Current Progress in TOF700 Fragment analysis in Argon data run 7



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Argon data run 7

Ar beam 3.2 GeV/n Targets Al,C,Sn,Cu,Pb



Schematic drawing of the BM@N setup

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TOF700 Particle Identification chain

For **Data** and **MC** we use the **same** Identification chain

For MC we use DCM QGSM Generator

Si-GEM(data) tracks from V. Plotnikov

DCH tracks from **DCH** group

TOF700 hits from **Y. Petukhov**

Si-GEM tracks are extrapolated to the **DCH1** z-position and matched against the **DCH1** tracks

Successfully matched tracks are extrapolated to the **TOF700** planes and matched against the **TOF700** hits



TOF400 DCH1 TOF700

Signal Normalization and Residual Smearing (V. Plotnikov)



GEM



Si-GEM tracks Cut Selection



Primary vertex cuts: number of tracks > 1, coordinates in limits Track cuts: Number of **Silicon hits > 1 && GEM hits > 3**

Silicon Efficiency



GEM Efficiency



GEM Efficiency



Momentum dependence of matching criteria



DCH1 Efficiency



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TOF700 Efficiency



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Reconstructed M² distribution



Note: different momentum ranges for different fragments



Fragments yield relative protons and K/π for different triggers

	π	к	р	He ³	d, He ⁴	t	Κ/π
All triggers All targets	31162	1805	106310	1992	25939	2348	
	0.2931	0.0170	1.0000	0.0187	0.2440	0.0221	0.0579
Tr2(id 41) BD>3	8523	458	27943	465	6526	595	
	0.3050	0.0164	1.0000	0.0166	0.2336	0.0213	0.0537
Tr3(id 42) Si>3	7119	411	25018	508	6027	553	
	0.2846	0.0164	1.0000	0.0203	0.2409	0.0221	0.0578
Tr1(id 49) BD>1&Si>2	8874	516	31105	522	8159	819	
	0.2853	0.0166	1.0000	0.0168	0.2623	0.0263	0.0582

The particles ratio does not depend much from the trigger

Rapidity distributions for MC model



Rapidity distributions are different, depending on target

Phase space for protons for Data and Efficiency corrected Data



Some bins along the edge of area are missing because there is not enough statistics in MC.

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Rapidity distributions for protons in different intervals on Pt for MC model and efficiency corrected Data



Phase space for deuterons for Data and Efficiency corrected Data



are missing because there is not enough statistics in MC

Rapidity distributions for deuterons in different intervals on pt for MC model and efficiency corrected Data



Here we have a much more better agreement in distributions

Phase space for H³ for Data and Efficiency corrected Data



Some bins along the the edge of area are missing because there is not enough statistics in MC

Rapidity projection for H³ for MC model and Efficiency corrected Data



Here we see wider bins because of the statistics

Phase space for triton for Data and Efficiency corrected Data



Some bins along the the edge of area are missing because there is not enough statistics in MC

Rapidity projection for triton for MC model and Efficiency corrected Data



PT vs YLAB triton

Here we see wider bins because of the statistics

Conclusion:

* MC simulation with realistic effects reasonably describes experimental Data in GEM, DCH, TOF700

* The same analysis chain and selection criteria were used for Data and MC

* Agreement between Data and realistic MC allows us to perform physics analysis to get fragment yields in dependence on transverse momentum and Rapidity

* Need to compare the measured yields with different models

* The developed algorithms of Data and MC analysis and gained experience will be used to get results in the next run.

Thank you for your attention !