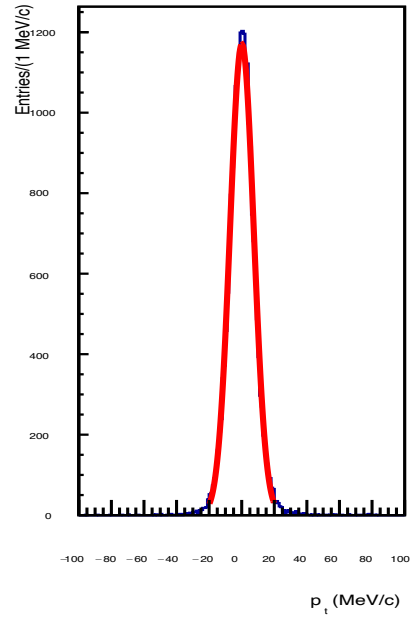
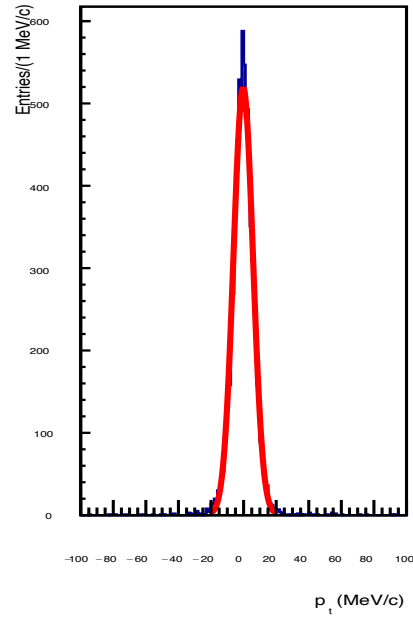
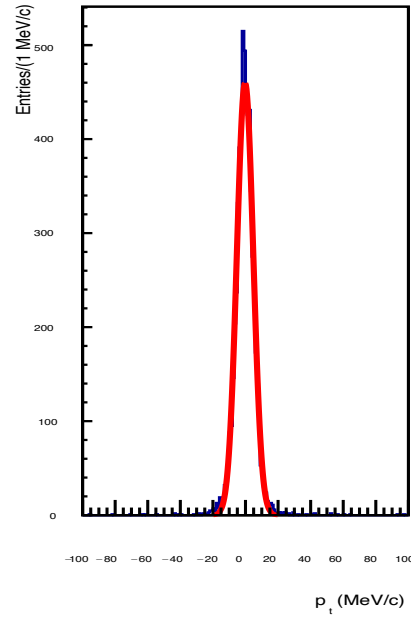
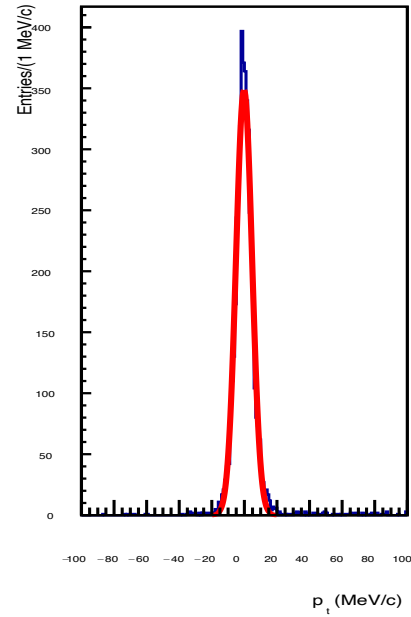
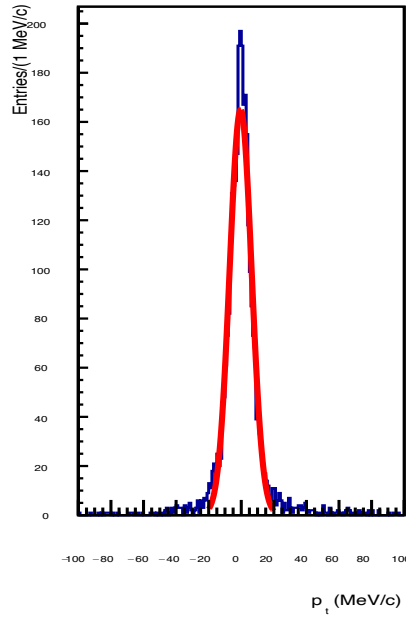
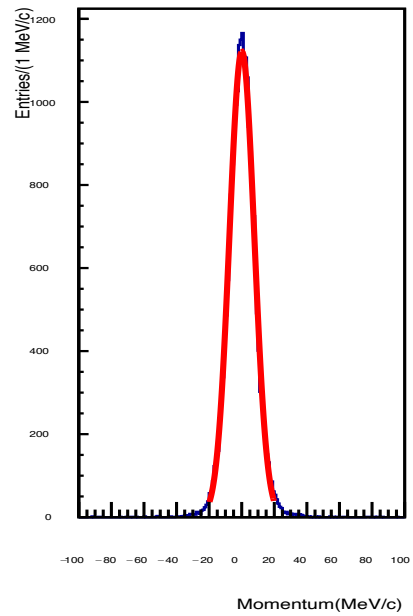
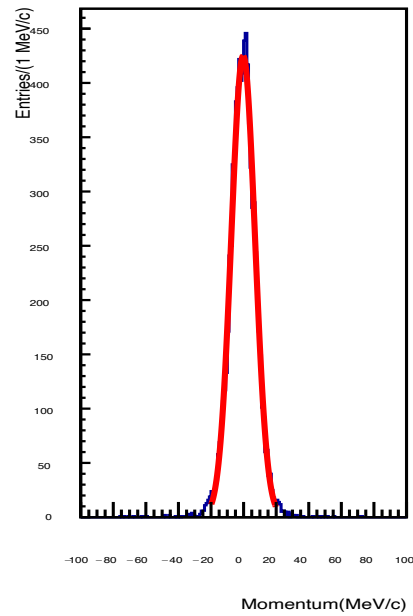
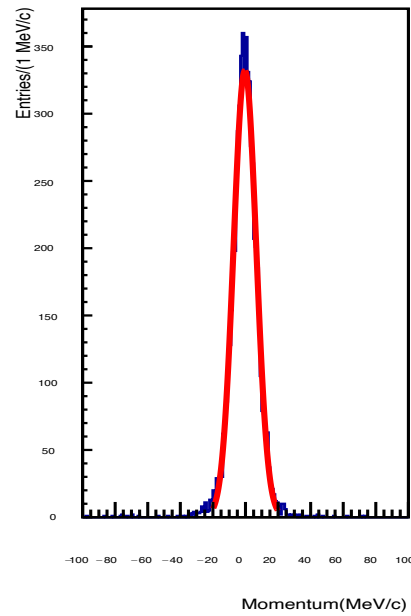
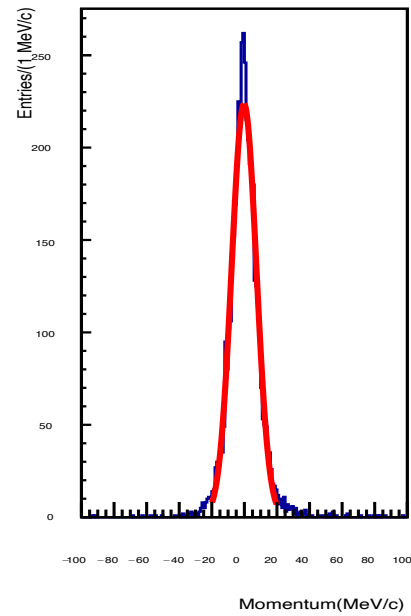
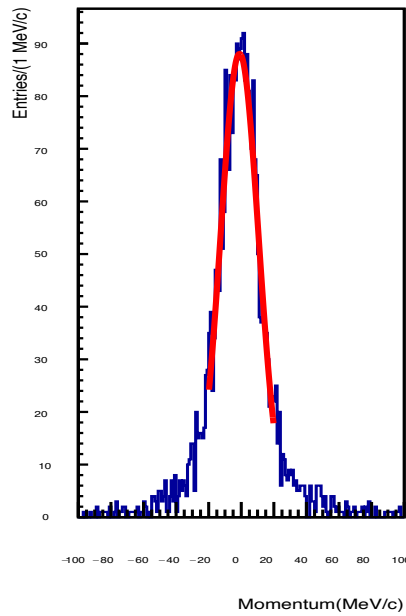
POCA MDC anti- proton



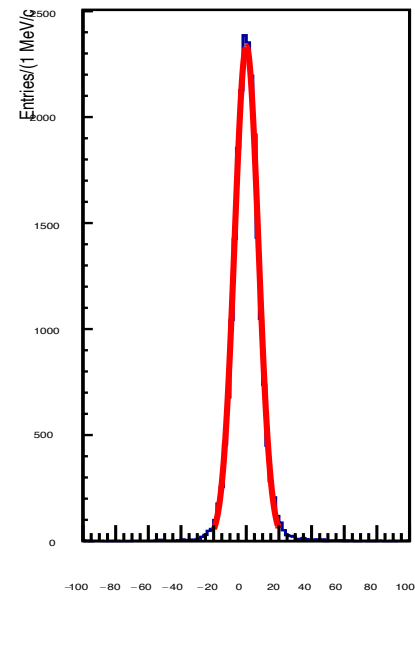
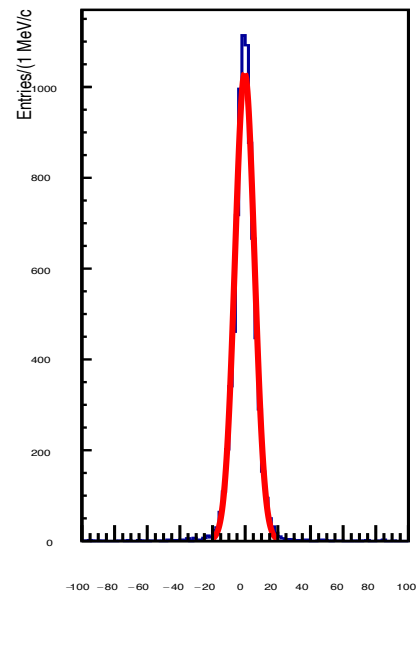
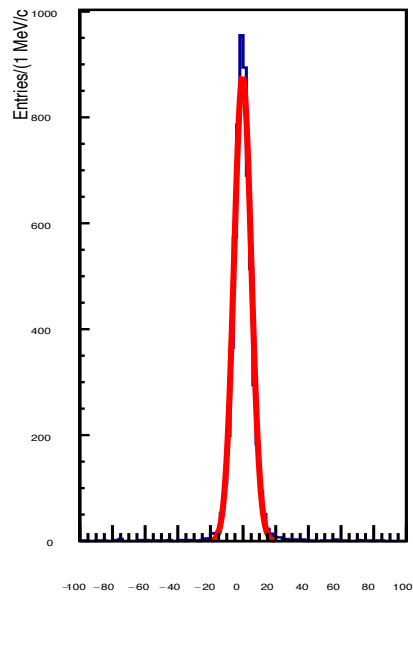
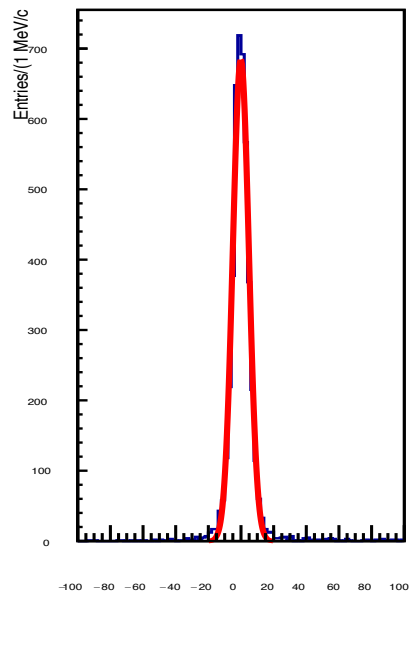
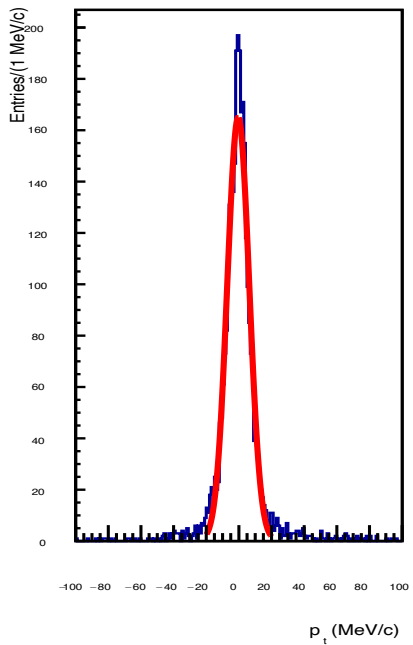
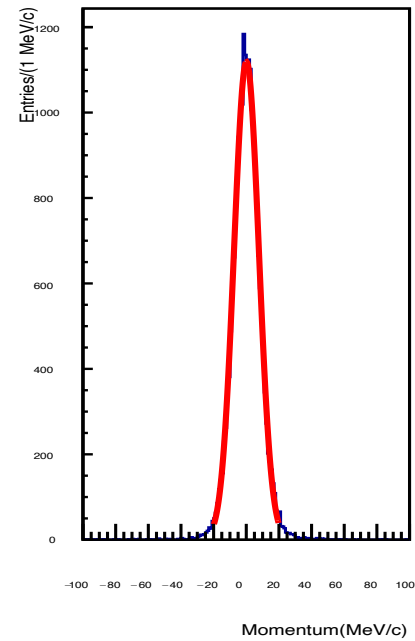
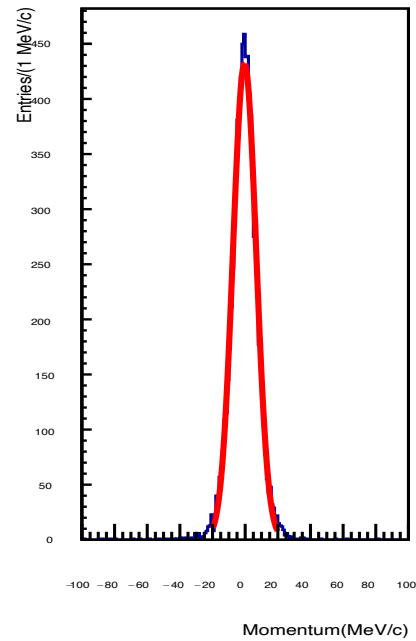
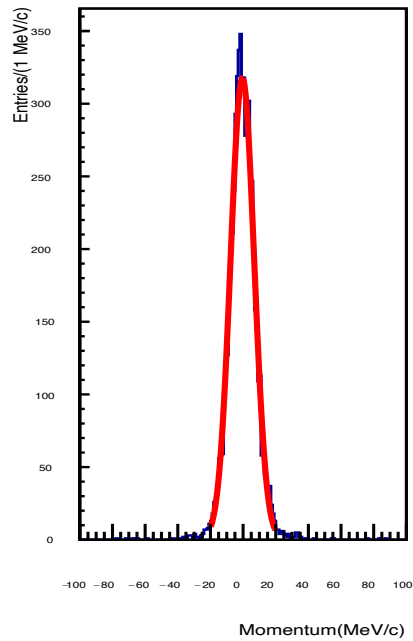
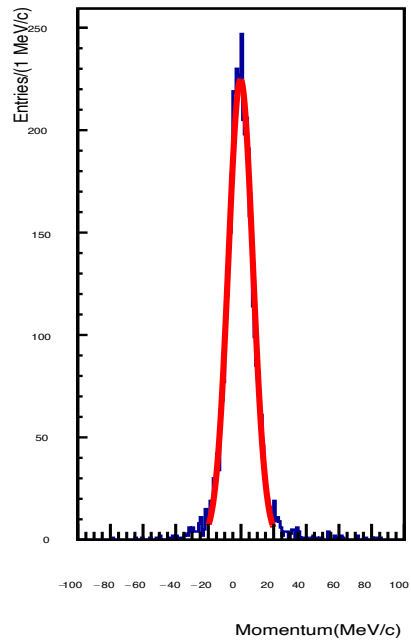
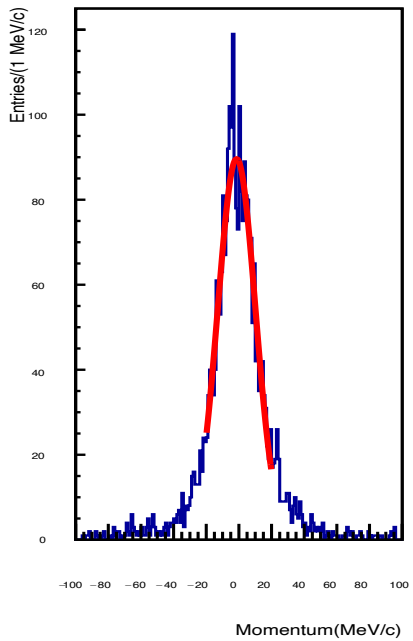
POCA MDC anti- proton



MDC proton momenta var



MDC antipr. momenta var

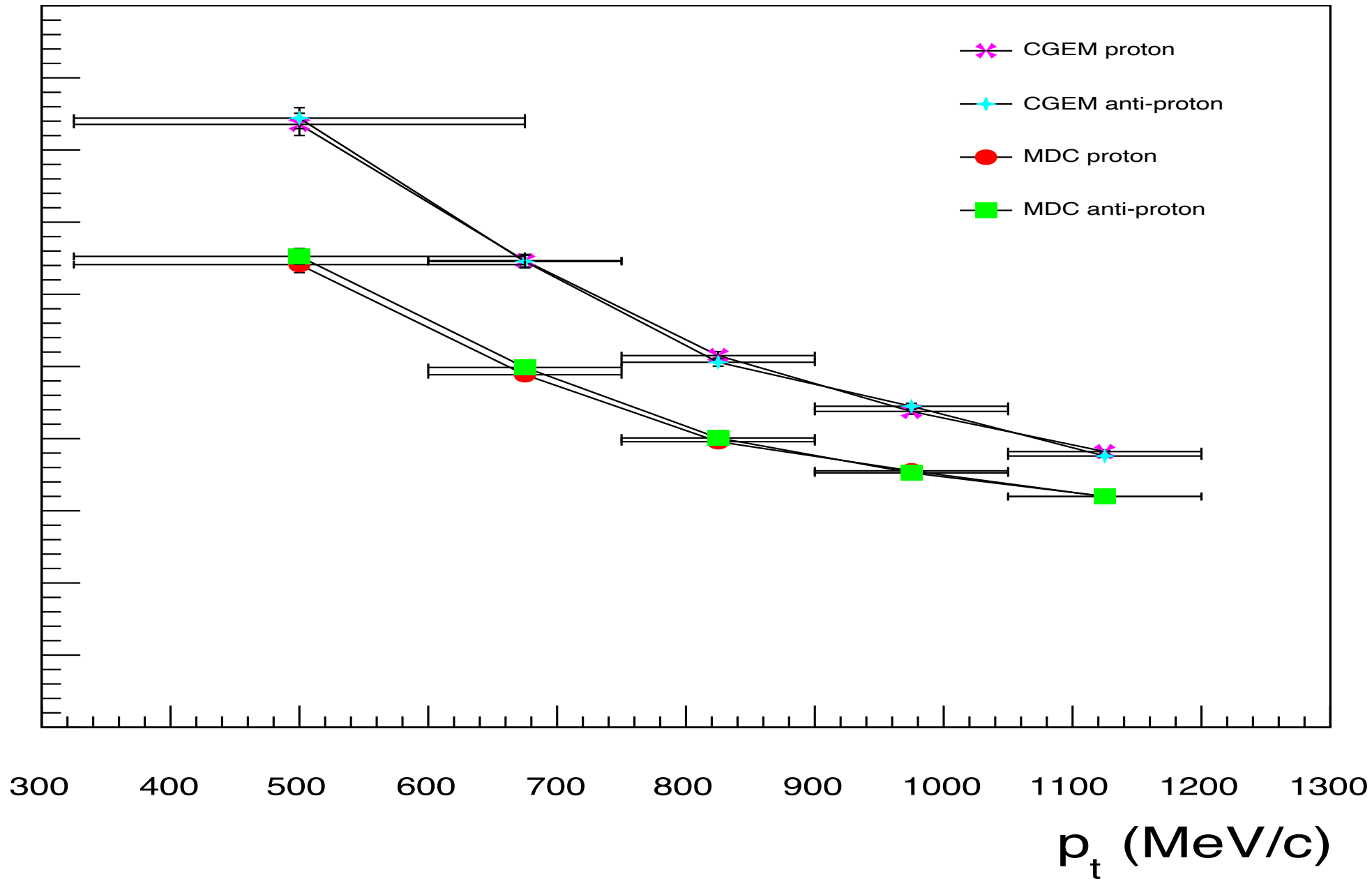


p_t dependence

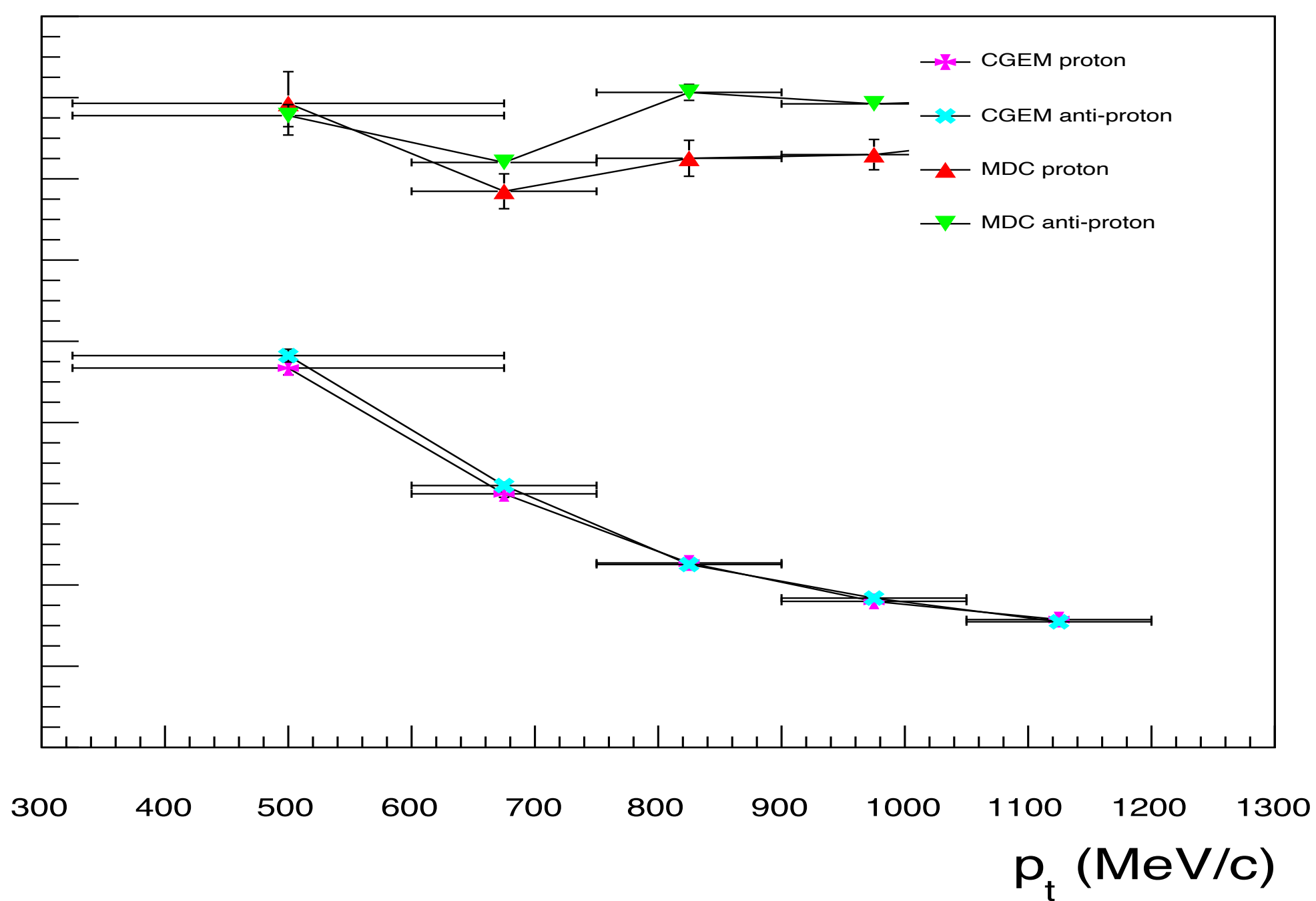


σ_{xy} (helix) (cm)

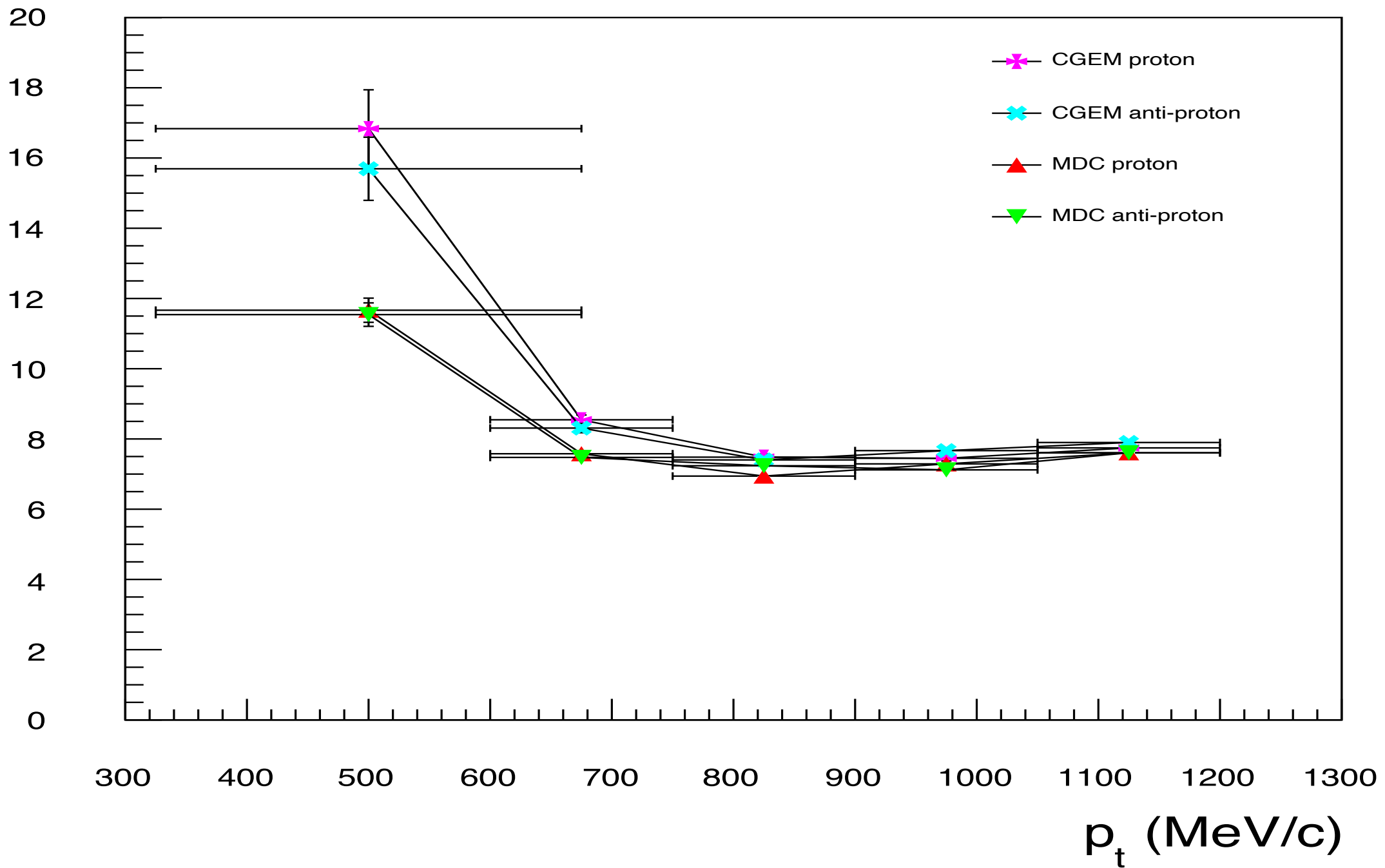
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0



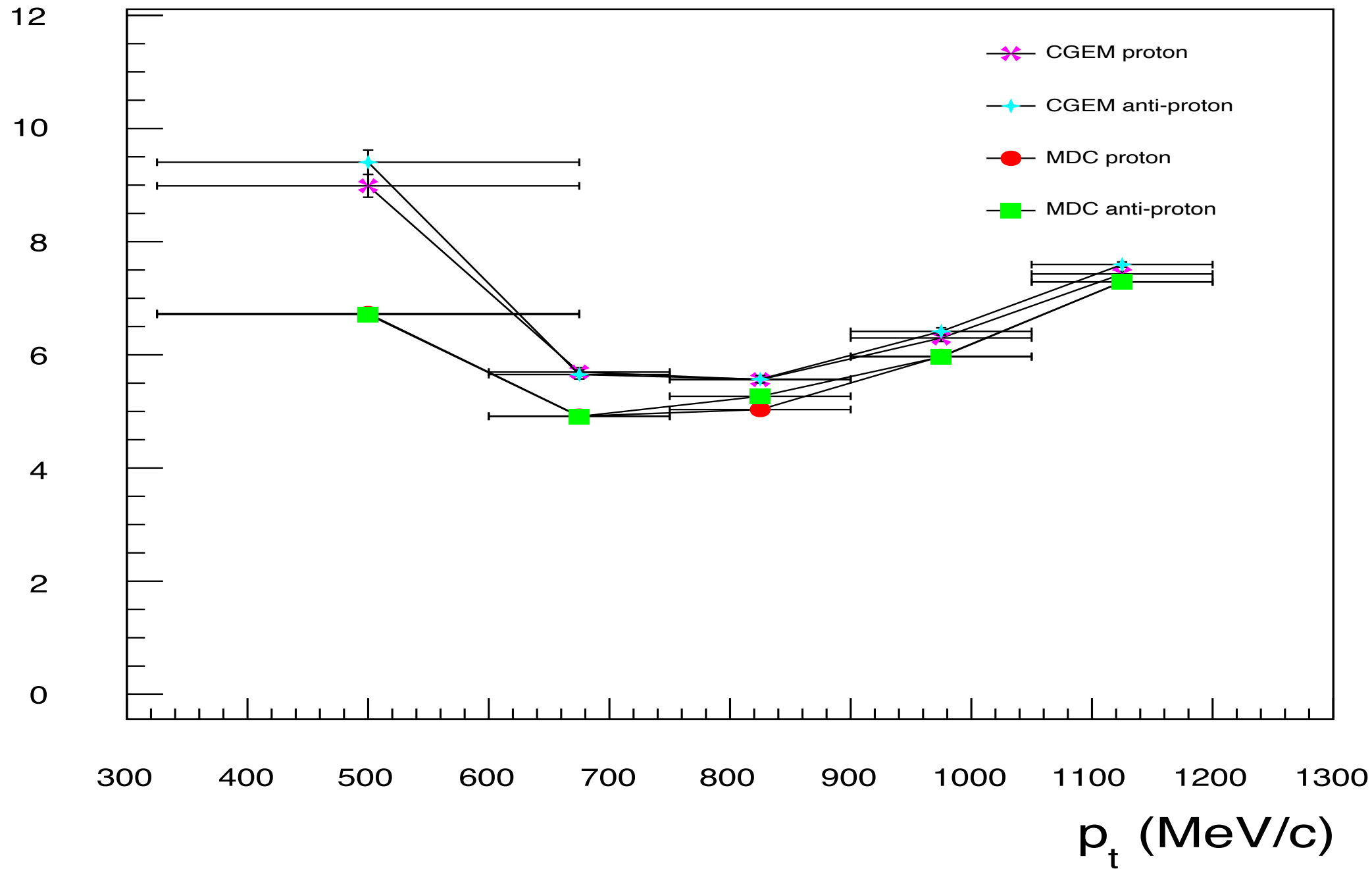
σ_z (helix) (cm)



σ_p (MeV/c)



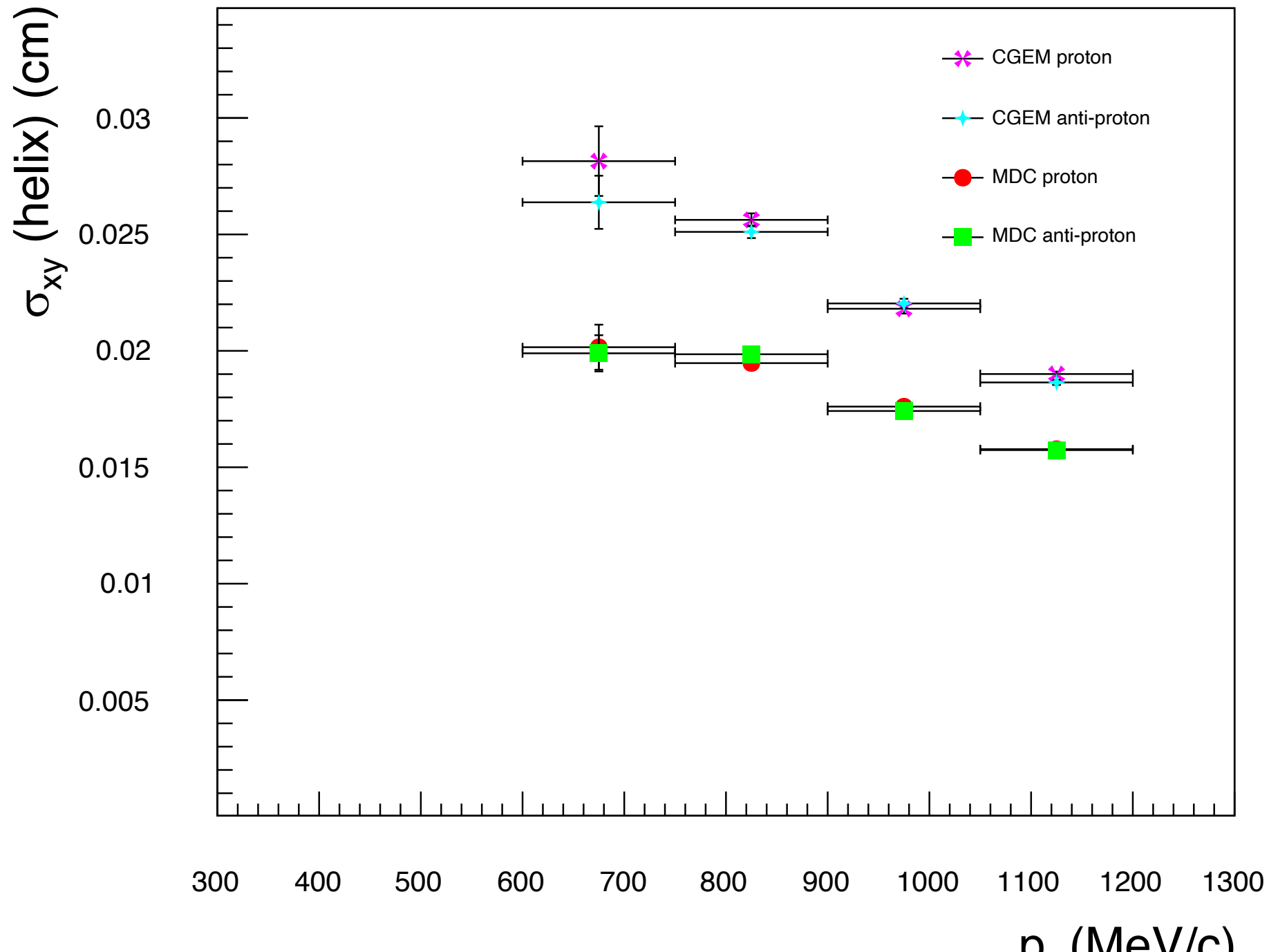
σ_{p_t} (MeV/c)



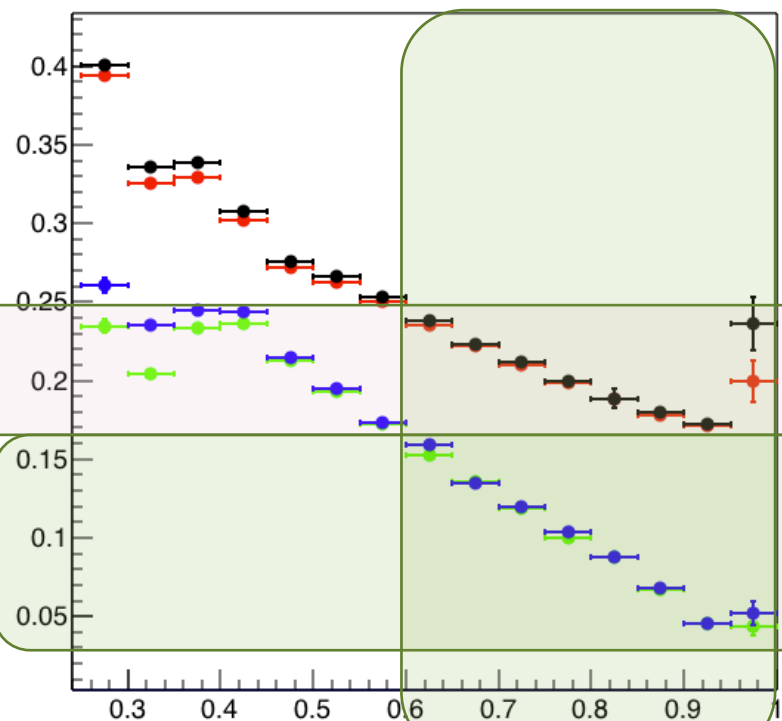
Further selection

- Back-to-back topology :opening angle $\phi_{p\bar{p}} > 178^\circ$
- Momentum window: $p_{\text{exp}} - 3\sigma \leq p \leq p_{\text{exp}} + 3\sigma$
- $(dE/dx)_p < 0.5$

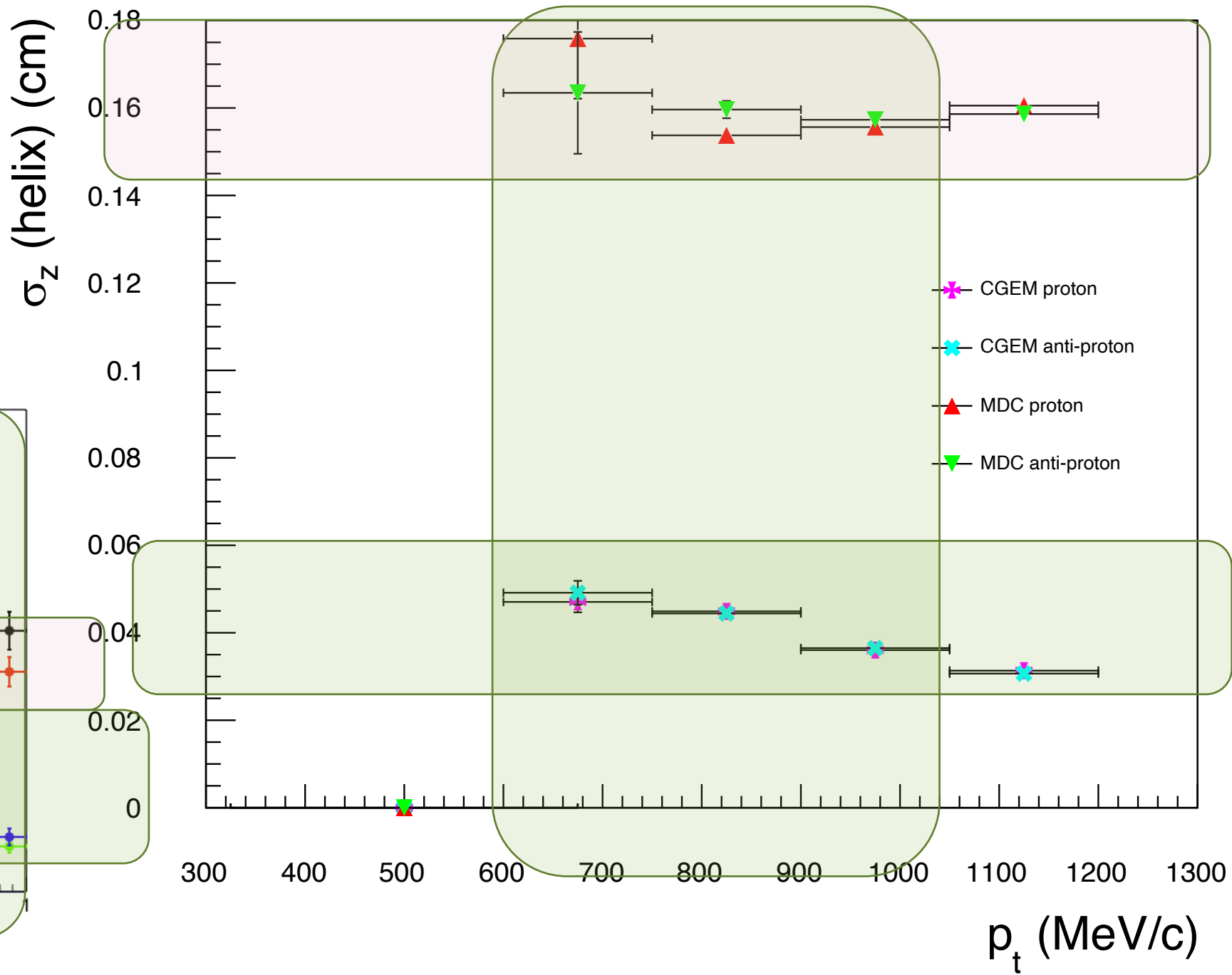
Lost first bin,
Second low population
Because ISR suppressed

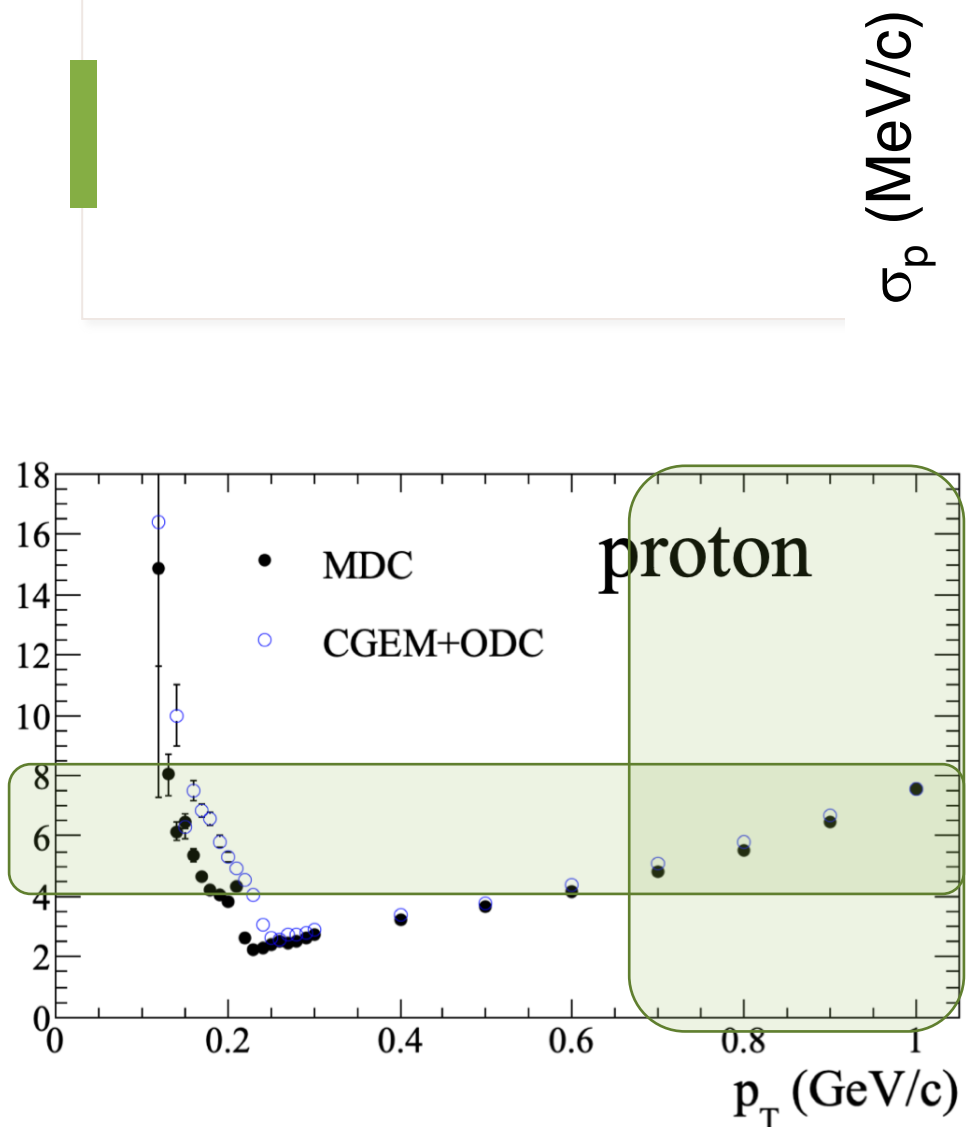


dZ RES

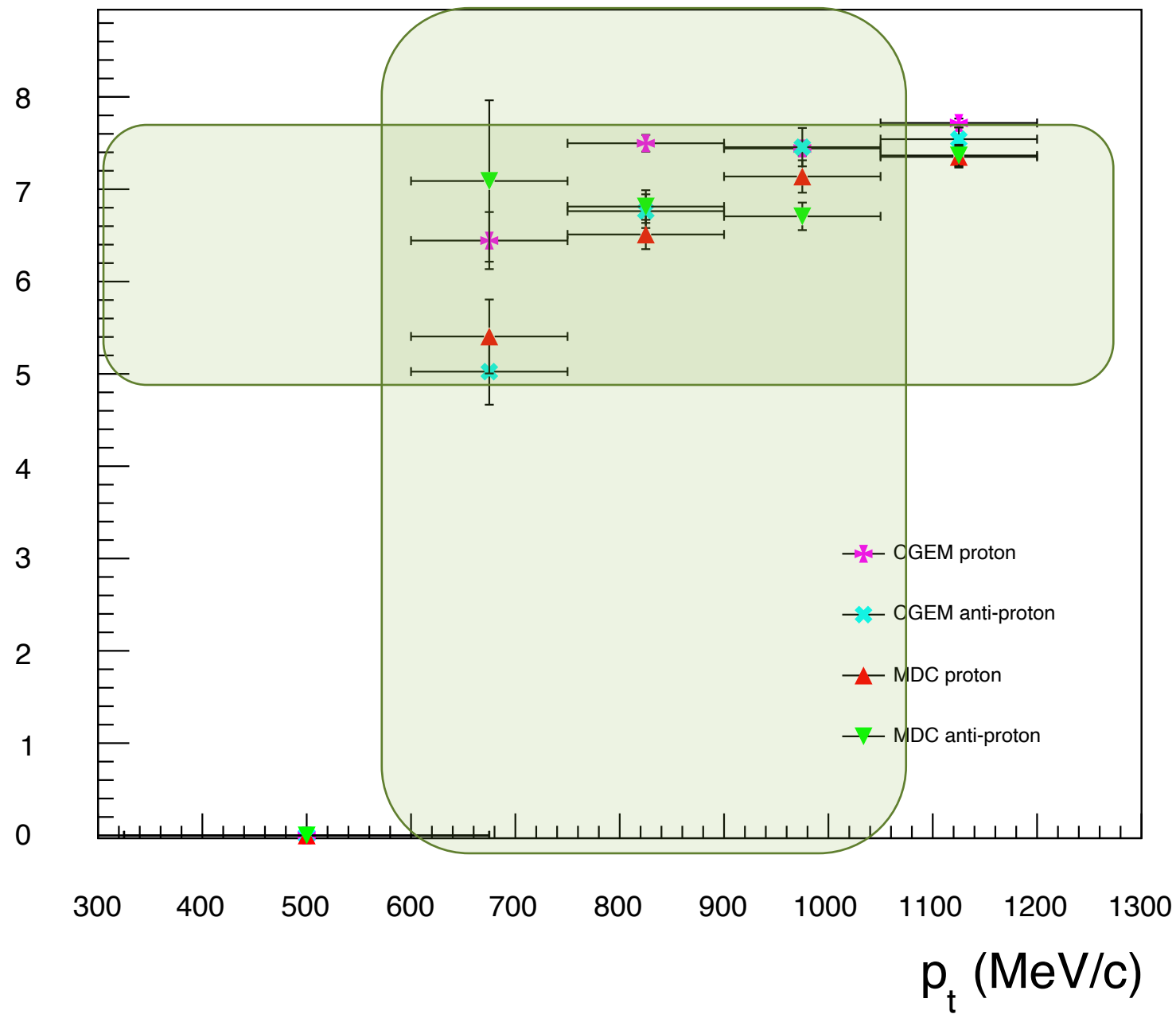


Cgemboss665b





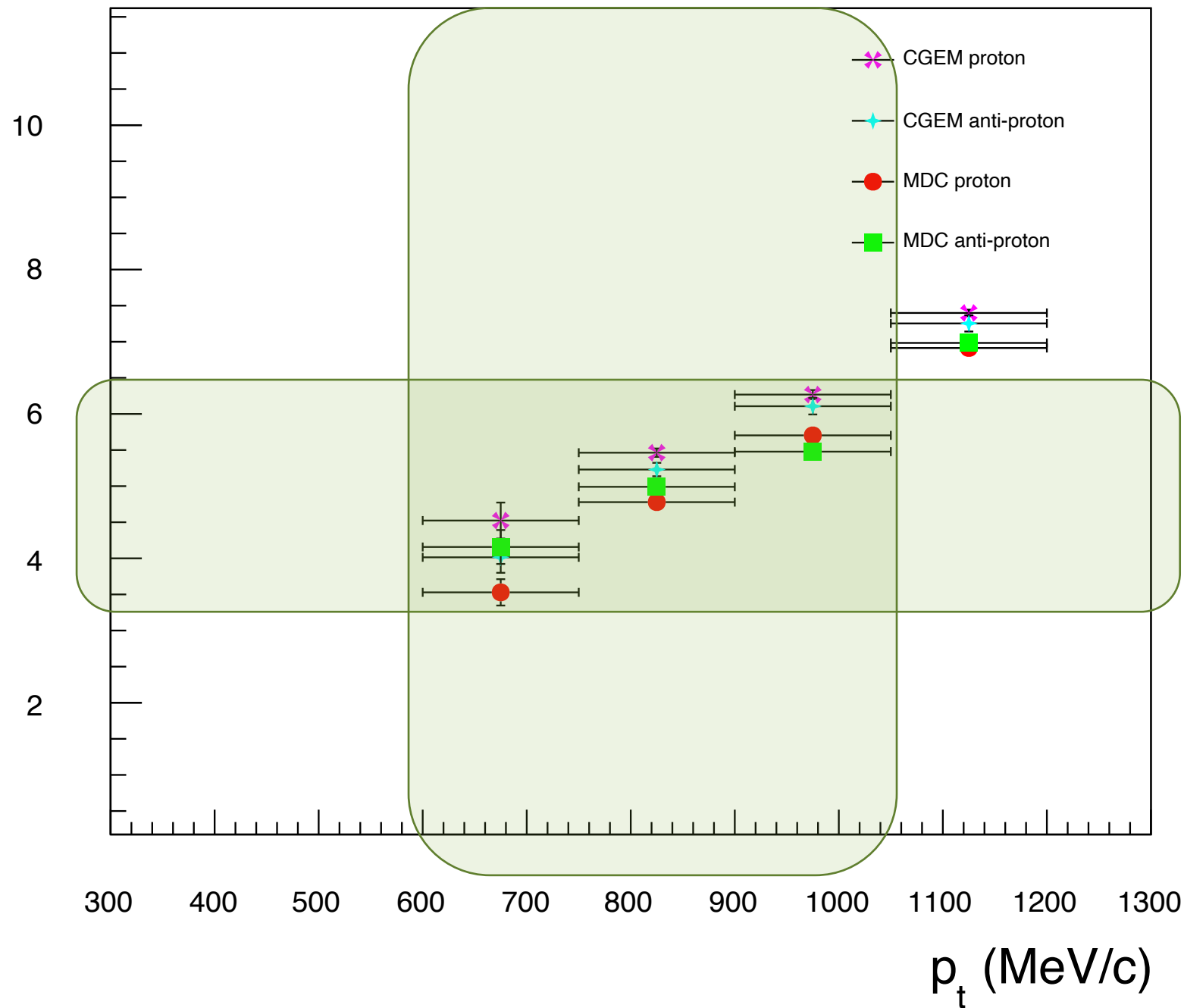
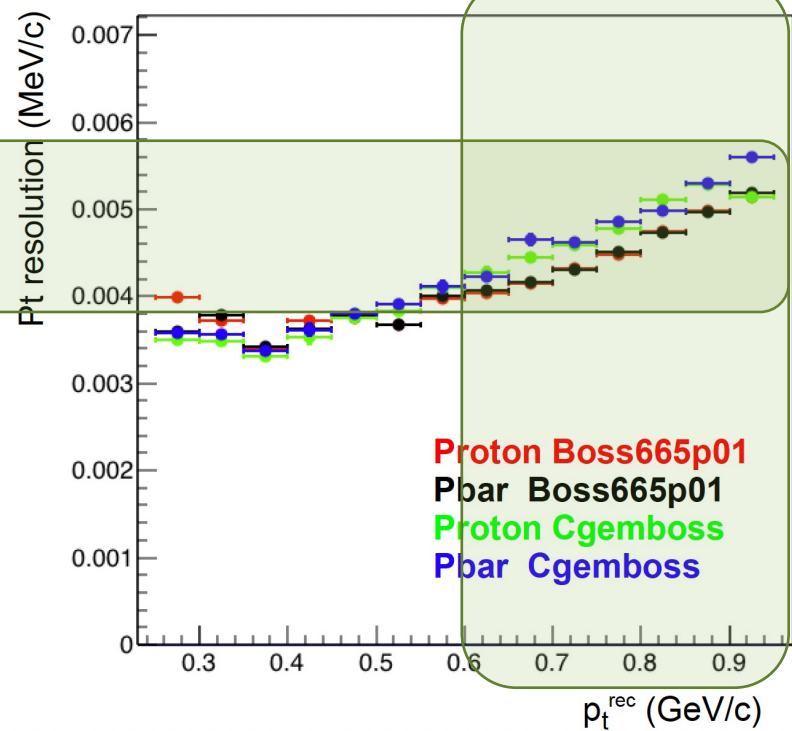
Cgemboss665h



Cgemboss665b

σ_{p_t} (MeV/c)

Pt resolution: $p_t^{\text{rec}} - p_t^{\text{true}}$



Efficiency studies



Selections flow

	GOOD	theta	vtxok	opening	E/p (p)	P range (3σ)	pid	TOT EFF
CGEMBOSS	42423	35177	35175	34103	34064	32649		(65.3+-0.2)%
BOSS	42336	35264	35264	34158	34121	33016		(65.0+-0.2)%

	GOOD	theta	vtxok	opening	E/p (p)	P range (3σ)	pid	TOT EFF nentries
CGEMBOSS	42423	35177	35175	34103	34064	32649	33564	(65.1 +-0.2)%
BOSS	41699	34687	34686	33629	33592	32515	32464	(64.9+-0.2)%

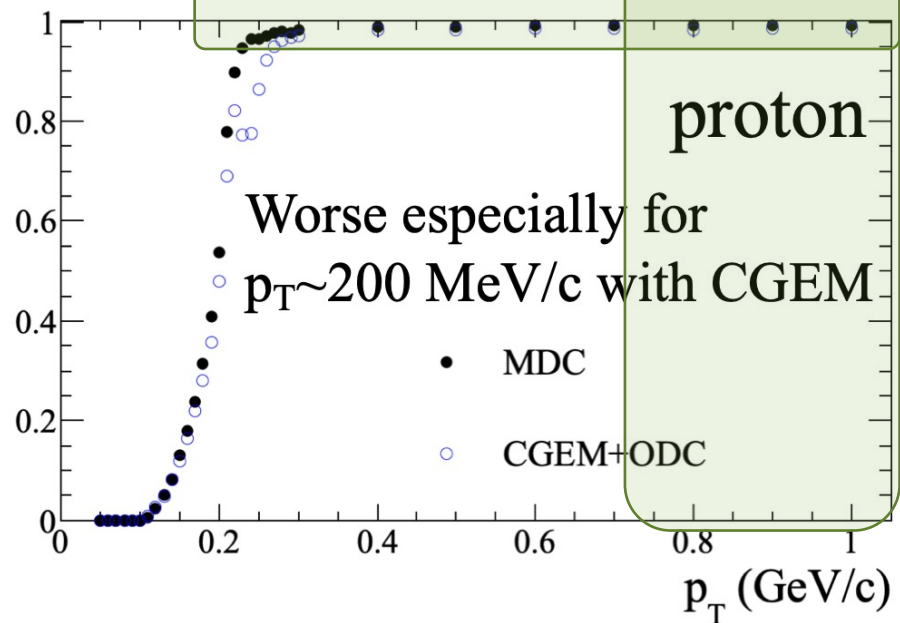
Selection efficiencies very similar in boss and cgemboss.

Work in progress

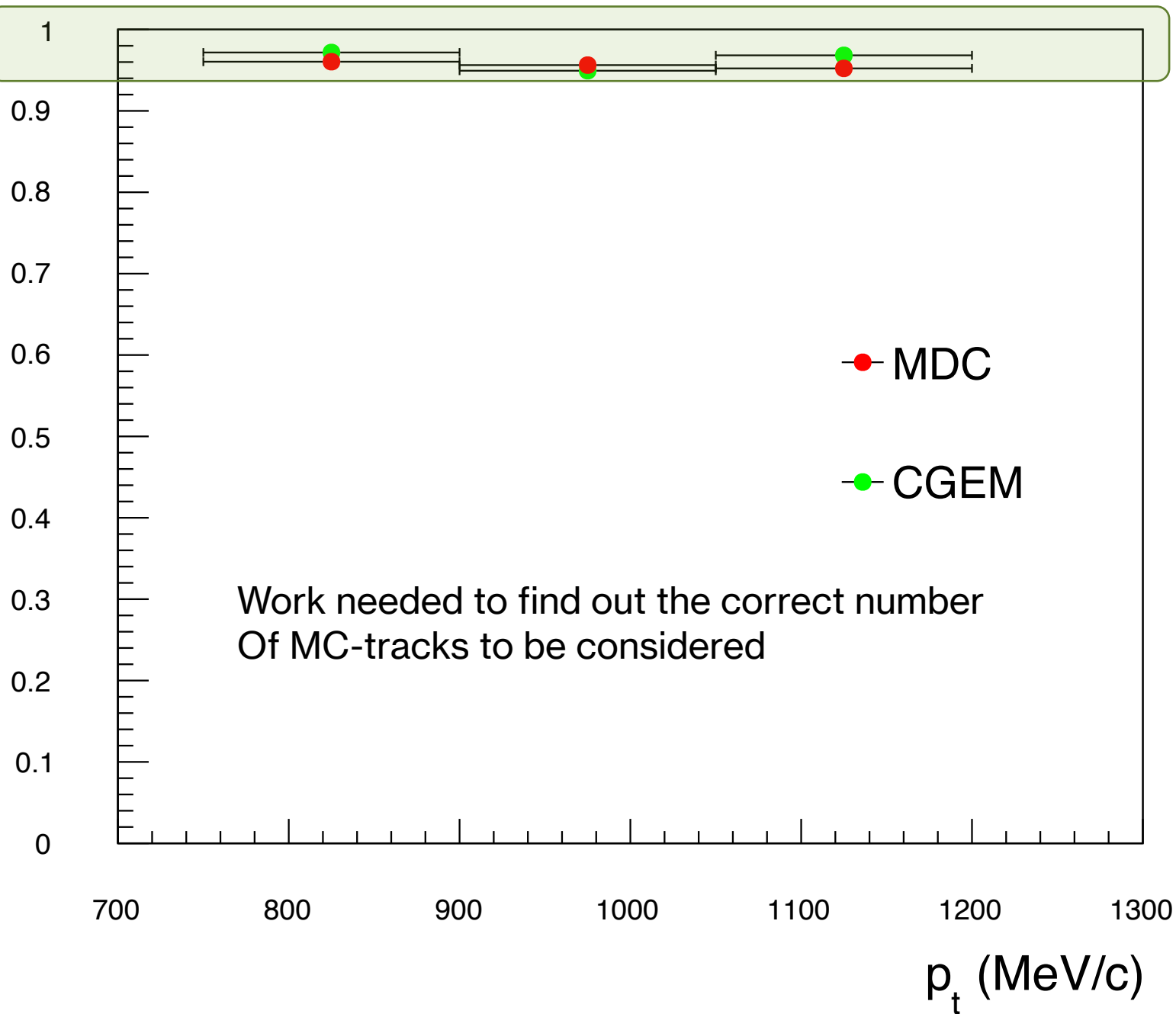
- Tracking efficiency (new lines of code to be written ...a new tree with all events with $N_{\text{good}} \geq 1$). Any code available yet?

“tracking efficiency”

Efficiency of good track



tracking efficiency



Work in progress

- Tracking efficiency (new lines of code to be written ...a new tree with all events with $N_{\text{good}} \geq 1$). Any code available yet?
- Simulation (DONE)/ Reconstruction (running)/ Ana (to be done) with standard last RUNID
- Resolutions/efficiencies to be studied with this sample. (first days of next week)
- The work is foreseen to be finished on Thursday.