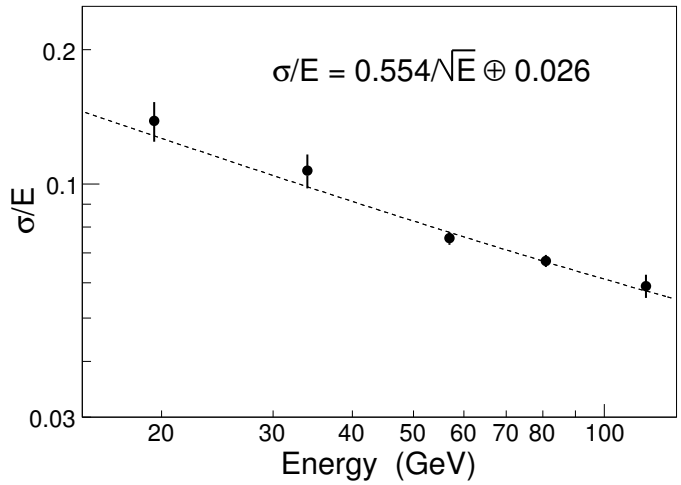
calo resolution - Figure 3

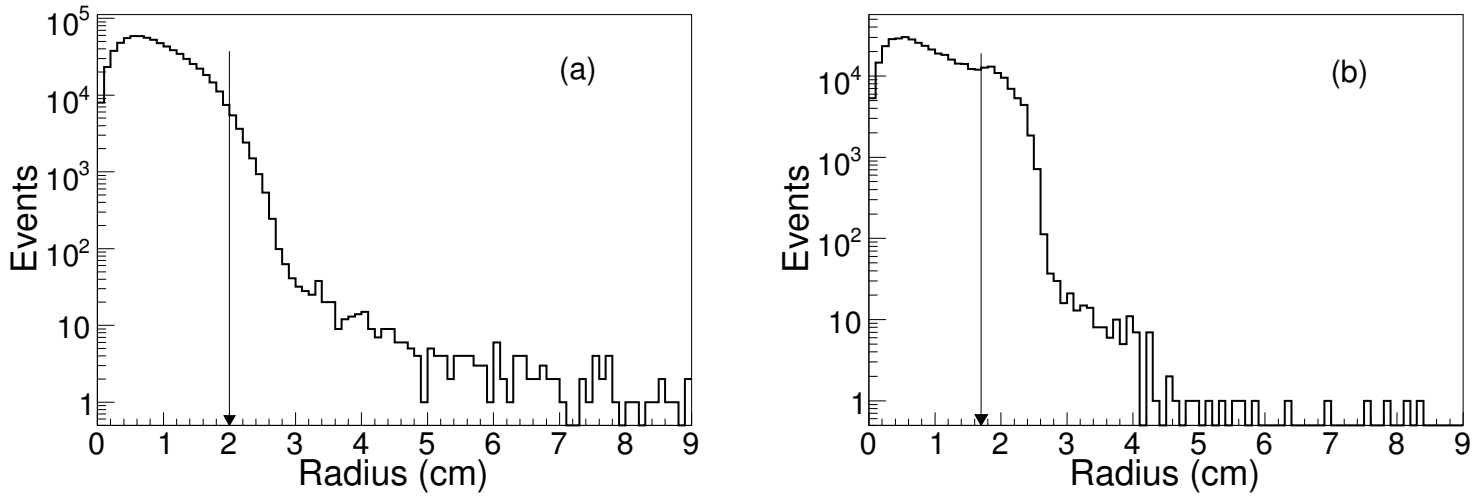


There is an issue with a label size in Y axis

hist name: caloRes, build-in. No conditions, no specific root file

Figure 4, beam track position cut at the target

Suggestion: remove Z vertex plots from Fig.4. Reason: radius plots illustrates incoming beam position, Zvtx - neutron sample



Incident proton track radius distributions relative to the beam axises at 58 GeV/c with the nuclear (a) and liquid hydrogen (b) targets. Arrows indicates the selected cut values.

p_T cut - Figure 5

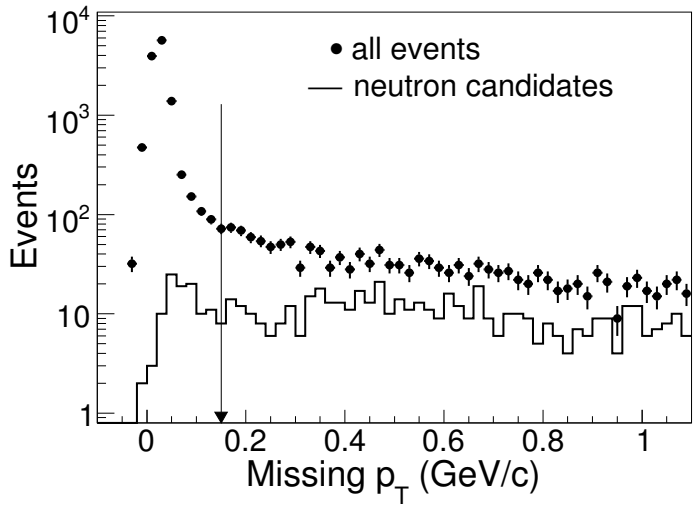


Figure 5. The distribution of the missing transverse momentum. The peak at 0 represents straight through beam tracks and were rejected with selected missing p_T threshold (shown as arrow).

——————— note for myself - what requirements used to make this plot (hist1008) ————

- pbeam, target: 120 GeV/c, thin targets - neu-Be-Bi-120GeV.root
- use beam trigger events only
- SciHi not used to make neutron candidates
- dPt cut not used

Figure 6 - proton losses in EMCAL

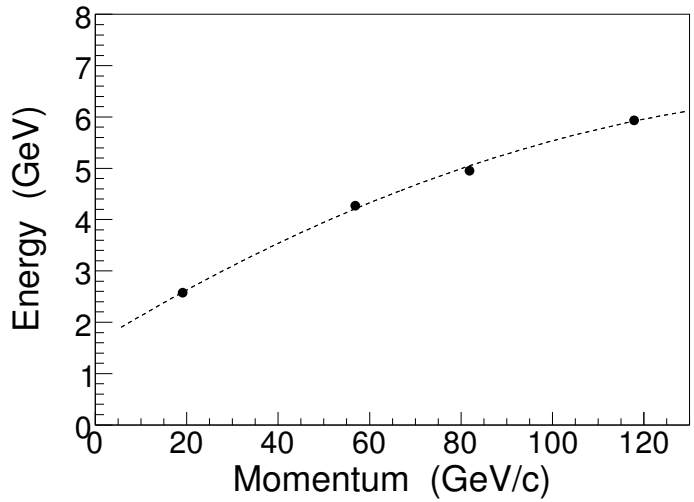


Figure 8 and 9

Suggestion: make one figure where Zvtx and neutron raw spectra would be combined. It will better clearify what is target-out and how it's momentum looks like

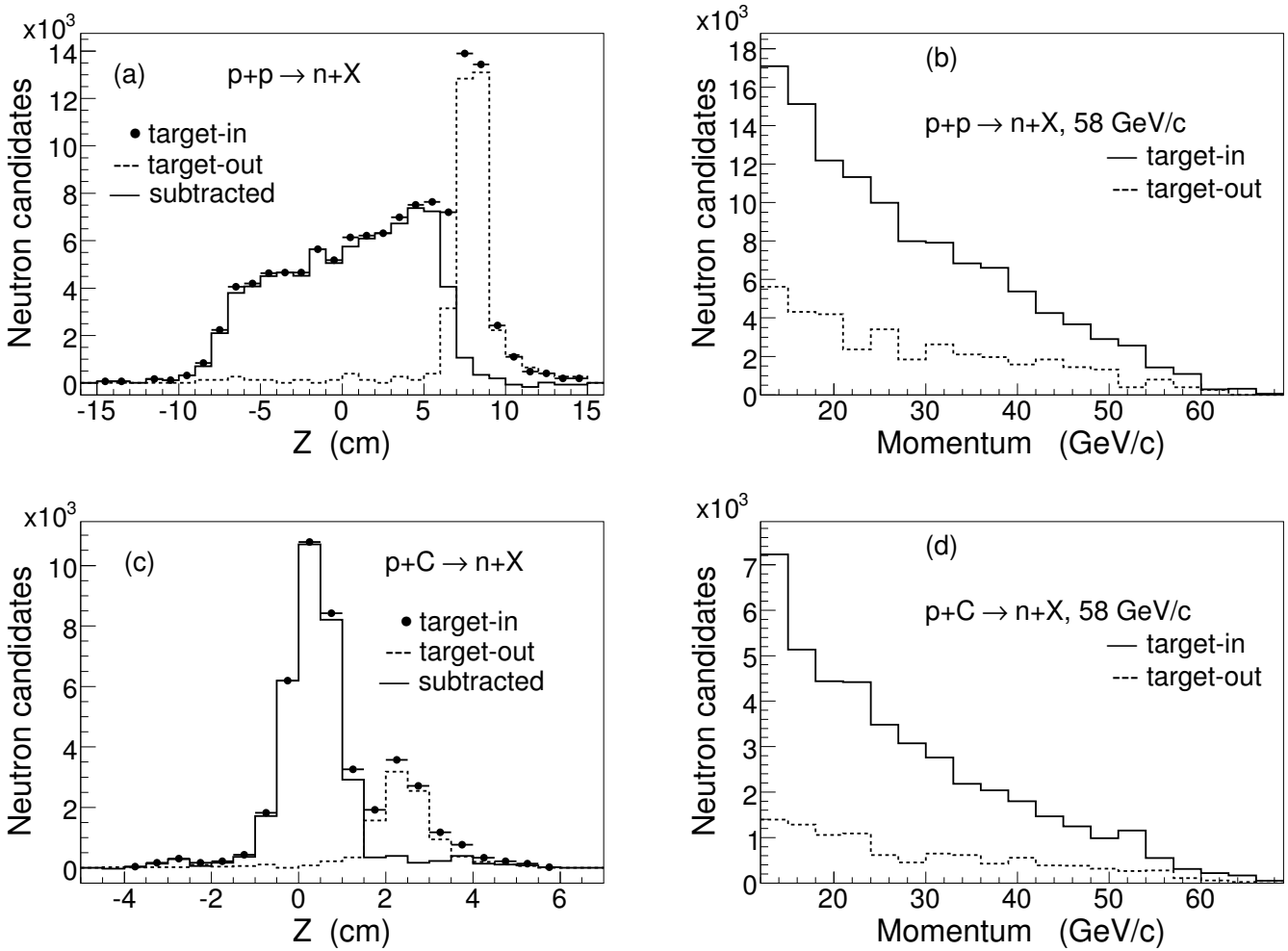


Figure (?) at beginning of “CORRECTIONS”

Why we rely on MC to calculate background, efficiencies...? Existing data not allow to do it. However, MC fully simulated spectrum found to be an identical to data. Then, there is a hope that an initial neutron spectrum in MC (at least shape) might be similar that as in data.

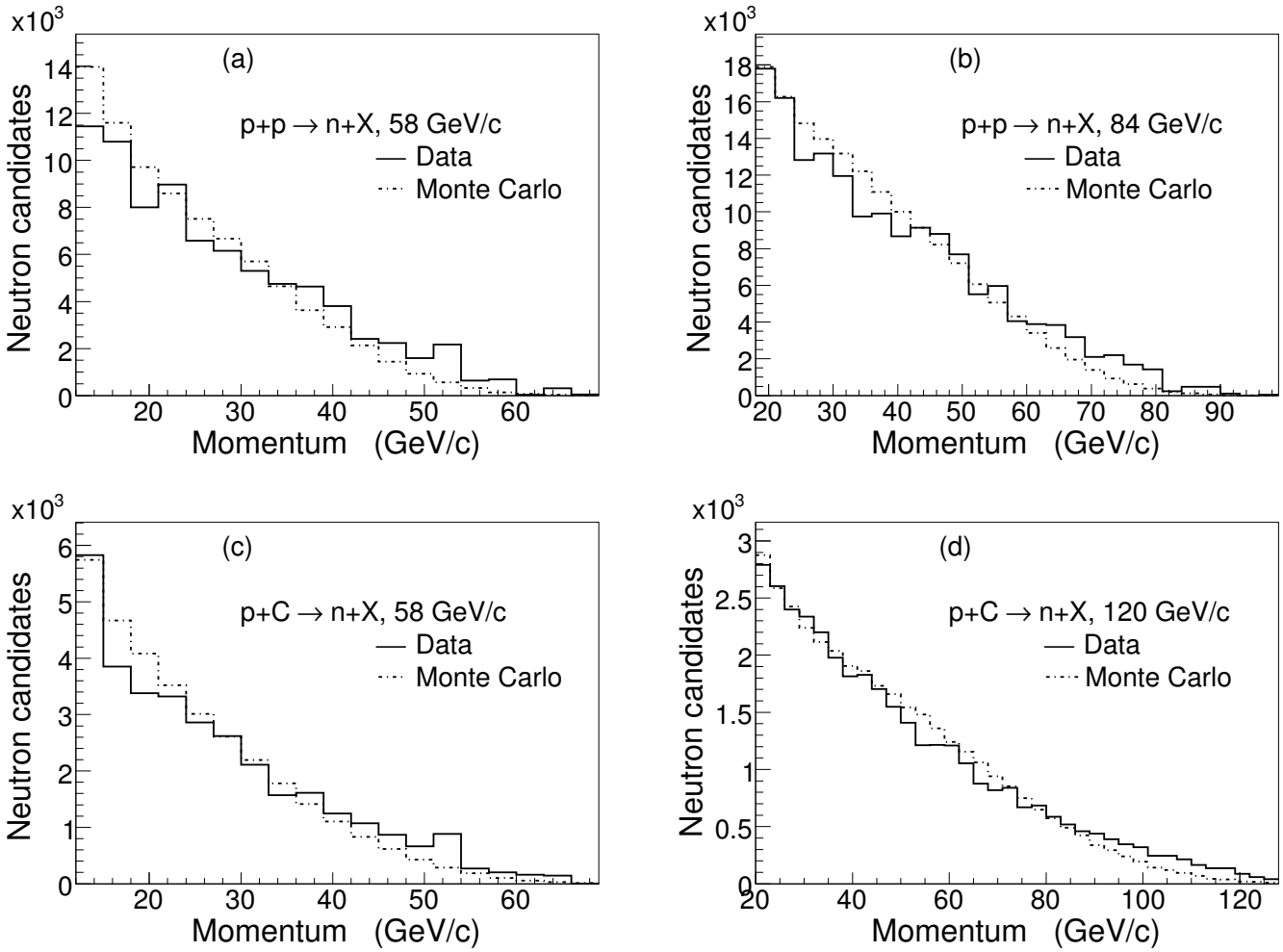
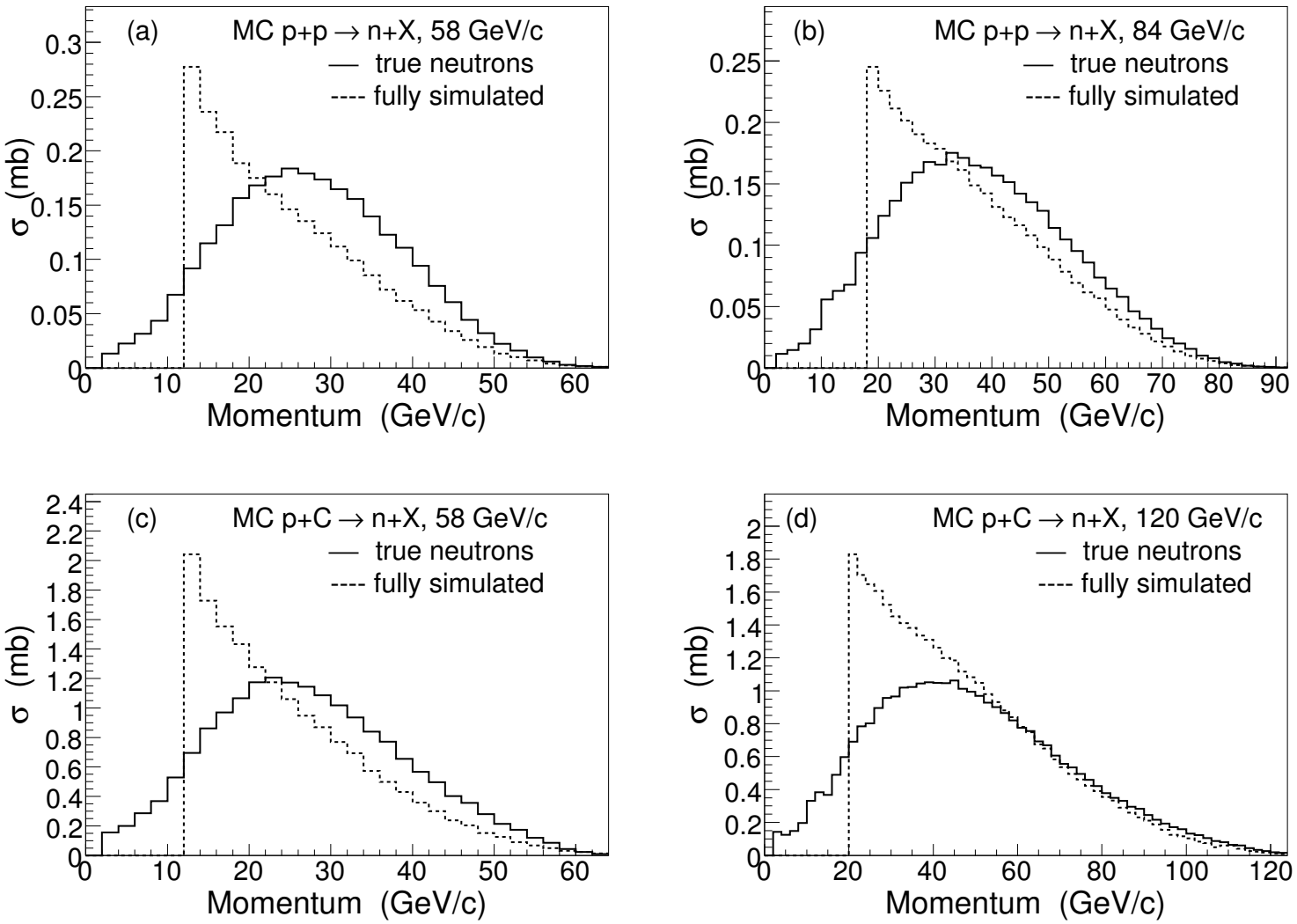


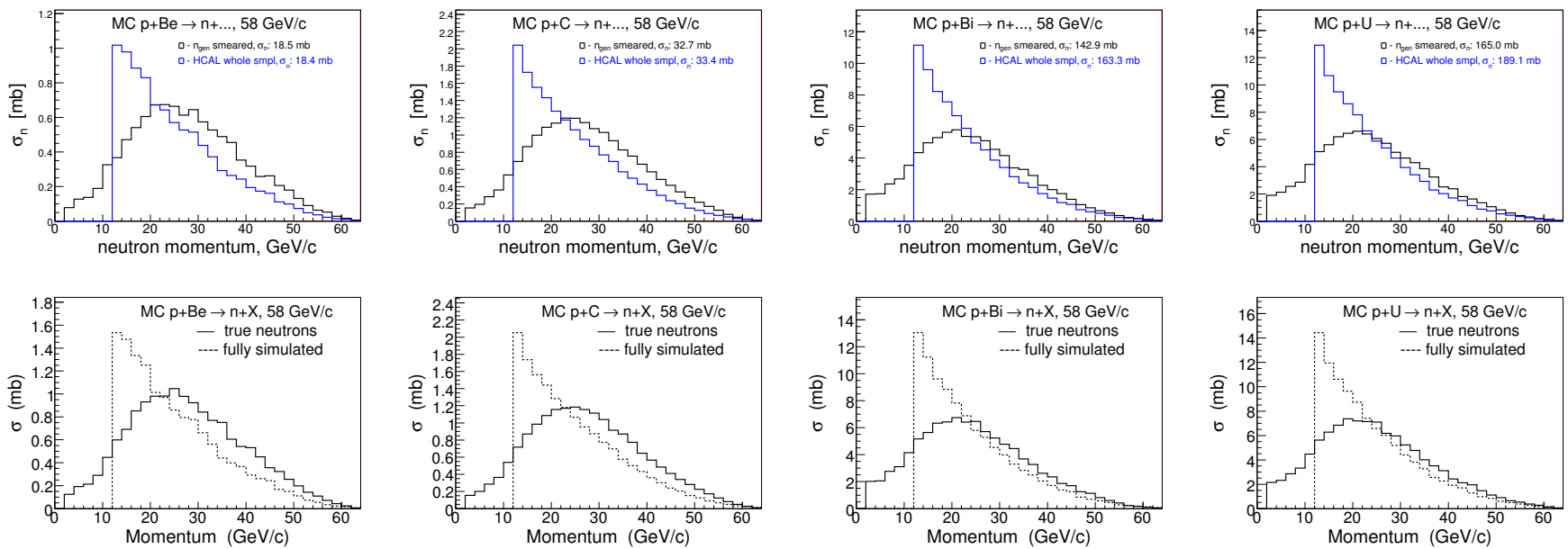
Figure 9


(a)
MC p+p → n+X, 58 GeV/c
true neutrons
fully simulated
σ (mb)
Momentum (GeV/c)
(b)
MC p+p → n+X, 84 GeV/c
true neutrons
fully simulated
σ (mb)
Momentum (GeV/c)
(c)
MC p+C → n+X, 58 GeV/c
true neutrons
fully simulated
σ (mb)
Momentum (GeV/c)
(d)
MC p+C → n+X, 120 GeV/c
true neutrons
fully simulated
σ (mb)
Momentum (GeV/c)

Be target issue in MC: 58 GeV/c

Durga suggested to calculate MC neutron cross sections same way as in data:

- previous: $\sigma_{inel} \cdot N_n / N_{MCevents}$
- now: $\frac{N_n}{N_{beam} \cdot n_t}$. Top row: previous. Bottom: new approach



Be target issue in MC: 120 GeV/c

Durga suggested to calculate MC neutron cross sections same way as in data:

- previous: $\sigma_{inel} \cdot N_n / N_{MCevents}$
- now: $\frac{N_n}{N_{beam} \cdot n_t}$. Top row: previous. Bottom: new approach

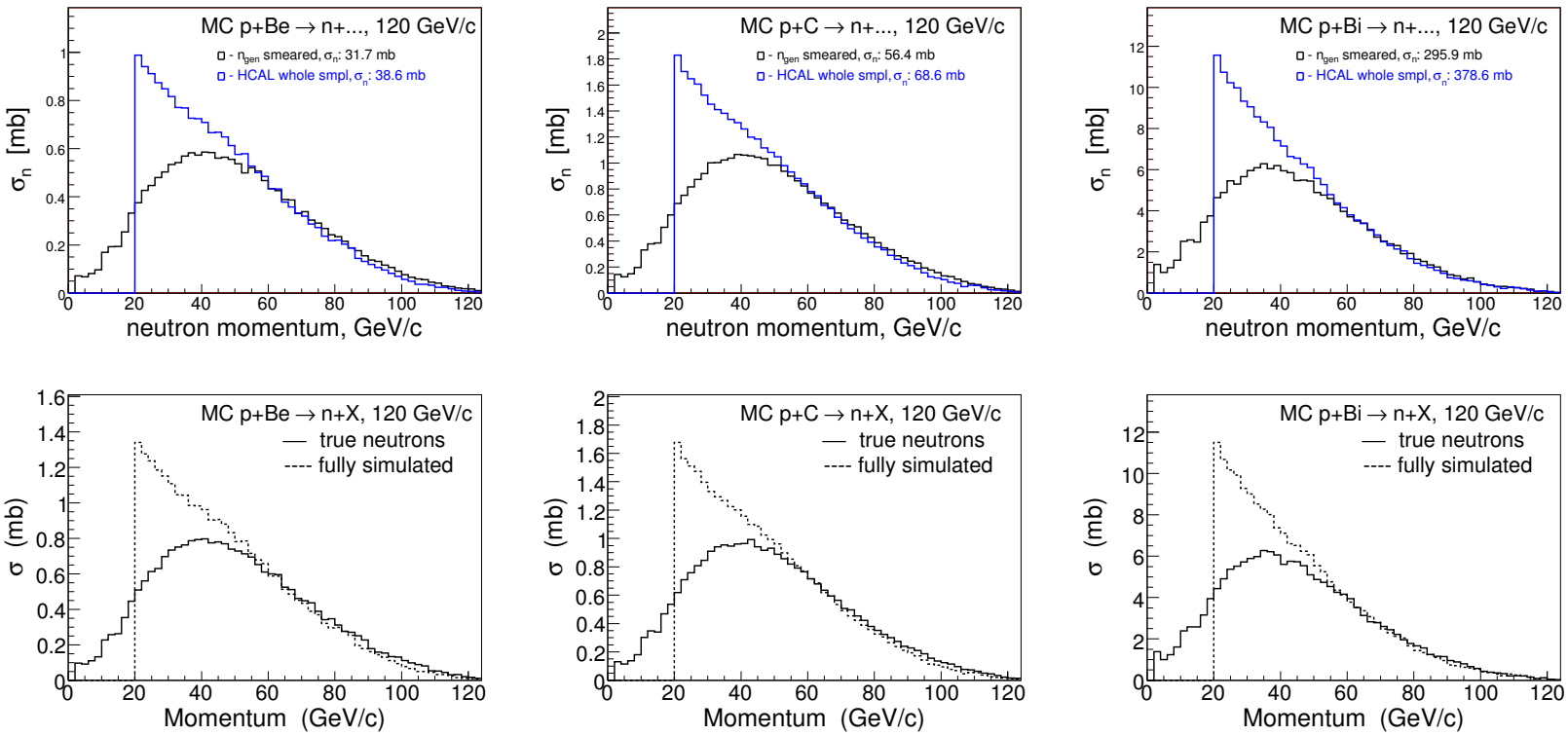


Figure 10

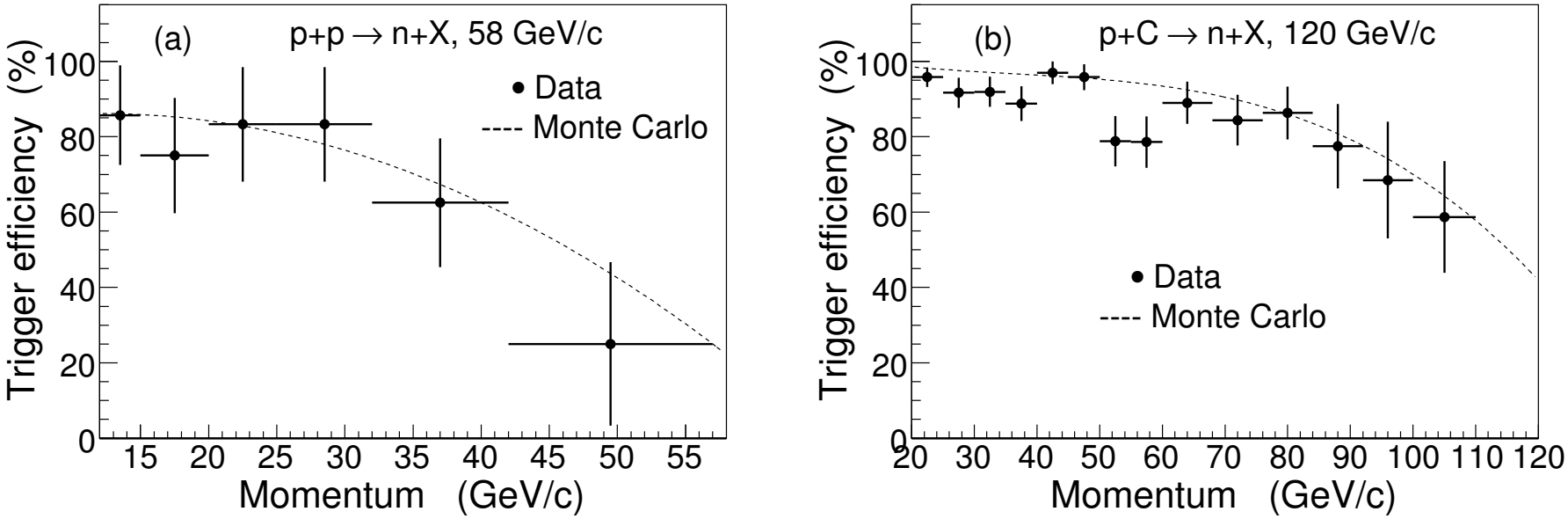

(a)
p+p → n+X, 58 GeV/c
• Data
---- Monte Carlo
Trigger efficiency (%)
Momentum (GeV/c)
(b)
p+C → n+X, 120 GeV/c
• Data
---- Monte Carlo
Trigger efficiency (%)
Momentum (GeV/c)

Figure 11, background

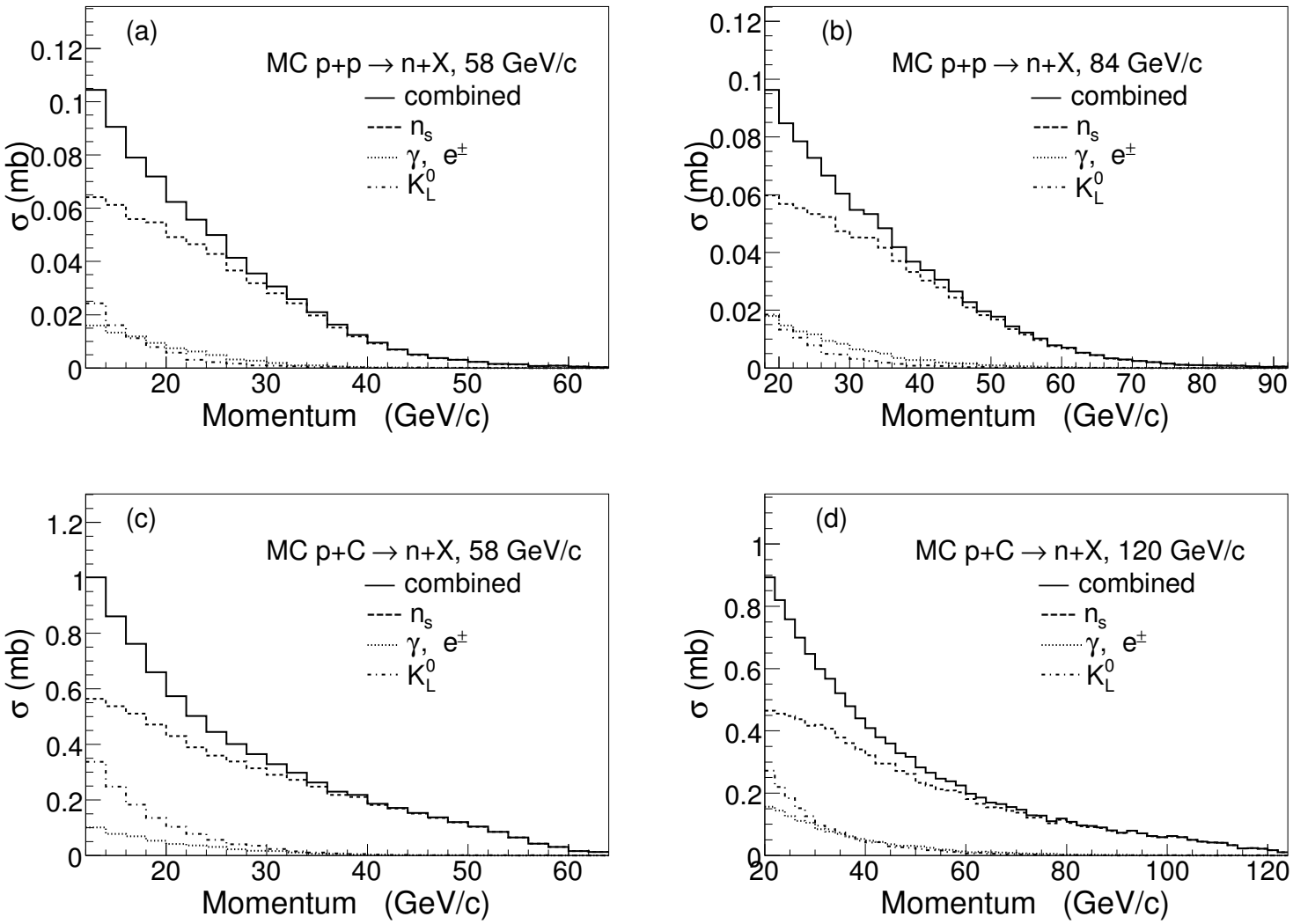


Figure 12, neutron selection efficiency

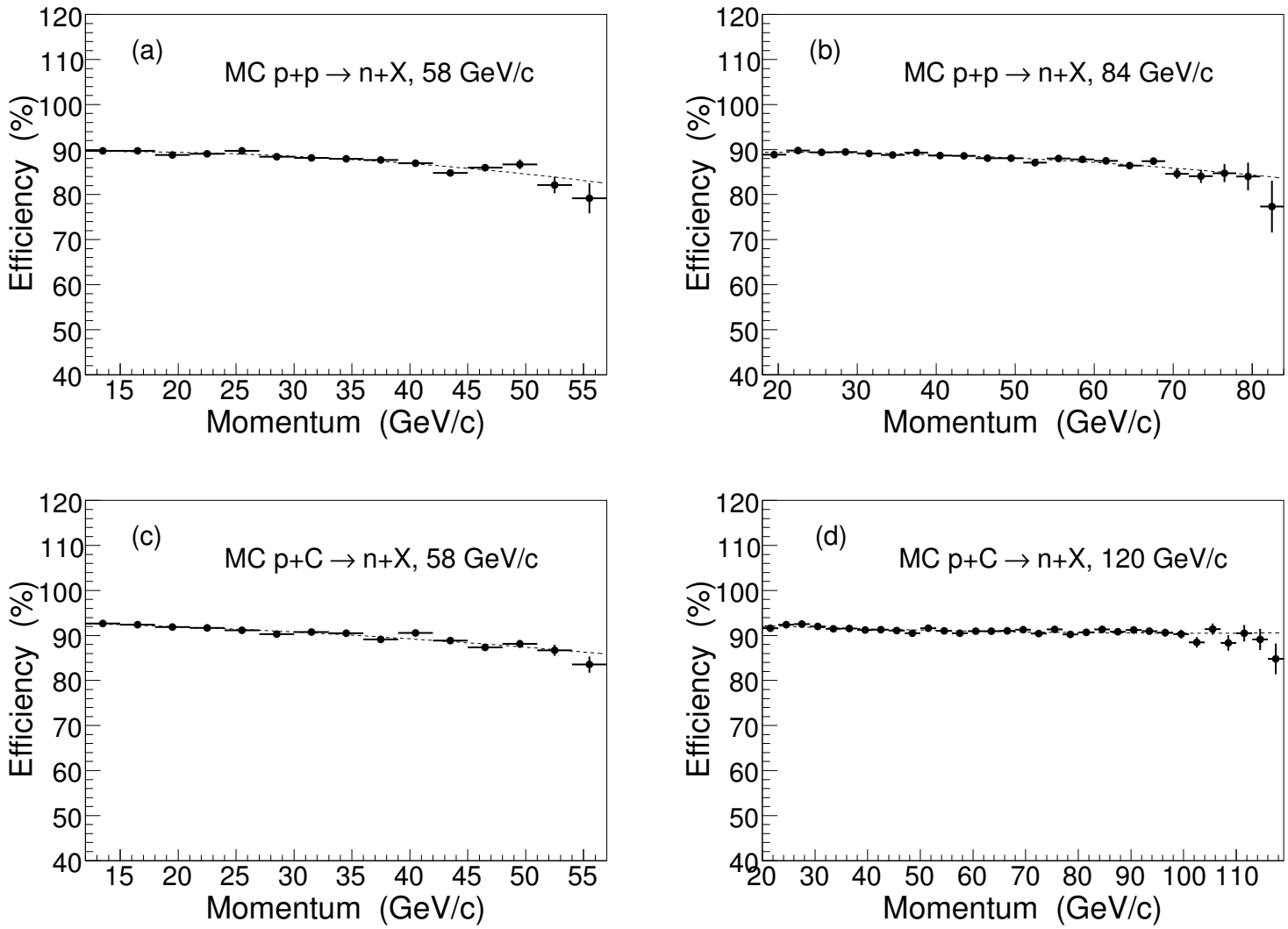


Figure 13, neutron corrected spectrum

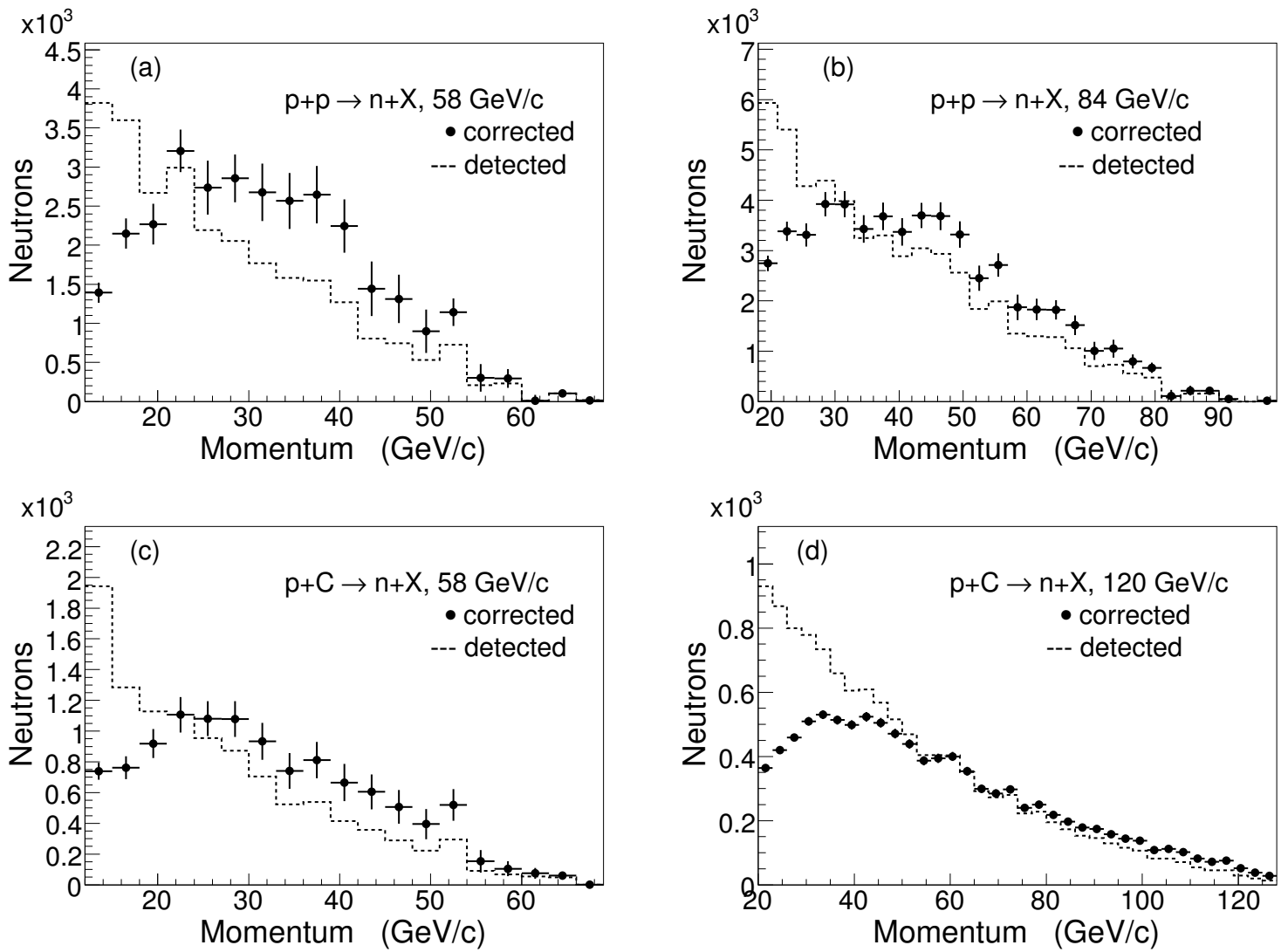


Figure 14, calo acceptance

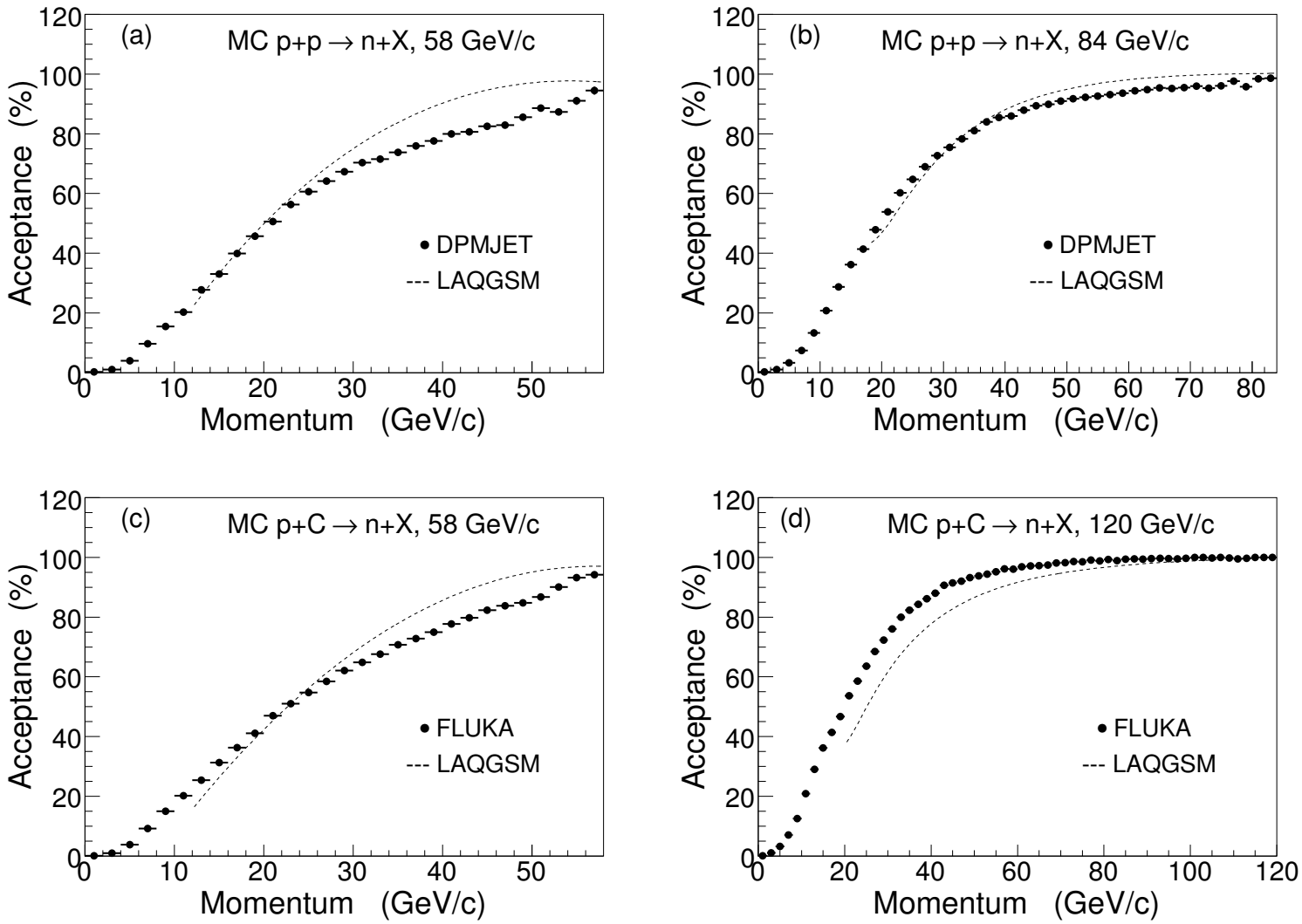


Table 5 - cross sections: data and MC

	Data	$DPMJET$ $FLUKA$	LAQGSM
H_2-58	5.8	4.9	4.7
Be-58	44.0	18.6 (28.1)	25.3
C-58	45.9	32.7 (32.9)	27.5
Bi-58	193.2	143.4(167.6)	88.3
U-58	178.8	165.0(184.7)	91.5
H_2-84	8.8	6.4	5.4
Be-120	55.0	31.6 (43.0)	33.4
C-120	64.5	56.5 (51.8)	36.6
Bi-120	300.2	296.1(293.9)	120.1

Table 1: Numbers in parenthesis are updated results for FLUKA.

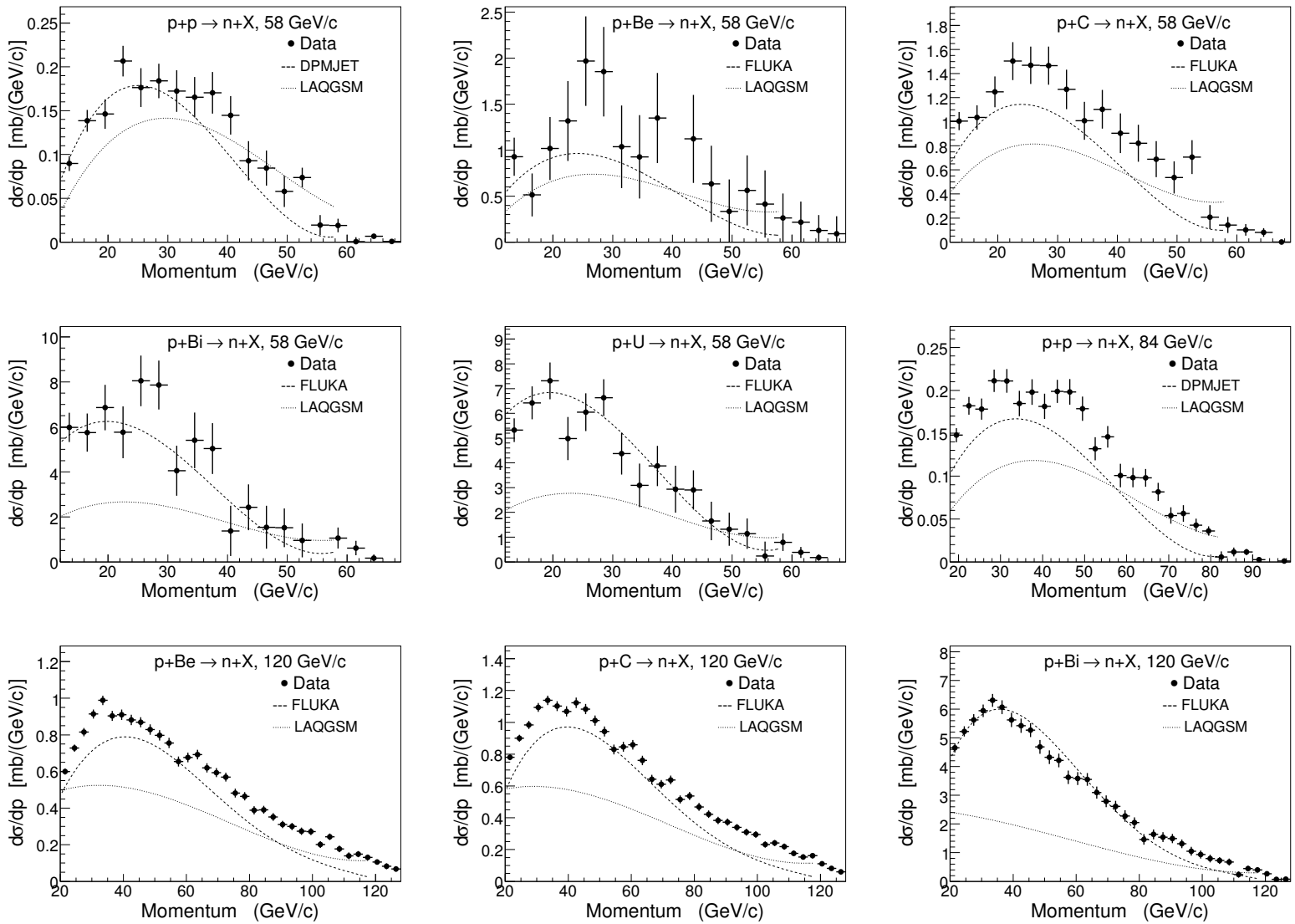



Figure 16, CS plots for data and MC