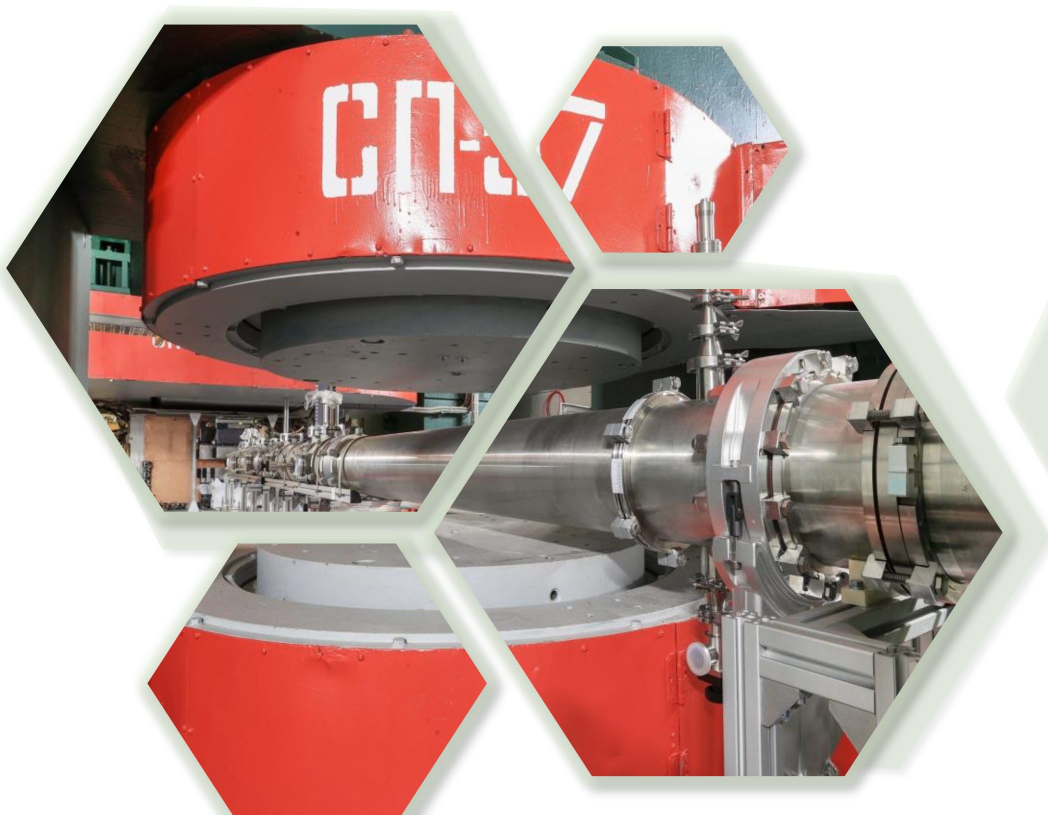
12th Collaboration Meeting of the BM@N Experiment at the NICA Facility

“Study of Λ - hyperon production in carbon collisions with solid targets (Run6)”



Speaker: Ksenia Alishina

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14.05.2024

Almaty, Kazakhstan

Goal of the job

To measure $\Lambda \rightarrow p + \pi^-$ yields and inverse slopes in p_T spectra.

The results will be published.

step 1 — To get the efficiency of signal reconstruction in the MC

step 2 — To plot the mass distribution Λ with efficiency ω_i over the kinematic range (y-p_T)

step 3 — Extrapolation procedure to low reconstraction efficiency ω_i based on QGSM model

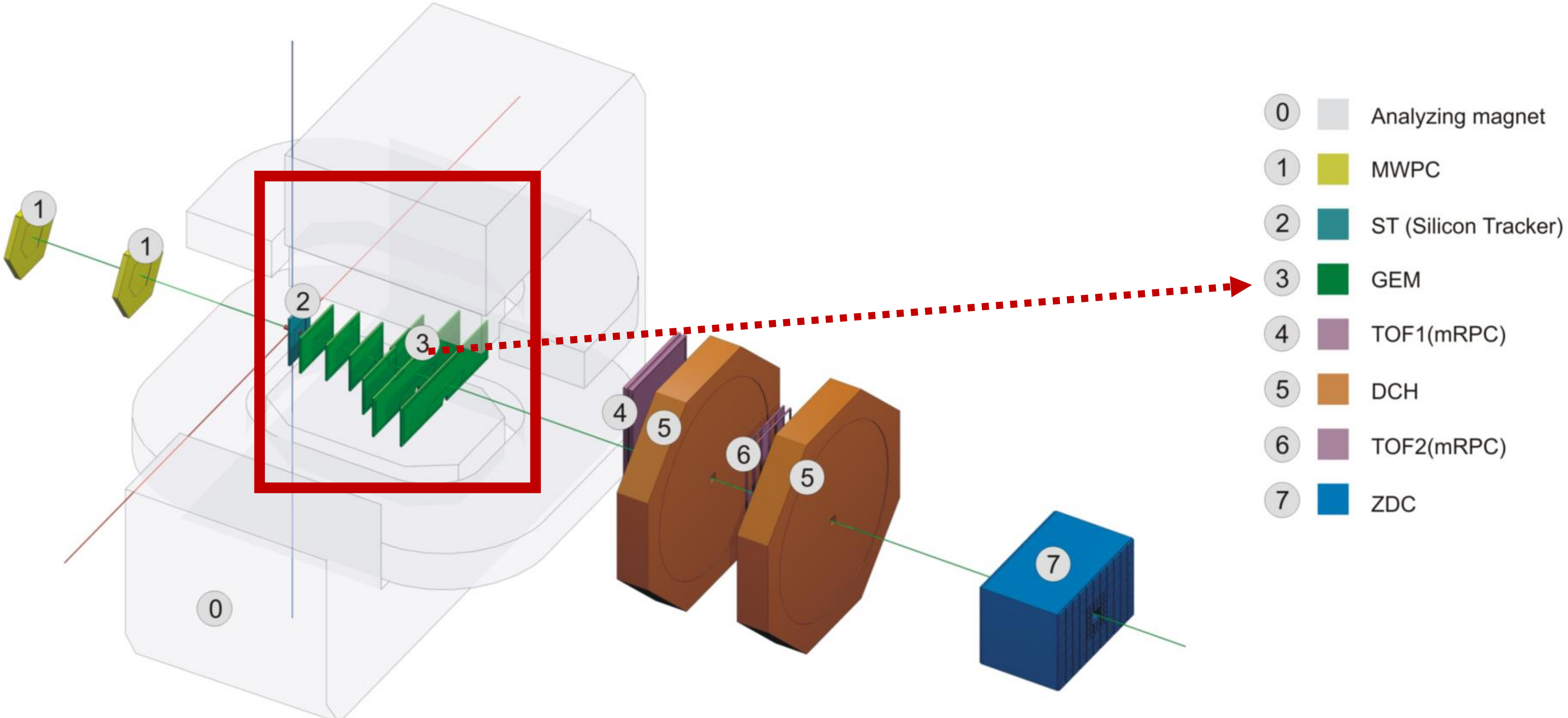
step 4 — Signal evaluation

step 5 — Λ production cross sections and yields in C+A (4, 4.5AGeV) interactions

step 6 — Inverse slopes in p_T spectra in C+A (4, 4.5AGeV) interactions

Setup scheme (run-6)

C + A → X , A : C, Al, Cu, Pb **Energy beam = 4.0 AGeV, 4.5 AGeV**

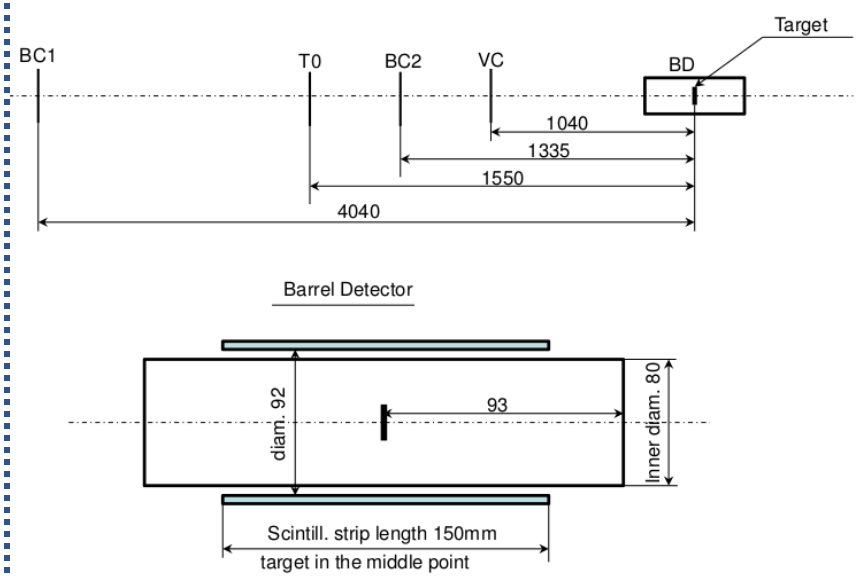


Gas Electron Multiplier (GEM) system:
To measure momenta of a charged particle;

Event reconstruction in GEM in C+A interaction;

*K. A. Alishina, Yu. Yu. Stepanenko, A.Y Khukhaeva" Gem residuals corrections in monte-carlo simulation for the run 6 at the BM@N experiment", PEPAN letters – volume 19,part 5, 2022

Event selection criteria

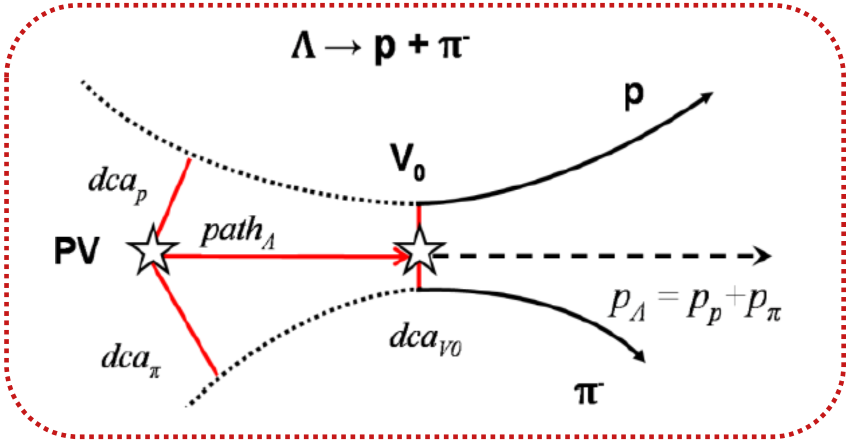


Schematic view and positions of the beam counters, barrel detector and target

1. Number of tracks in selected events: positive>=1, negative>=1;
2. Number of signals in the start detector: T0=1,
3. Number of signals in the beam counter: BC2=1,
4. Number of signals in the veto counter around the beam: Veto=0;
5. Trigger condition in the barrel detector: number of signals BD>=2 or BD>=3 (run dependent);

The suppression factors of reconstructed events ε_{pileup} due to selection **criteria 2** applied to eliminate beam halo and pile-up events in interactions of the 4.0 and 4.5 AGeV carbon beam with the C, Al, Cu, Pb targets.

Selection of events with Λ hyperon



Event topology:

PV – primary vertex

V0 – vertex of hyperon decay

dca – distance of the closest approach

path – decay length

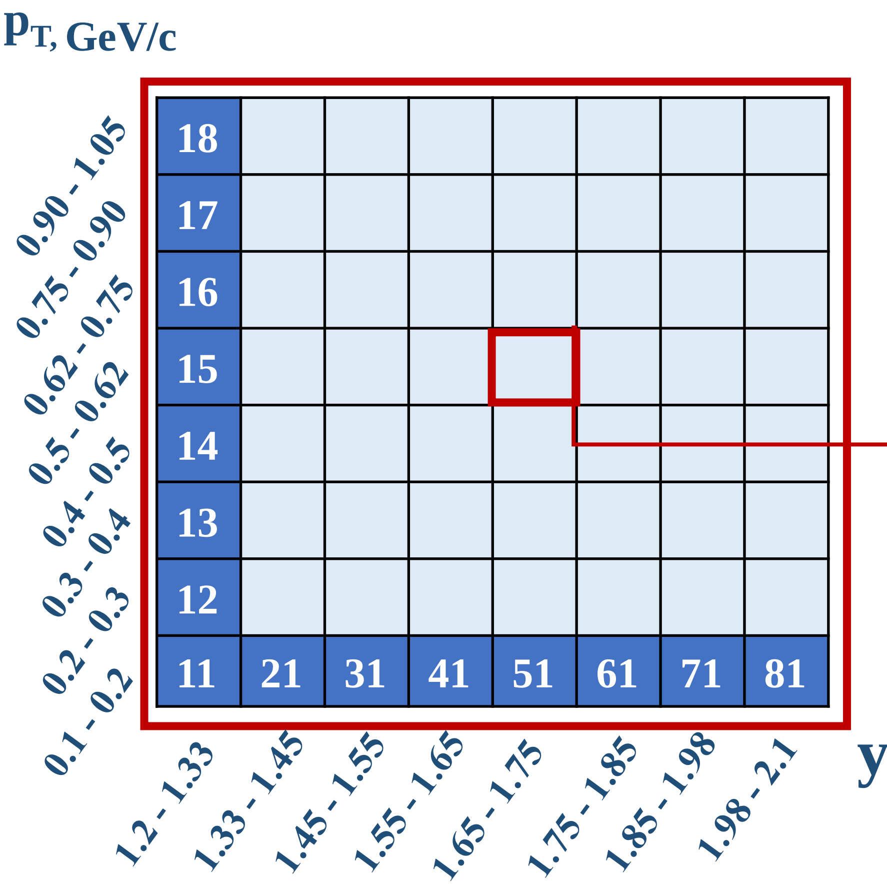
Criteria for the selection of Λ - hyperons :

1. Each track has at least 4 of the 6 hits in (GEM);
2. p_{pos} < 3.9(4.4) GeV/c for a beam energy of 4 (4.5) AGeV;
3. p_{neg} > 0.3 GeV/c;
4. dca < 1 cm;
5. Distance between the decay vertex V_0 and the primary vertex: path > 2.0 – 2.5 cm (**target dependent**).

K. A. Alishina, Yu. Yu. Stepanenko, "Study of Λ–hyperon production in collisions of heavy ions with solid targets in the BM@N experiment"(PEPAN,2024)

Kinematic measuring range (4, 4.5 AGeV):

$0.1 < p_T < 1.05$ GeV/c
$1.2 < y_{lab} < 2.1$



1 Divide the kinematic measuring range by y, p_T into (8x8) cells in the MC simulation

2 To get the number of events generated by the MC

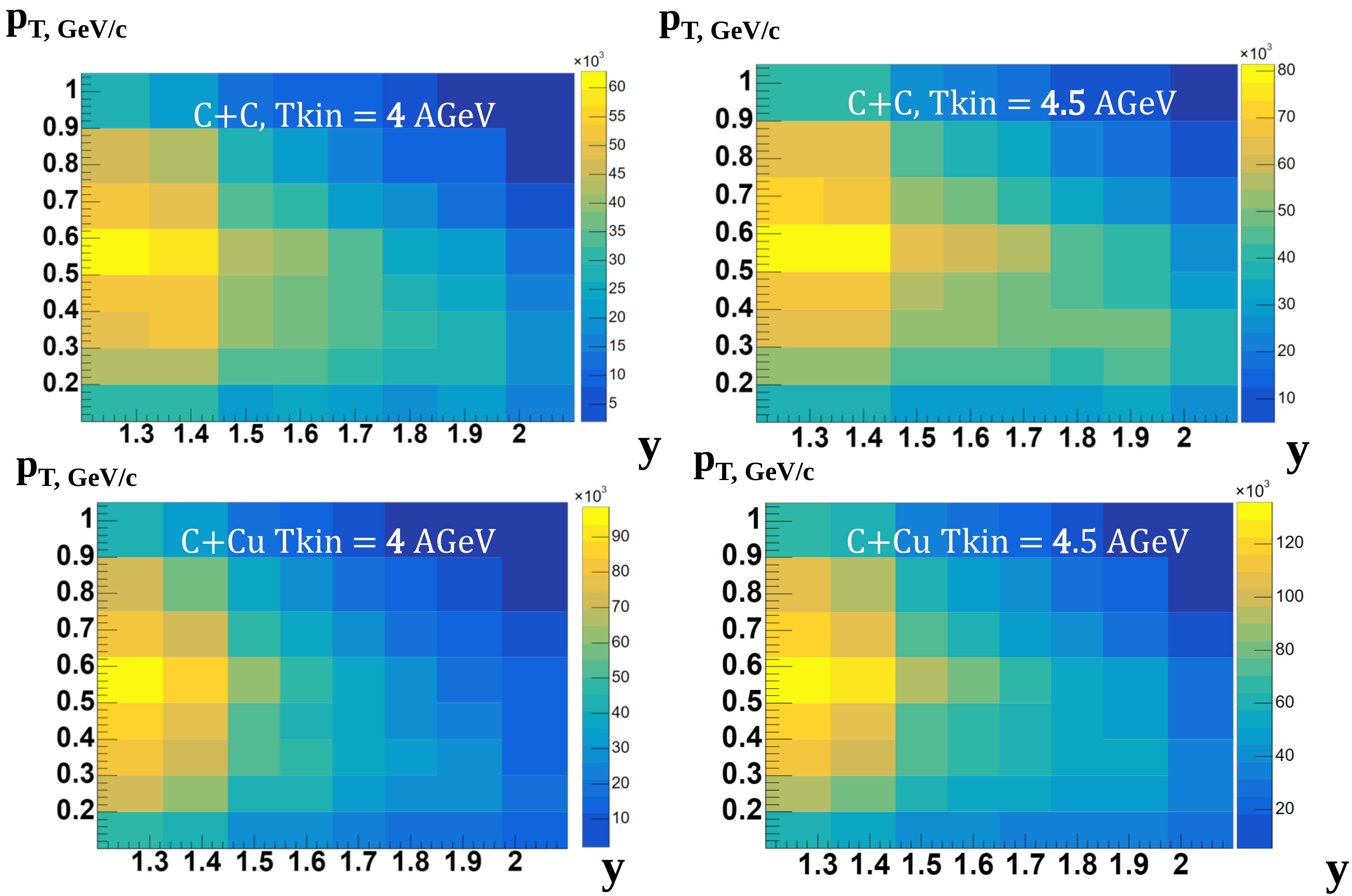
3 In each cells the invariant mass distribution fit with

$$f_{bg} = N \cdot (m - M_0)^A \cdot e^{-B \cdot (m - M_0)}$$

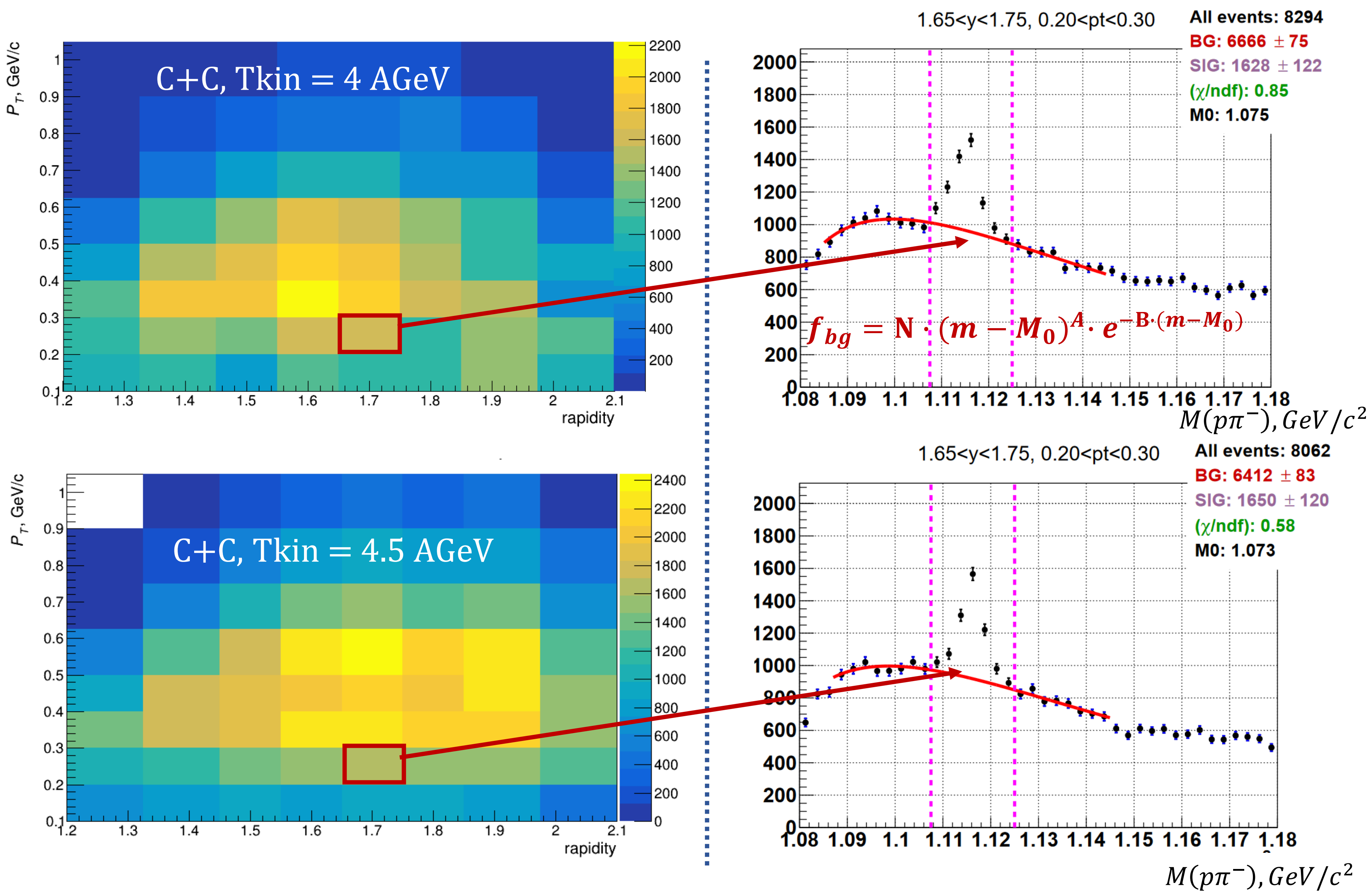
N, A, B are free parameters,
$M_0 = 1.078$ ГэВ/c^2 is the threshold limit, m is the mass value.

4 Each event is weighted with $\omega_i = MC_{rec\_i}/MC_{gen\_i}$,
MC_{rec_i} is evaluated number of Λ,
MC_{gen_i} is the number of Λ generated;

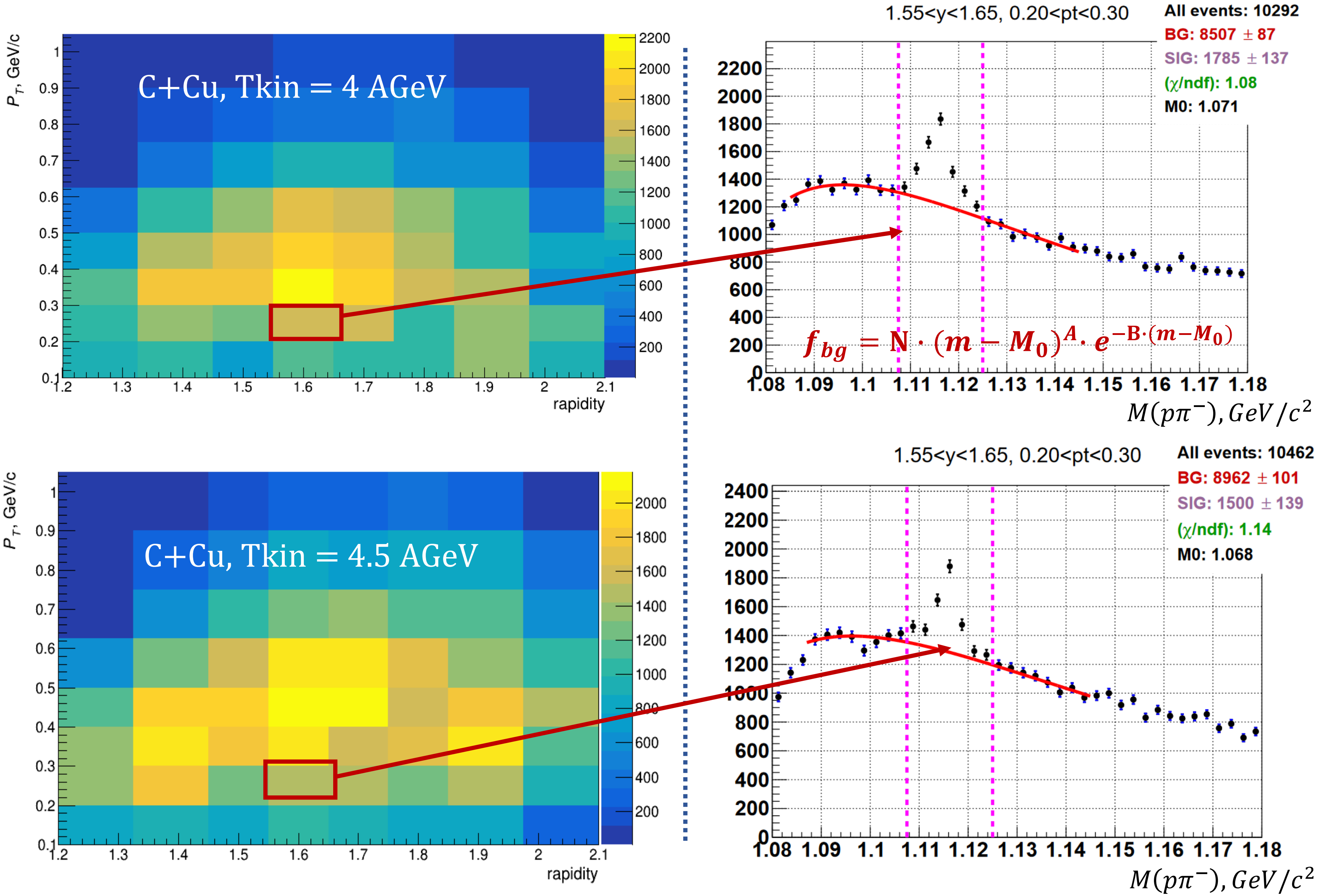
Λ generated in $(y - p_T)$ cells



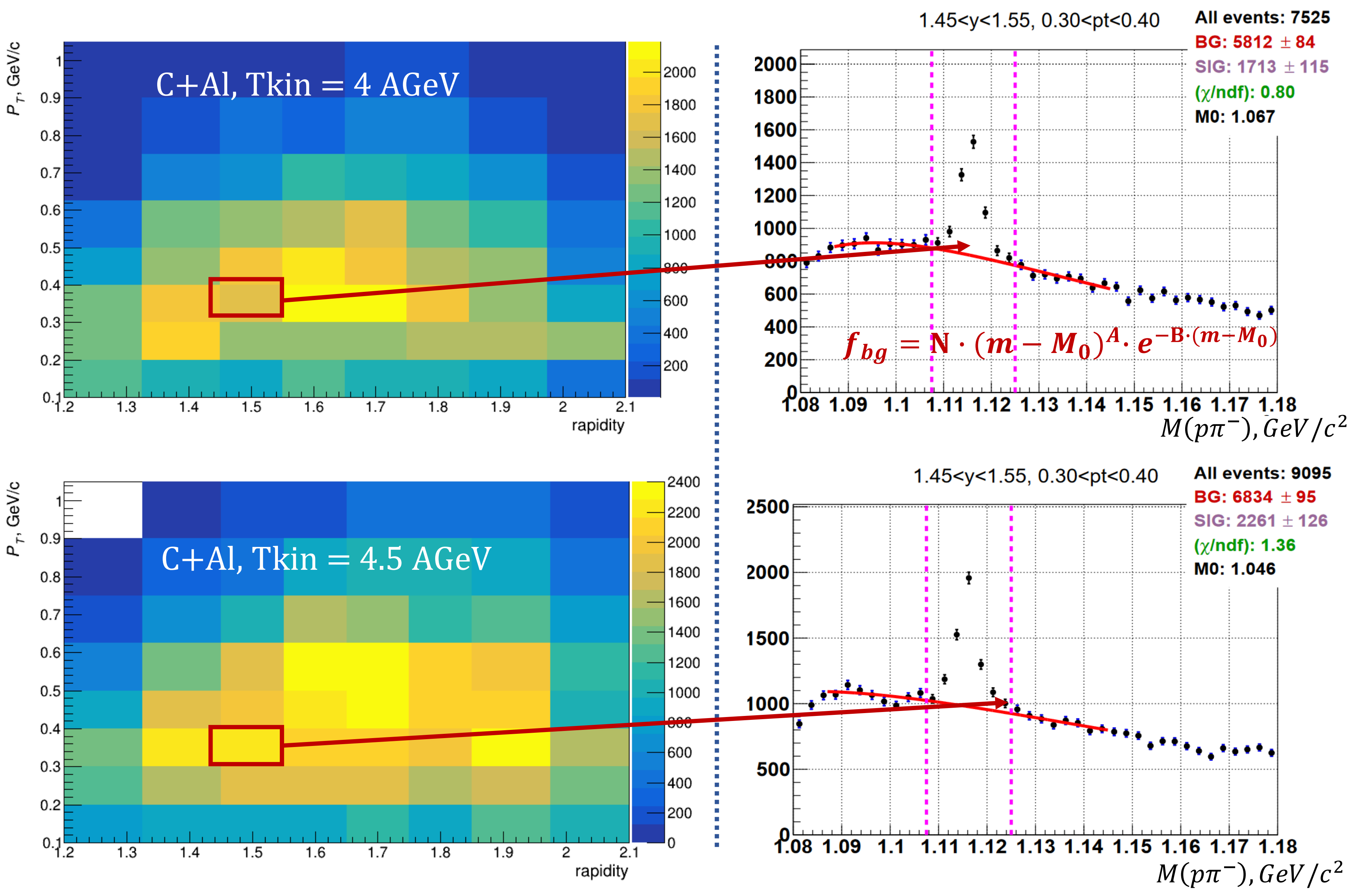
Distribution of the reconstructed signal in the MC



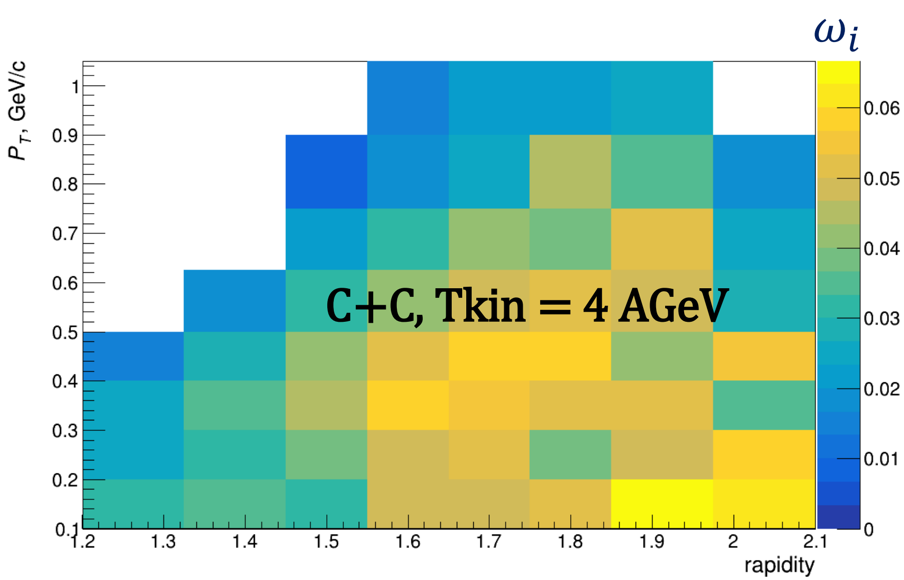
Distribution of the reconstructed signal in the MC

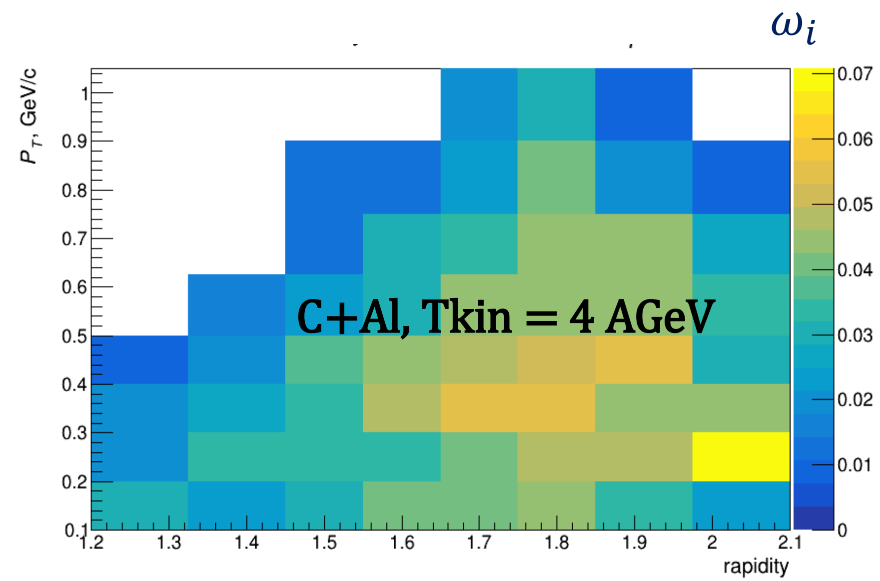


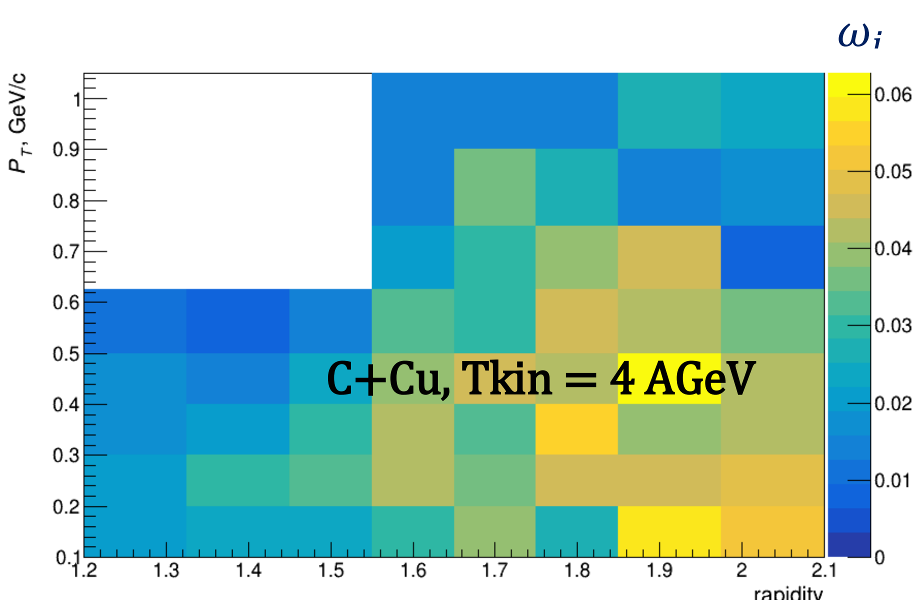
Distribution of the reconstructed signal in the MC

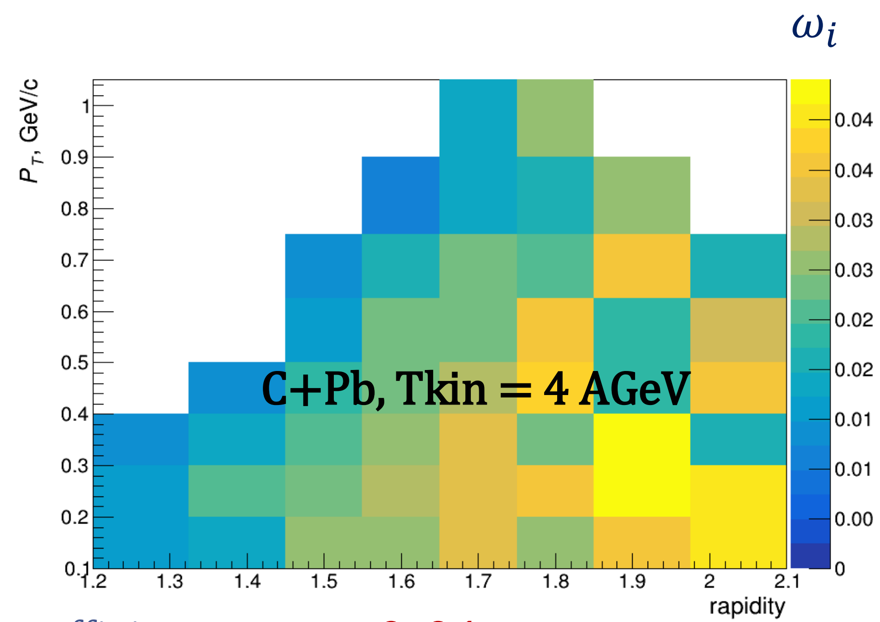


Λ reconstruction efficiency in $(y - P_T)$ cells



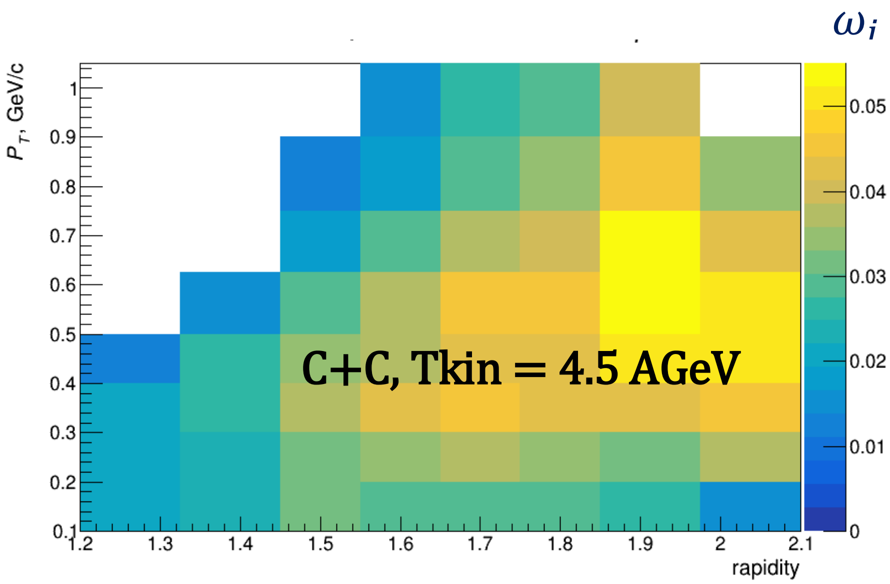


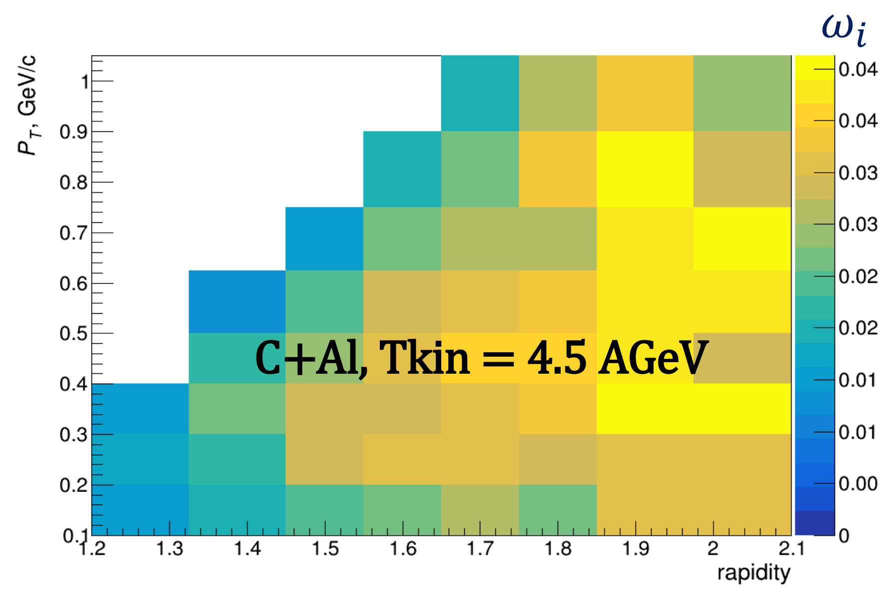


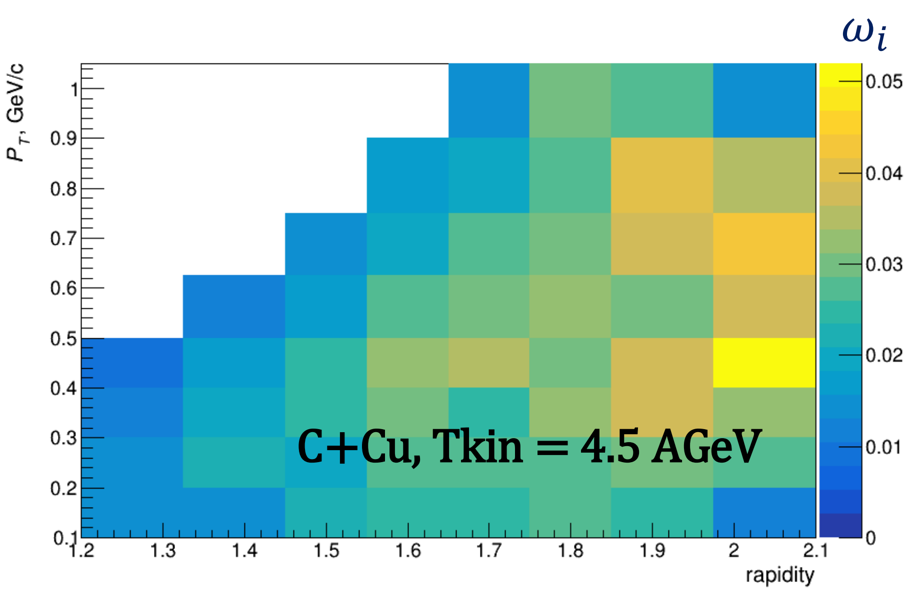


Accepted cells with the efficiency $\boldsymbol{\omega_i \geq 0.01}$

Λ reconstruction efficiency in $(y - P_T)$ cells



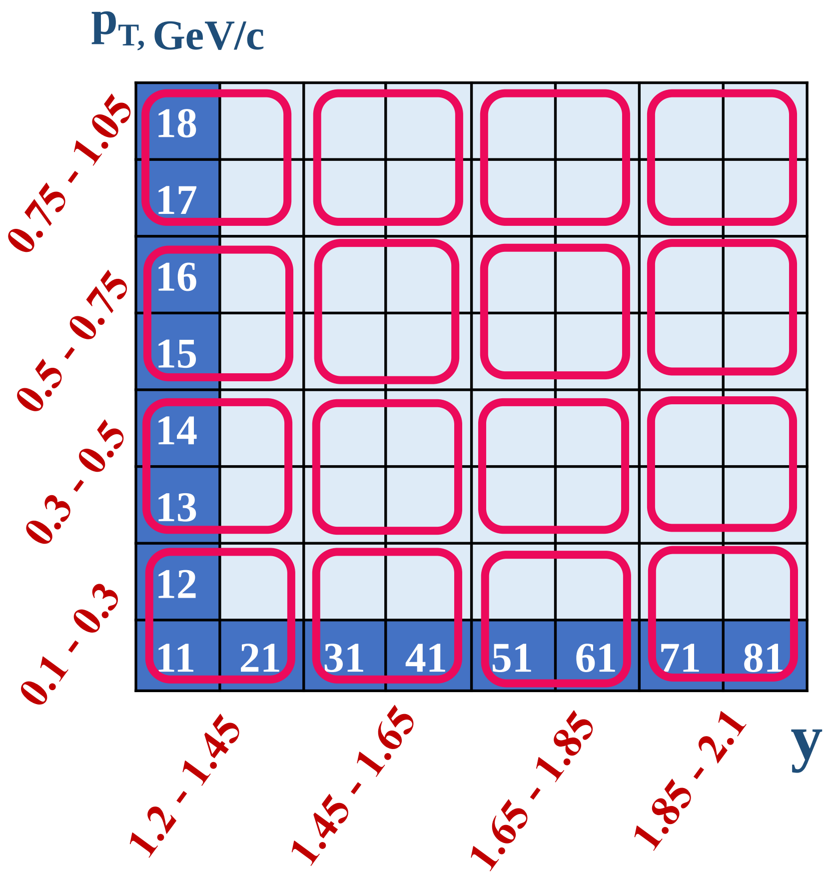




Integrated efficiency in full kinematic range

$$\omega_{isum} = \sum N_{rec} \Big/ \sum N_{gen}$$

4 AGeV				
Target	C	Al	Cu	Pb
ω_{isum}(%)	3,24	2,70	2,44	1,86
4.5 AGeV				
ω_{isum}(%)	2,77	2,41	1,91	1,47



1 **Real data are split in 4×4 matrix due to statistic limitation;**

2 **To obtain extrapolation factors by the formula:**

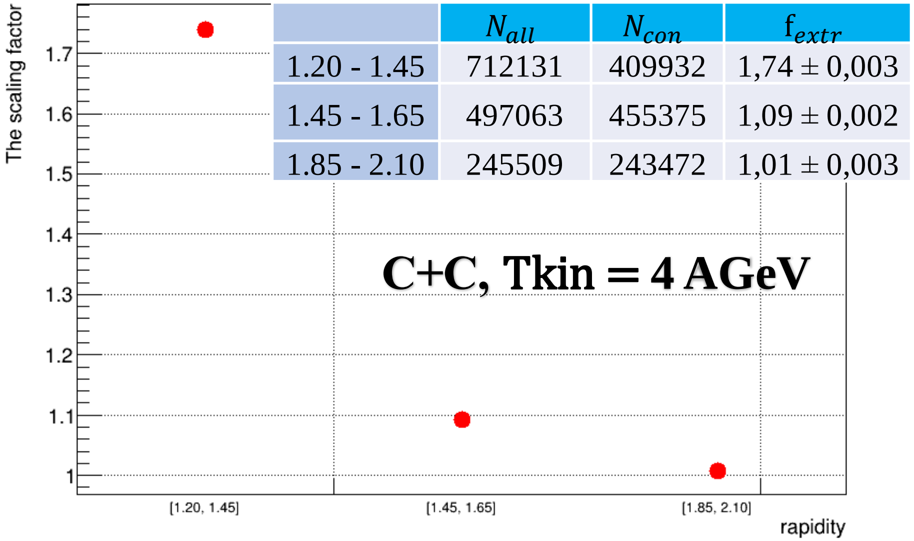
$$f_{extr} = {}^{N_{all}}/{}_{N_{con}}$$

N_{all} – **sum of all generated events in paired columns by y;**

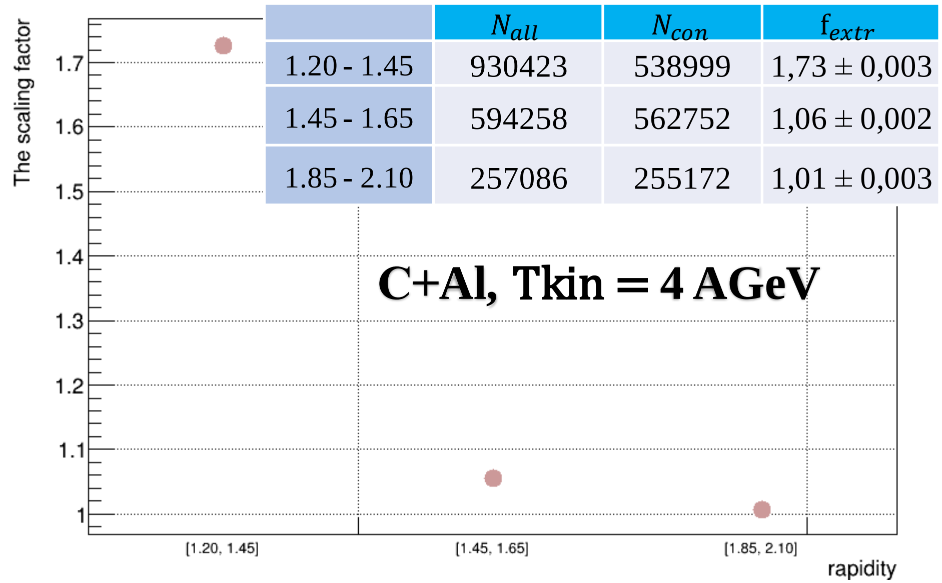
N_{con} – **sum of all considered($\omega_i \geq 0.01$) in paired columns by y;**

3 **Multiply f_{extr} by the content of the histogram $M_{inv}(\Lambda \rightarrow p\pi^-)$ in the data for the kinematic respective region;**

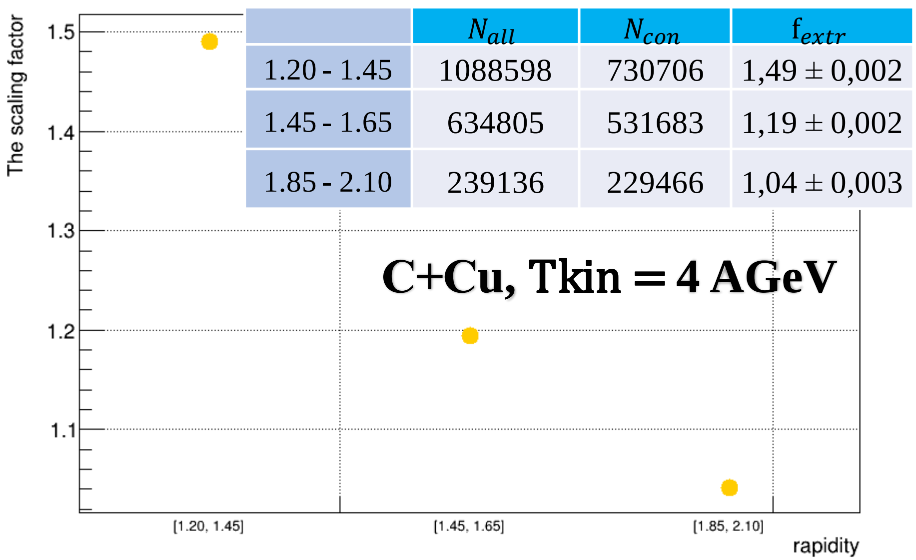
Extrapolation factor f_{extr}



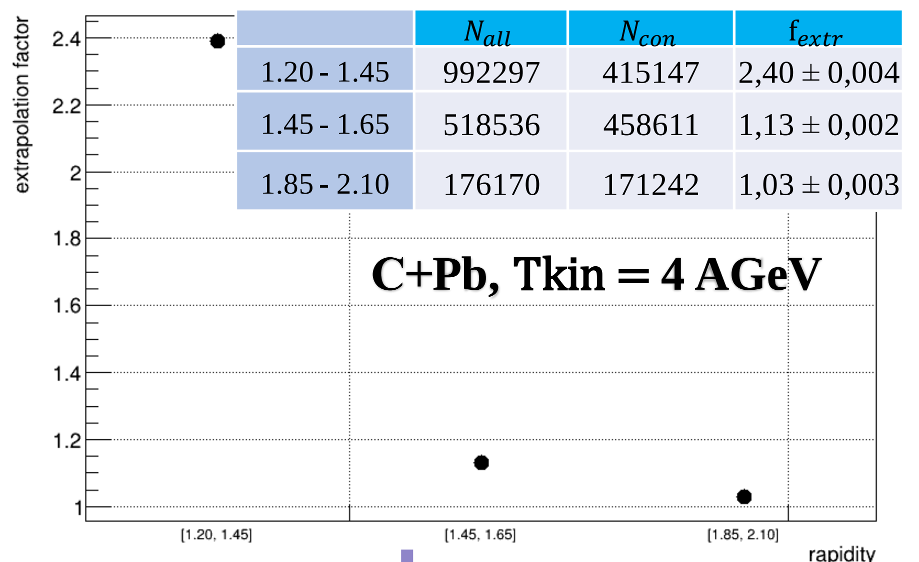
	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	712131	409932	1,74 ± 0,003
1.45 - 1.65	497063	455375	1,09 ± 0,002
1.85 - 2.10	245509	243472	1,01 ± 0,003



	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	930423	538999	1,73 ± 0,003
1.45 - 1.65	594258	562752	1,06 ± 0,002
1.85 - 2.10	257086	255172	1,01 ± 0,003



	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	1088598	730706	1,49 ± 0,002
1.45 - 1.65	634805	531683	1,19 ± 0,002
1.85 - 2.10	239136	229466	1,04 ± 0,003



	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	992297	415147	2,40 ± 0,004
1.45 - 1.65	518536	458611	1,13 ± 0,002
1.85 - 2.10	176170	171242	1,03 ± 0,003

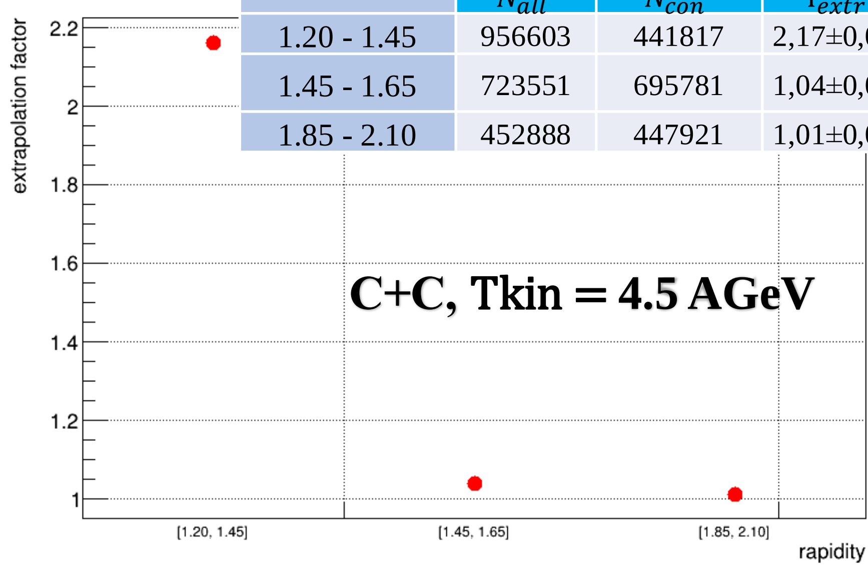
1 Done for all targets separately.

2 Done on DCM-QGSM model data.

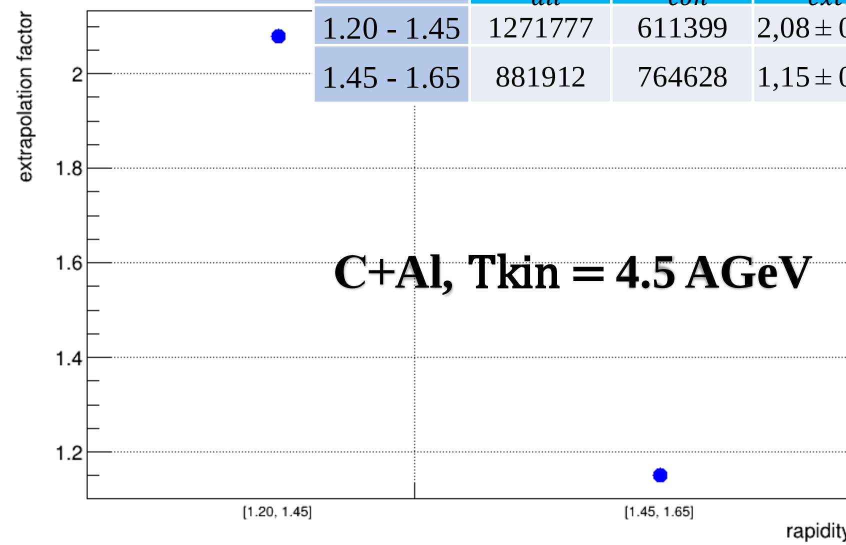
3 The graphs show points from cells($\omega_i \geq 0.01$).

Extrapolation factor f_{extr}

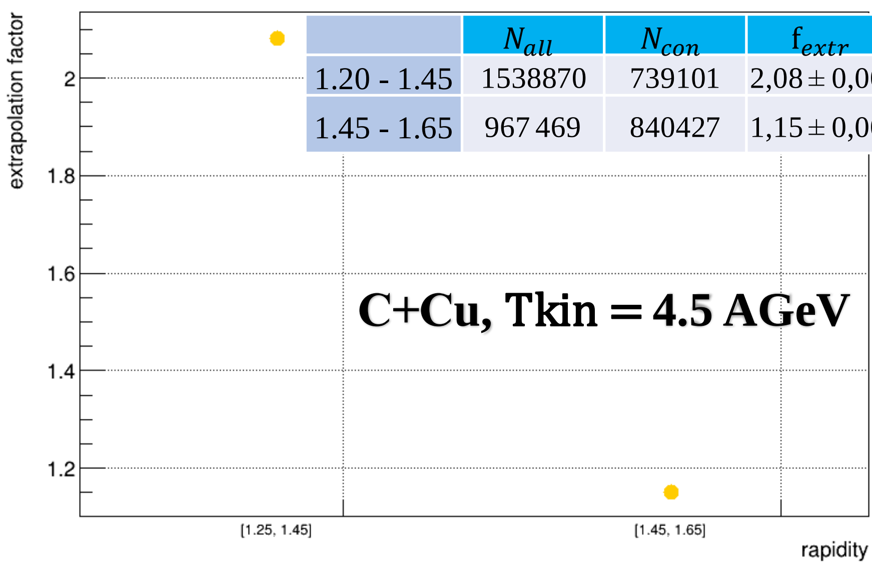
	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	956603	441817	2,17±0,004
1.45 - 1.65	723551	695781	1,04±0,002
1.85 - 2.10	452888	447921	1,01±0,002



	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	1271777	611399	2,08 ± 0,003
1.45 - 1.65	881912	764628	1,15 ± 0,002

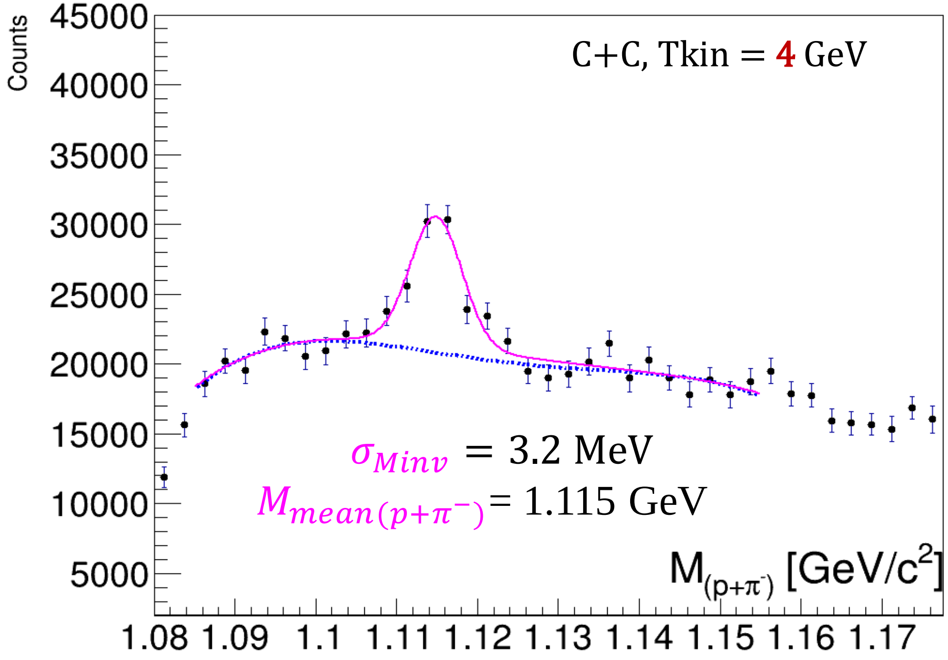


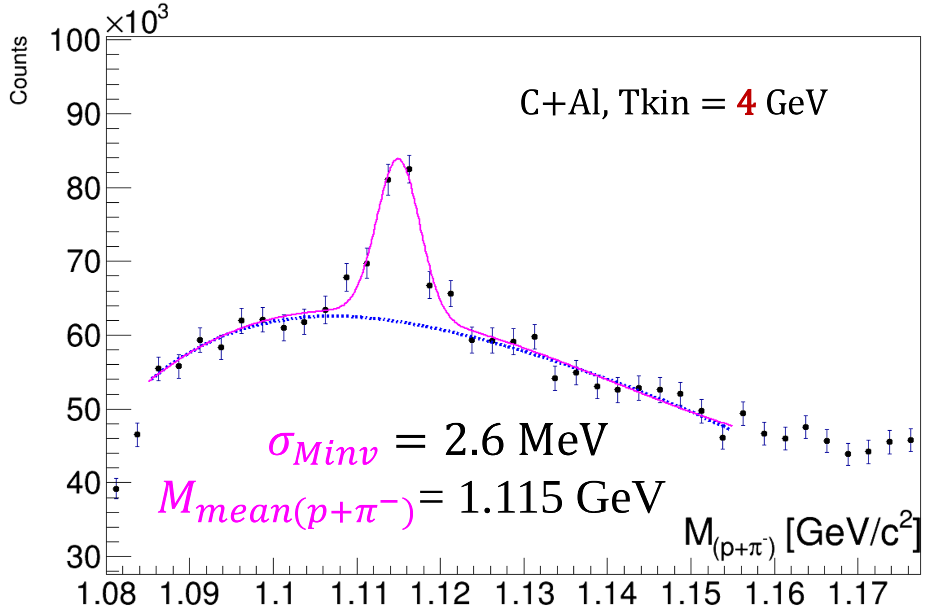
	N_{all}	N_{con}	f_{extr}
1.20 - 1.45	1538870	739101	2,08 ± 0,003
1.45 - 1.65	967 469	840427	1,15 ± 0,002



1. Done for all targets separately.
2. Done on DCM-QGSM model data.
3. The graphs show points from cells($\boldsymbol{\omega_i \geq 0.01}$).

Mass distribution of the $\Lambda \to p\pi^-$(DATA)





Procedure in DATA C+A → X

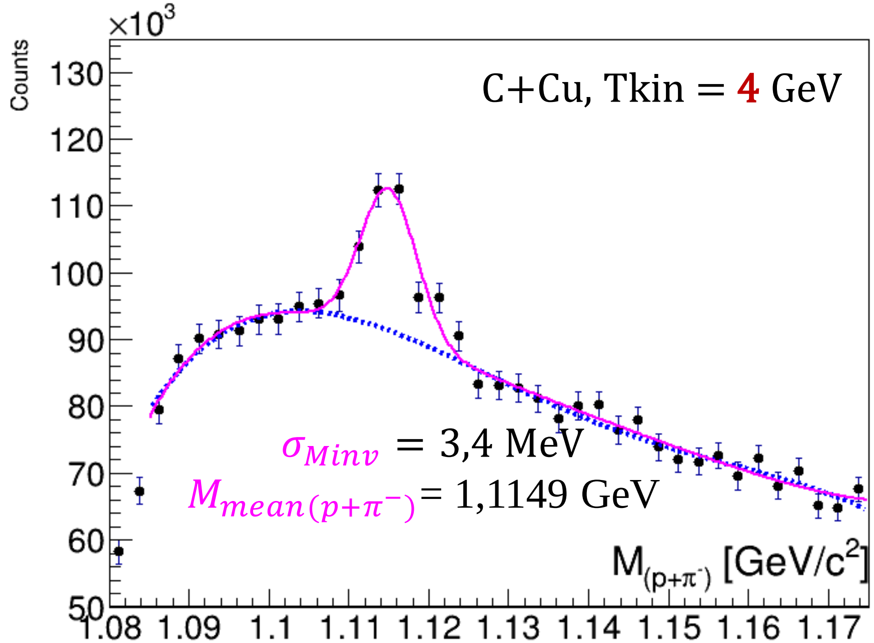
1) Split (y, pT) area in small cells for MC/DATA (8x8);
2) To each event assigned the weight ω_i;
3) Sum the cells by $\sum_{ij} y_{ij}$ and by $\sum_{ij} pT_{ij}$

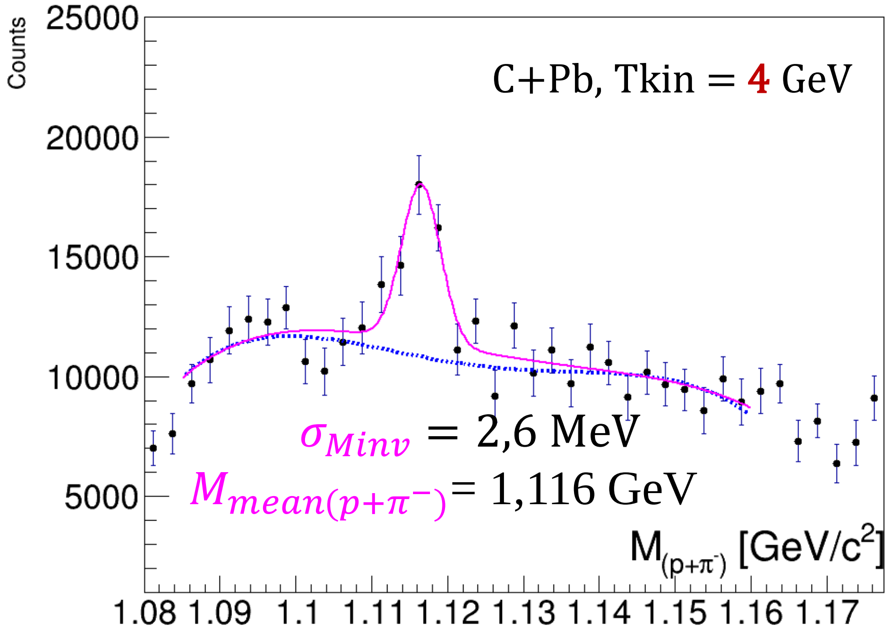
Interaction C+C	signal $N^{\Lambda}_{rec}(p_T/y)$
4.0 AGeV	33957±2753

Interaction C+Al	signal $N^{\Lambda}_{rec}(p_T/y)$
4.0 AGeV	63047±5005

$0{,}1 < p_T < 1{,}05$

- Λ signal width ~ 2.0 - 4 MeV;
- **Signal** = hist – Background in **1107,5 - 1125** MeV/c²;
- **Background** → $F(M_{p\pi^-})_{bg} = p_0 + p_1 M_{p\pi^-} + p_2 M_{p\pi^-}{}^2 + p_3 M_{p\pi^-}{}^3 + p_4 M_{p\pi^-}{}^4$ → 4th polynomial(**Blue dashed**);
- $err(stat) = \sqrt{\sum w_i^2}$;





Procedure in DATA C+A → X

1) Split (y, pT) area in small cells for MC/DATA (8x8);
2) To each event assigned the weight ω_i;
3) Sum the cells by $\sum_{ij} y_{ij}$ and by $\sum_{ij} pT_{ij}$

Interaction C+Cu	signal $N^{\Lambda}_{rec}(p_T/y)$
4.0 AGeV	76295±2895

Interaction C+Pb	signal $N^{\Lambda}_{rec}(p_T/y)$
4.0 AGeV	22060±2895

$0,1 < p_T < 1,05$

- Λ signal width ~ 2.0 - 4 MeV;
- **Signal** = hist – Background in **1107,5 - 1125** MeV/c²;
- **Background** → $F(M_{p\pi^-})_{bg} = p_0 + p_1 M_{p\pi^-} + p_2 M_{p\pi^-}{}^2 + p_3 M_{p\pi^-}{}^3 + p_4 M_{p\pi^-}{}^4$ → 4th polynomial(**Blue dashed**);
- $err(stat) = \sqrt{\sum w_i^2}$;

Cross sections $\sigma_\Lambda(y/p_T)$ of the $\Lambda \to p\pi^-$

The inclusive cross section σ_Λ and Y_Λ of Λ hyperon in C+A interactions are calculated in bins of (y - p_T) according to the formula:

weighted signal

$$\sigma_\Lambda(p_T) = [\sum_y N^\Lambda_{rec}(y,p_T)/\varepsilon_{rec}(y,p_T)]/[\varepsilon_{trig}\cdot\varepsilon_{pileup}\ L]$$
$$\sigma_\Lambda(y) = [\sum_{p_T} N^\Lambda_{rec}(y,p_T)/\varepsilon_{rec}(y,p_T)]/[\varepsilon_{trig}\cdot\varepsilon_{pileup}\cdot L]$$

L is the luminosity, N^Λ_{rec} is the number of recontacted Λ-hyperons,
ε_{rec} is the combined efficiency of the Λ - hyperon reconstruction,
ε_{trig} is the trigger efficiency, ε_{pileup} is the suppression factors of reconstructed events.

Table 1. Trigger efficiency ε_{trig}

4 AGeV	C	Al	Cu	Pb
ε_{trig}(BD≥2)	0.80±0.02	-	-	-
ε_{trig}(BD≥3)	-	0.87±0.02	0.92±0.02	0.95±0.02

4.5 AGeV	C	Al	Cu	Pb
ε_{trig}(BD≥2)	0.80±0.02	-	-	-
ε_{trig}(BD≥3)	-	0.83±0.02	0.91±0.02	0.94±0.02

Table 2. ε_{pileup} suppression factors

Selection	4AGeV	4.5AGeV
T0==1	+	+
BC2==1	+	+
Veto ==0	+	+
C	0,67	0,53
Al	0,74	0,62
Cu	0,78	0,62
Pb	0,78	0,69

Table 3. Integrated **luminosities** collected in interactions of the carbon beam of 4.0 and 4.5AGeV with different targets.

Interactions, target thickness		Integrated luminosity/ 10^{30} cm^{-2}		Integrated luminosity/ 10^{30} cm-2
C+C (9 mm)		6.06		4.69
C+Al (12 mm)	4 AGeV	2.39	4.5 AGeV	3.60
C+Cu (5 mm)		2.00		3.06
C+Pb (10 mm)		0.22		0.84

Yields of the $\Lambda \rightarrow p\pi^-$

The $\mathbf{Y_\Lambda}$ of Λ hyperon in C+A interactions are calculated in bins of (y - p_T) cells according to the formula:

$$Y_\Lambda(y - p_T) = \sigma_\Lambda(y - p_T)/\sigma_{inel}$$

σ_{inel} is the cross section for minimum bias inelastic C+A interactions(model).

The cross sections for inelastic C+Al, C+Cu, C+Pb interactions calculated by the formula (DCM-QGSM): $\sigma_{inel} = \pi R_0^2 (A_P^{1/3} + A_T^{1/3})^2$

R_0 = 1.2 fm is an effective nucleon radius, A_P and A_T are atomic numbers of the beam and target nucleus [1]. The **uncertainties** for C+Al, C+Cu, C+Pb inelastic cross sections are estimated by formula: $\sigma_{inel} = \pi R_0^2 (A_P^{1/3} + A_T^{1/3} - b)^2$ with R_0 = 1.46 fm and b = 1.21 [2].

Table 4. Inelastic cross sections σ_{inel} for carbon-nucleus interactions

Interaction	C+C	C+Al	C+Cu	C+Pb
Inelastic cross section, mb	830±50	1260±50	1790±50	3075±50

[1] Kalliopi Kanaki "Study of Λ hyperon production in C+C collisions at 2 AGeV beam energy with the HADES spectrometer".
[2] H.Angelov et al., P1-80-473, JINR, Dubna.

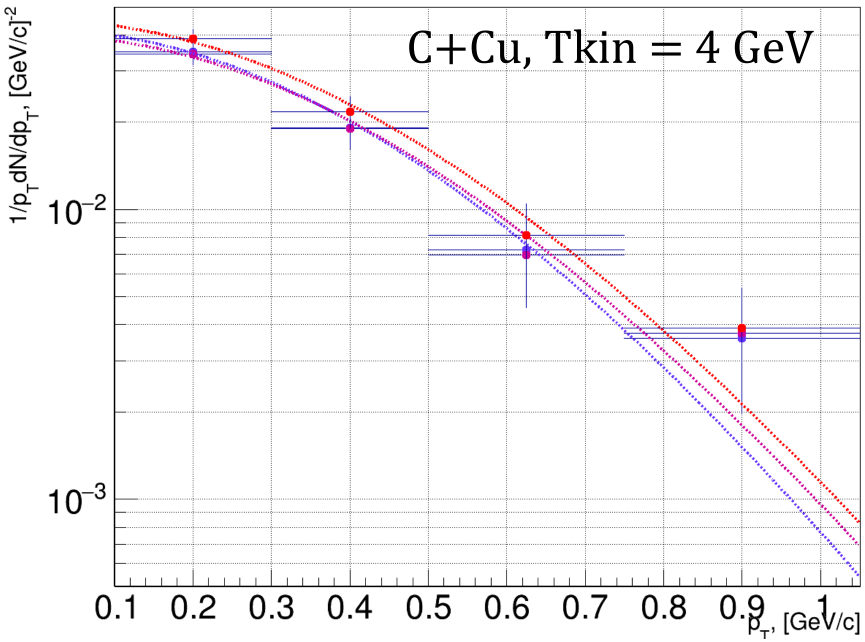
Integrated yields (Preliminary) of the $\Lambda \rightarrow p\pi^-$

Full data statistics

The data were collected by periods(I and II)

Target	Full (yields ± stat ± sys)	I period (yields ± stat ±sys)	II period (yields ± stat ±sys)
		Yields total, 4.0 AGeV	
C + C	**0,011±0,003±0,002**	0,011±0,004±0,0008	0,011±0,003±0,0009
C + Al	**0,026±0,007±0,002**	0,028±0,008±0,005	0,029±0,011±0,008
C + Cu	**0,030±0,006±0,003**	0,035±0,009±0,002	0,0273±0,009±0,007
C + Pb	**0,039±0,015±0,002**	0,039±0,015±0,002	-
		Yields total, 4.5 AGeV	
C + C	**0,013±0,004± 0,002**	0,012±0,006±0,001	0,012±0,005±0,001
C + Al	**0,023±0,006±0,007**	0,022±0,008±0,007	0,023±0,007±0,008
C + Cu	**0,037±0,007±0,006**	0,035±0,011±0,005	0,035±0,009±0,003
C + Pb		**will done…**	

Determination of slopes from momentum spectra



T_0 = 96,1 ± 13,8 MeV;
T_1 = 102,9 ± 19 MeV;
T_2 = 104,5 ± 16,3 MeV;

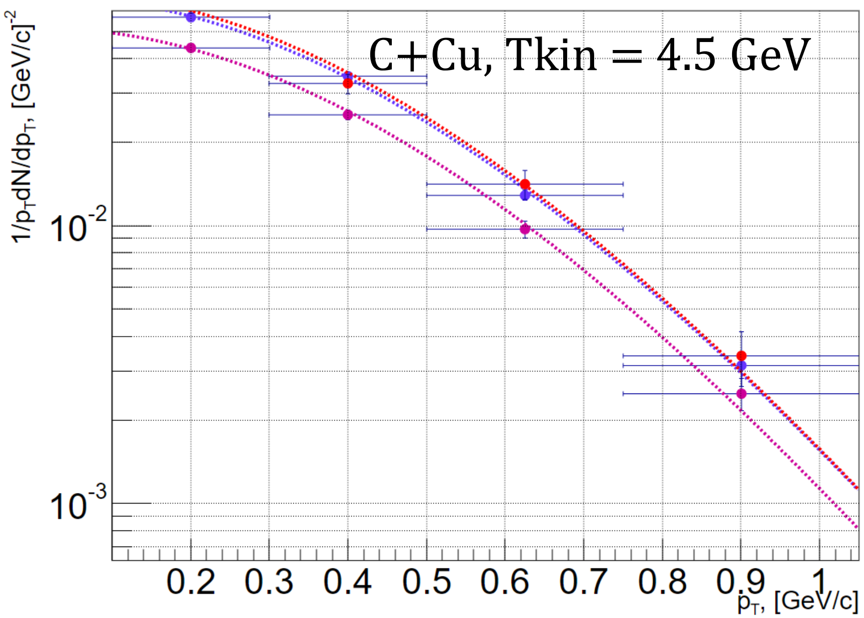
The measured spectra of the Λ yields in p_T are parameterized by the formula:

$$1/p_T\, d^2N/dp_T dy = N \cdot \exp(-(m_T - m_\Lambda)/T)$$

The transverse mass $m_T = \sqrt{m_\Lambda^2 + p_T^2}$,

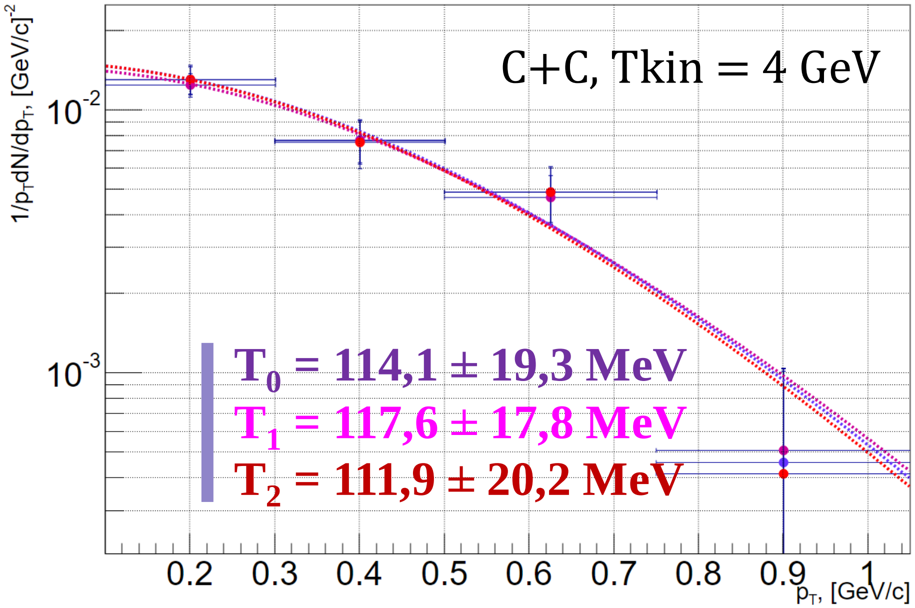
The N normalization,

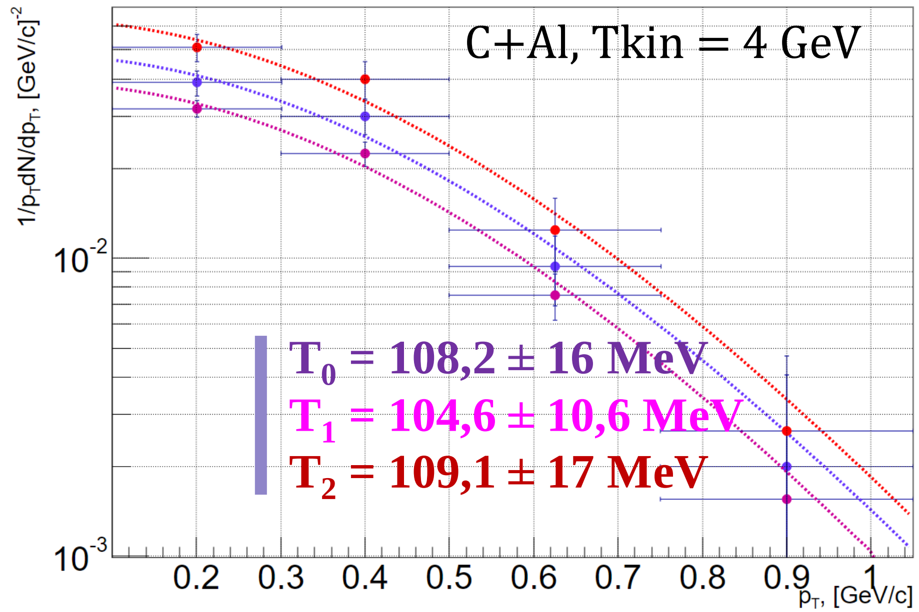
The inverse slope parameter T are free parameters of the fit;

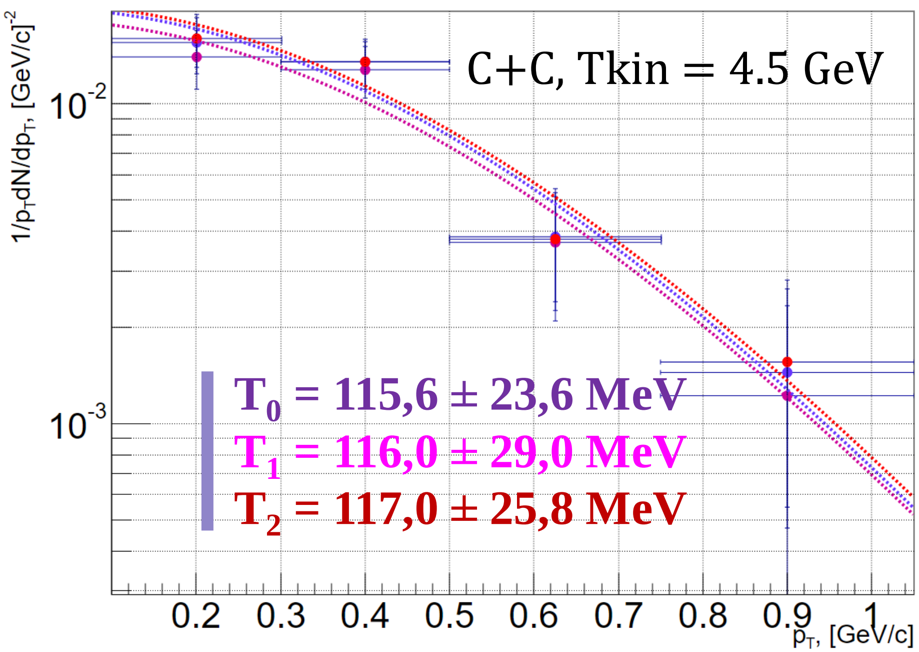


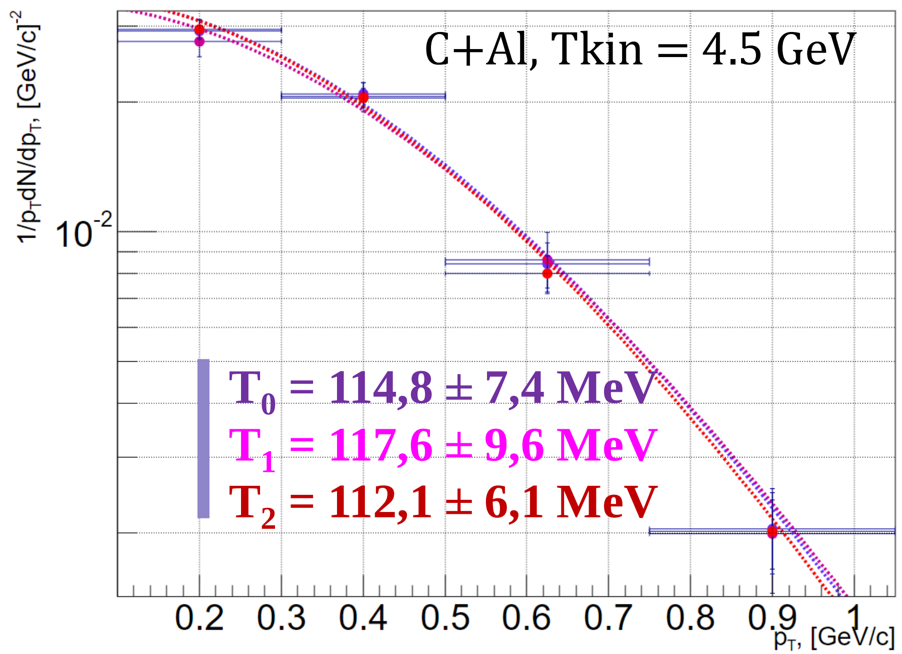
T_0 = 101,1 ± 2,6 MeV;
T_1 = 100,1 ± 3,8 MeV;
T_2 = 100,3 ± 6,7 MeV;

Determination of slopes from momentum spectra









SLOPE RESULTS (Preliminary)

4.0 AGeV	T_0, MeV, C+C	T_0, MeV, C+Al	T_0 MeV, C+Cu	T_0 MeV, C+Pb
Exp data	114.1±19.3±2.85	108.2±16±2.25	96.1±13.8±0.8	Due to low statistics
DCM - QGSM	125,9	120,2	133,2	130,2
UrQMD	107,3	128,0	132,8	135,5
PHSD	86,6	100,0	105,4	98,2

4.5 AGeV	T_0, MeV, C+C	T_0, MeV, C+Al	T_0, MeV, C+Cu	T_0, MeV, C+Pb
Exp data	115.6±23.6±0.5	114.8±7.4±2.8	101.1±2.6±0.1	Will done…
DCM - QGSM	132	133	135	142
UrQMD	122	128	130	134
PHSD	101	106	109	108

COMPLETE THE ANALYSIS NOTE. PREPARE PAPER DRAFT

THE SLOPES FROM THE TRANSVERSE p_T SPECTRA WERE OBTAINED

1

THE Λ RECONSTRUCTION EFFICIENCY WAS DETERMINED IN MC.

2

AN EXTRAPOLATION PROCEDURE WAS DEVELOPED AND APPLIED

3

MASS DISTRIBUTIONS Λ WERE OBTAINED WITH WEIGHT ω_i FOR EACH CELL OUT OF 64 IN THE MC AND PHYSICAL DATA.

PRELIMINARY RESULTS ON THE COMPUTATION OF YIELDS AND CROSS SECTIONS WERE OBTAINED

Back up

Reconstruction efficiency Λ's for $P_T(y)$

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+C(4.5AGeV)							
0.90 - 1.05	**0,00**	**0,08**	**0,52**	1,51	2,63	2,78	3,96	**0,95**
0.75 - 0.90	**0,03**	**0,33**	1,12	1,89	2,86	3,36	4,53	3,34
0.62 - 0.75	**0,13**	**0,85**	1,89	2,95	3,84	4,13	5,25	4,33
0.50 - 0.62	**0,63**	1,65	2,83	3,73	4,44	4,48	5,51	5,06
0.40 - 0.50	1,36	2,66	3,50	3,82	4,24	4,39	5,21	5,06
0.30 - 0.40	2,18	2,69	3,62	4,26	4,45	4,40	4,38	4,43
0.20 - 0.30	2,00	2,24	3,20	3,51	3,73	3,53	3,28	3,65
0.1 - 0.20	2,00	2,34	3,17	2,81	2,95	3,00	2,56	1,53
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+C(4.0AGeV)							
0.90 - 1.05	**0,02**	**0,07**	**0,40**	1,50	2,25	2,31	2,48	**0,83**
0.75 - 0.90	**0,01**	**0,31**	**0,93**	1,85	2,64	4,49	3,35	1,89
0.62 - 0.75	**0,20**	**0,82**	2,16	3,04	4,14	3,69	5,05	2,51
0.50 - 0.62	**0,58**	1,72	3,13	4,24	4,78	5,18	4,87	2,91
0.40 - 0.50	1,41	2,90	4,20	5,20	5,80	5,82	4,21	5,46
0.30 - 0.40	2,36	3,55	4,42	5,82	5,53	5,30	5,16	3,34
0.20 - 0.30	2,55	3,29	3,75	4,82	5,16	3,78	4,81	5,72
0.10 - 0.20	3,08	3,62	3,29	4,65	4,88	5,20	6,67	6,18
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

Reconstruction efficiency Λ's for $P_T(y)$

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Al(4.5AGeV)							
0.90 - 1.05	**0,00**	**0,08**	**0,36**	0,79	2,06	3,08	3,84	2,94
0.75 - 0.90	**0,04**	**0,31**	**0,82**	1,86	2,67	3,86	4,41	3,35
0.62 - 0.75	**0,14**	**0,72**	1,47	2,73	3,06	3,07	4,24	4,63
0.50 - 0.62	**0,47**	1,28	2,36	3,35	3,68	3,80	4,19	4,25
0.40 - 0.50	**0,98**	2,11	3,00	3,48	4,04	4,12	4,17	3,31
0.30 - 0.40	1,53	2,59	3,38	3,33	3,65	3,81	4,63	4,44
0.20 - 0.30	1,76	2,29	3,32	3,56	3,57	3,45	3,59	3,66
0.1 - 0.20	1,49	1,93	2,52	2,54	3,16	2,64	3,50	3,52
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Al(4.0AGeV)							
0.90 - 1.05	**0,02**	**0,02**	**0,50**	**0,77**	1,80	2,85	1,00	**0,57**
0.75 - 0.90	**0,04**	**0,25**	1,13	1,23	2,35	4,22	1,83	1,05
0.62 - 0.75	**0,12**	**0,72**	1,37	2,98	3,45	4,39	4,29	2,58
0.50 - 0.62	**0,51**	1,63	2,38	3,06	4,26	4,35	4,40	3,32
0.40 - 0.50	1,04	2,08	3,61	4,53	4,84	5,00	5,48	2,97
0.30 - 0.40	1,93	2,80	3,53	4,71	5,35	5,55	4,52	4,45
0.20 - 0.30	2,04	3,44	3,40	3,49	3,93	4,95	4,91	7,08
0.10 - 0.20	2,89	2,43	2,93	4,22	3,92	4,38	3,48	2,41
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

Reconstruction efficiency Λ's for $P_T(y)$

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Cu(4.5AGeV)							
0.90 - 1.05	**0,01**	**0,06**	**0,43**	0,97	1,45	3,01	2,68	1,42
0.75 - 0.90	**0,02**	**0,27**	**0,76**	1,58	1,92	2,82	4,06	3,57
0.62 - 0.75	**0,08**	**0,53**	1,45	2,05	2,66	3,01	3,85	4,18
0.50 - 0.62	**0,42**	1,04	1,79	2,64	2,95	3,19	2,98	3,81
0.40 - 0.50	1,01	1,79	2,54	3,18	3,41	3,10	3,87	5,20
0.30 - 0.40	1,24	1,99	2,46	3,04	2,55	3,25	3,80	3,31
0.20 - 0.30	1,47	2,20	2,04	2,66	2,77	2,76	3,07	2,80
0.1 - 0.20	1,34	1,54	2,10	2,54	2,52	2,66	2,51	1,09
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Cu(4.0AGeV)							
0.90 - 1.05	**0,02**	**0,02**	**0,04**	1,35	1,38	1,46	2,57	2,35
0.75 - 0.90	**0,20**	**0,13**	**0,18**	1,26	3,53	2,77	1,53	1,84
0.62 - 0.75	**0,61**	**0,86**	**0,70**	2,19	3,00	3,79	4,54	**0,90**
0.50 - 0.62	1,11	1,34	1,26	3,35	2,96	4,49	4,19	3,67
0.40 - 0.50	1,91	1,56	2,22	3,92	4,68	4,27	6,27	4,19
0.30 - 0.40	1,80	1,97	2,89	4,36	3,36	5,34	3,86	4,28
0.20 - 0.30	1,88	3,00	3,42	4,38	3,55	4,43	4,40	4,83
0.10 - 0.20	2,01	2,37	2,22	2,89	3,98	2,58	5,70	5,02
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

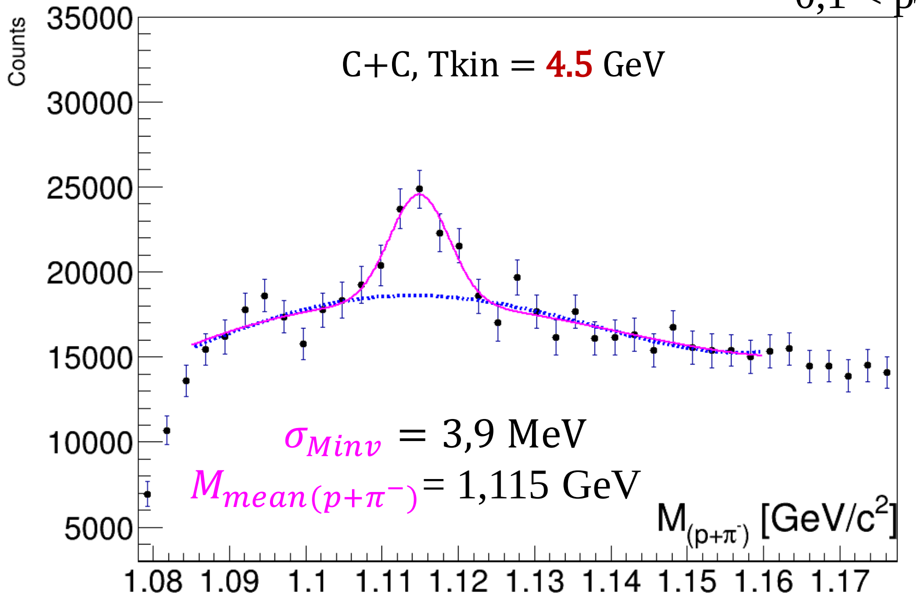
Reconstruction efficiency Λ's for $P_T(y)$

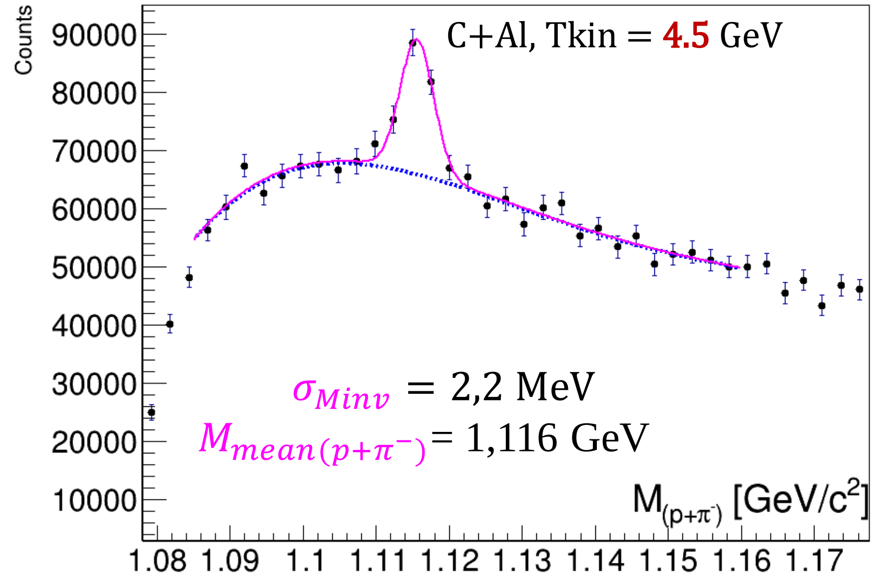
	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Pb(4.5AGeV)							
0.90 - 1.05	**0,00**	**0,04**	**0,27**	**0,93**	1,62	2,55	2,56	**0,77**
0.75 - 0.90	**0,02**	**0,17**	**0,49**	1,20	1,88	2,22	2,40	2,57
0.62 - 0.75	**0,07**	**0,34**	**0,95**	1,52	1,81	1,85	2,55	3,23
0.50 - 0.62	**0,30**	**0,83**	1,54	2,15	2,36	2,64	2,93	3,16
0.40 - 0.50	**0,59**	1,42	2,06	2,24	2,66	2,45	2,94	3,36
0.30 - 0.40	**0,98**	1,39	2,28	2,09	2,33	2,59	2,61	2,81
0.20 - 0.30	**0,80**	1,66	2,08	2,20	2,26	2,14	2,55	2,85
0.1 - 0.20	**0,94**	1,25	1,34	1,59	1,53	1,74	2,01	1,25
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

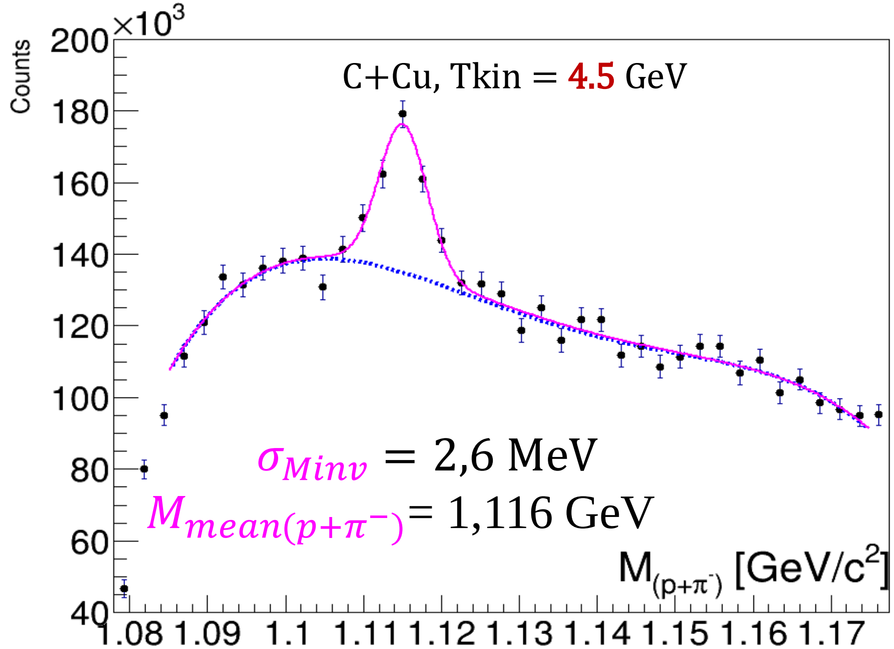
	$\omega_i = MC_{rec\_i}/MC_{gen\_i}$ (%), C+Pb(4.0AGeV)							
0.90 - 1.05	**0,05**	**0,09**	**0,30**	0,65	1,91	3,07	**0,72**	**0,75**
0.75 - 0.90	**0,04**	**0,16**	**0,56**	1,16	1,77	2,00	2,96	**0,56**
0.62 - 0.75	**0,15**	**0,53**	1,35	2,02	2,89	2,45	4,13	2,02
0.50 - 0.62	**0,35**	**0,89**	1,50	2,93	2,86	3,94	2,24	3,59
0.40 - 0.50	**0,78**	1,48	2,37	2,88	3,28	4,27	2,34	4,03
0.30 - 0.40	1,27	1,73	2,57	3,13	3,71	2,80	4,84	1,99
0.20 - 0.30	1,66	2,54	2,77	3,27	3,79	4,09	4,90	4,43
0.10 - 0.20	1,49	1,77	3,13	3,02	3,88	3,06	4,05	4,55
y	1.20-1.33	1.33 - 1.45	1.45 - 1.55	1.55 - 1.65	1.65 - 1.75	1.75 - 1.85	1.85 - 1.98	1.98 - 2.1

Mass distribution of the $\Lambda \to p\pi^-$ (DATA)

$0{,}1 < p_T < 1{,}05$







C+Pb, Tkin = 4.5 GeV

will done…