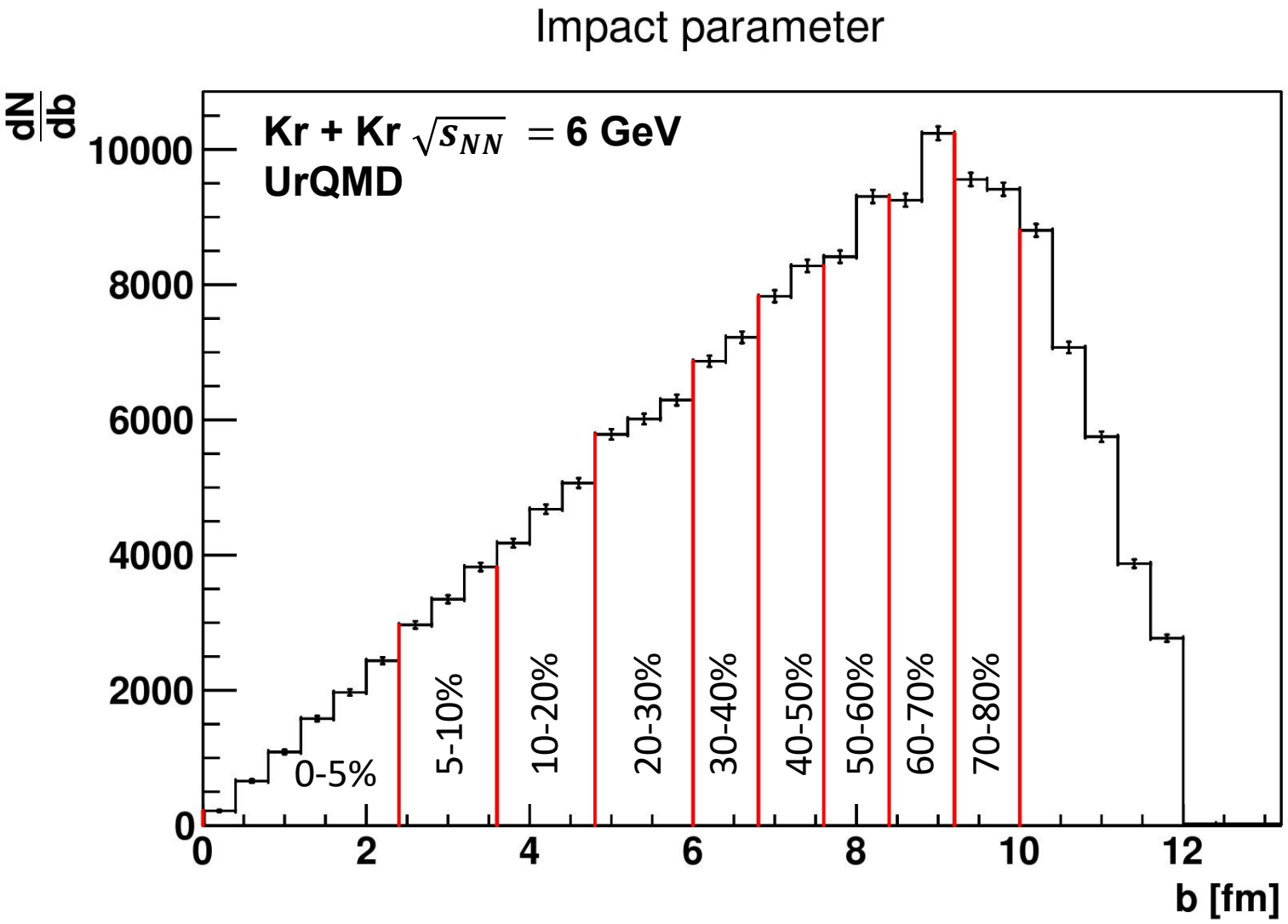
Charged and identified ($\pi^{\pm}$, $\mathrm{K}^{\pm}$) hadron spectra in Kr + Kr collisions at $\sqrt{s_{NN}} = 6$ GeV using UrQMD model

Anastasiia Vasilieva

2025-09-01

Collision centrality determiantion using impact parameter

System: Kr + Kr $\sqrt{s_{NN}}$ = 6 GeV

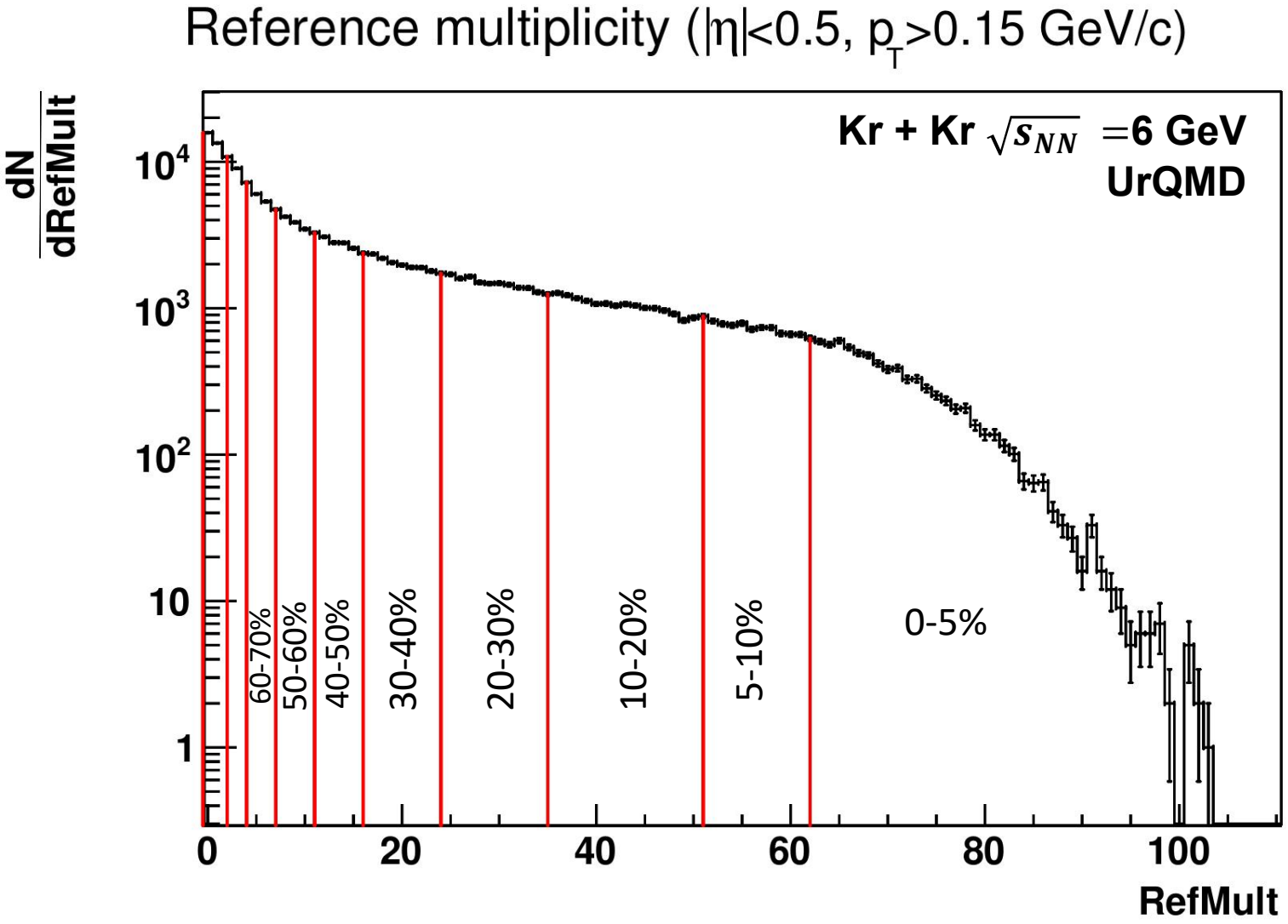


Centrality	Impact parameter b, fm	Fraction
0 - 5%	0 - 2.4	0.04825
5 - 10%	2.4 - 3.6	0.10979
10 - 20%	3.6 - 4.8	0.19429
20 - 30%	4.8 - 6.0	0.30410
30 - 40%	6.0 - 6.8	0.38961
40 - 50%	6.8 - 7.6	0.48736
50 - 60%	7.6 - 8.4	0.59489
60 - 70%	8.4 - 9.2	0.71316
70 - 80%	9.2 - 10.0	0.82828

Collision centrality determiantion using reference multiplicity ($|\eta| < 0.5$)

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

Reference multiplicity (RefMult) is calculated as a number of charged particles with **$|\eta| < 0.5$ and $p_T > 0.15$ GeV/c**



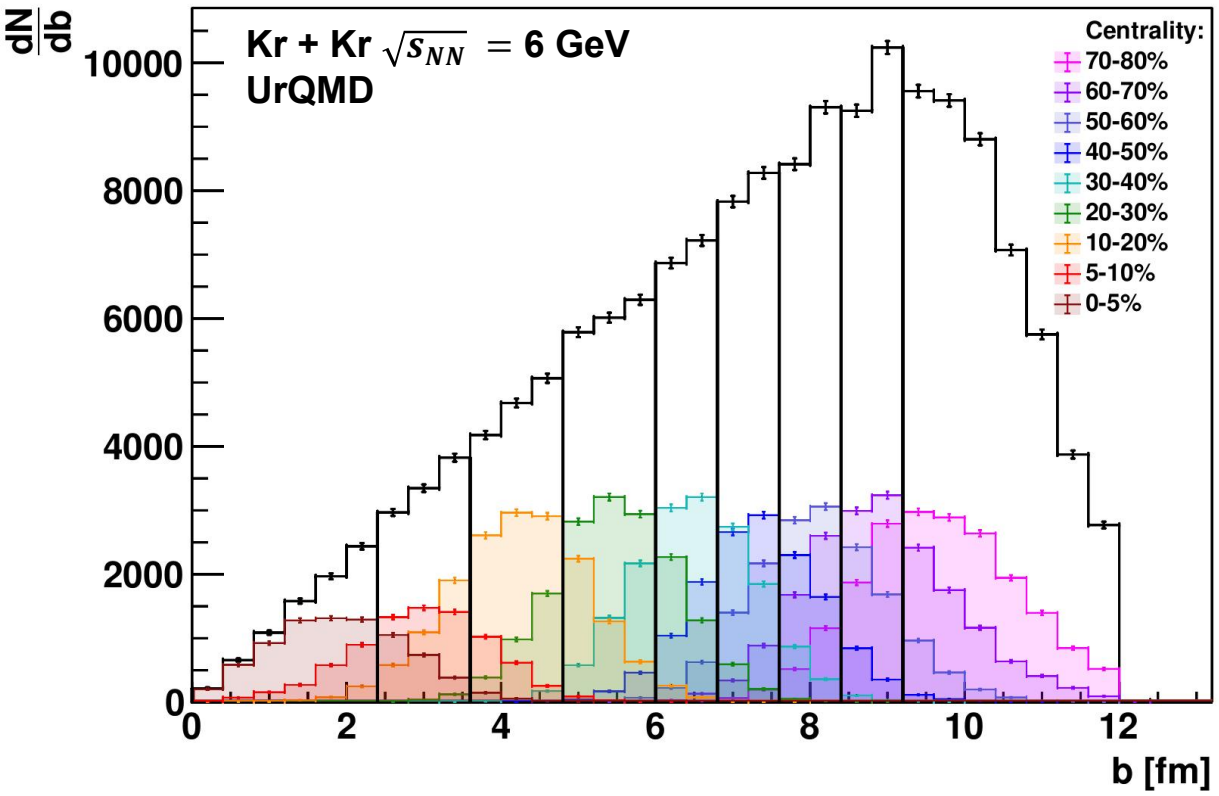
Centrality	RefMult	Fraction
0 - 5%	62 - 112	0.04851
5 - 10%	51 - 62	0.09845
10 - 20%	35 - 51	0.20111
20 - 30%	24 - 35	0.30202
30 - 40%	16 - 24	0.40236
40 - 50%	11 - 16	0.49051
50 - 60%	7 - 11	0.58925
60 - 70%	4 - 7	0.70217
70 - 80%	2 - 4	0.82256

Collision centrality determiantion using reference multiplicity ($|\eta| < 0.5$)

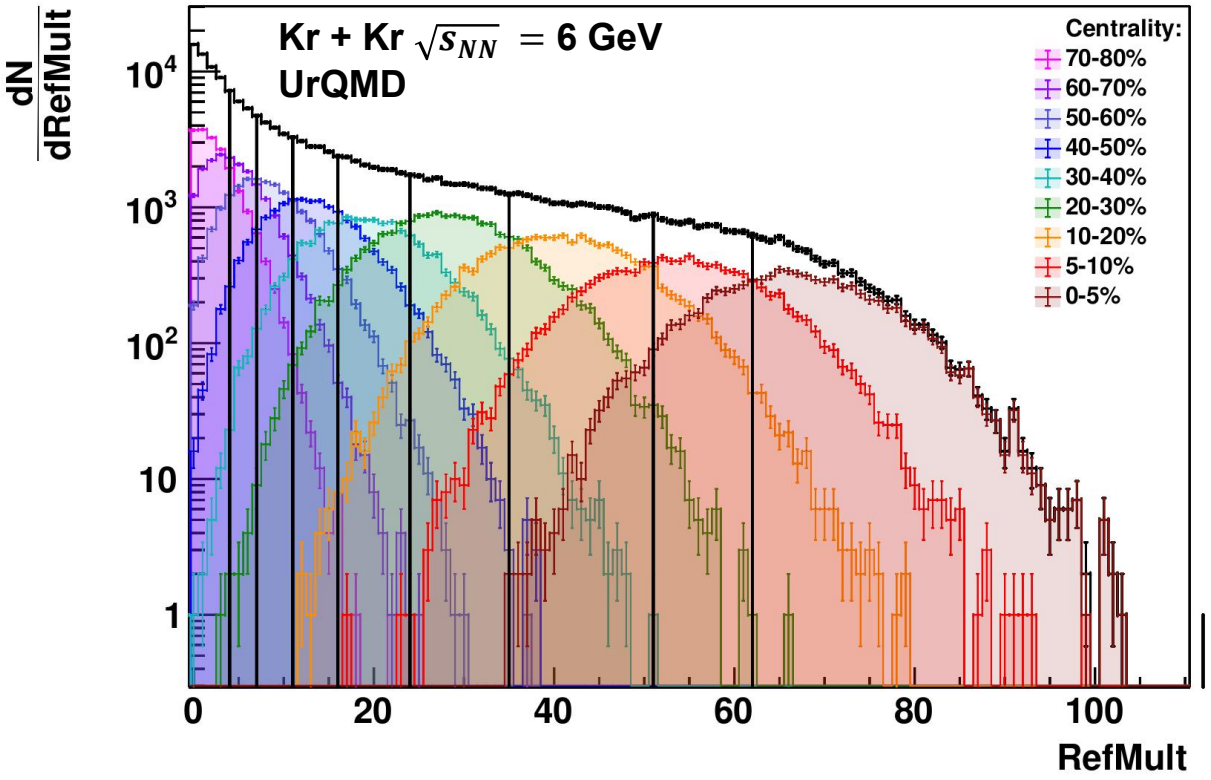
System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

Reference multiplicity (RefMult) is calculated as a number of charged particles with **$|\eta| < 0.5$ and $p_T > 0.15$ GeV/c**

Impact parameter



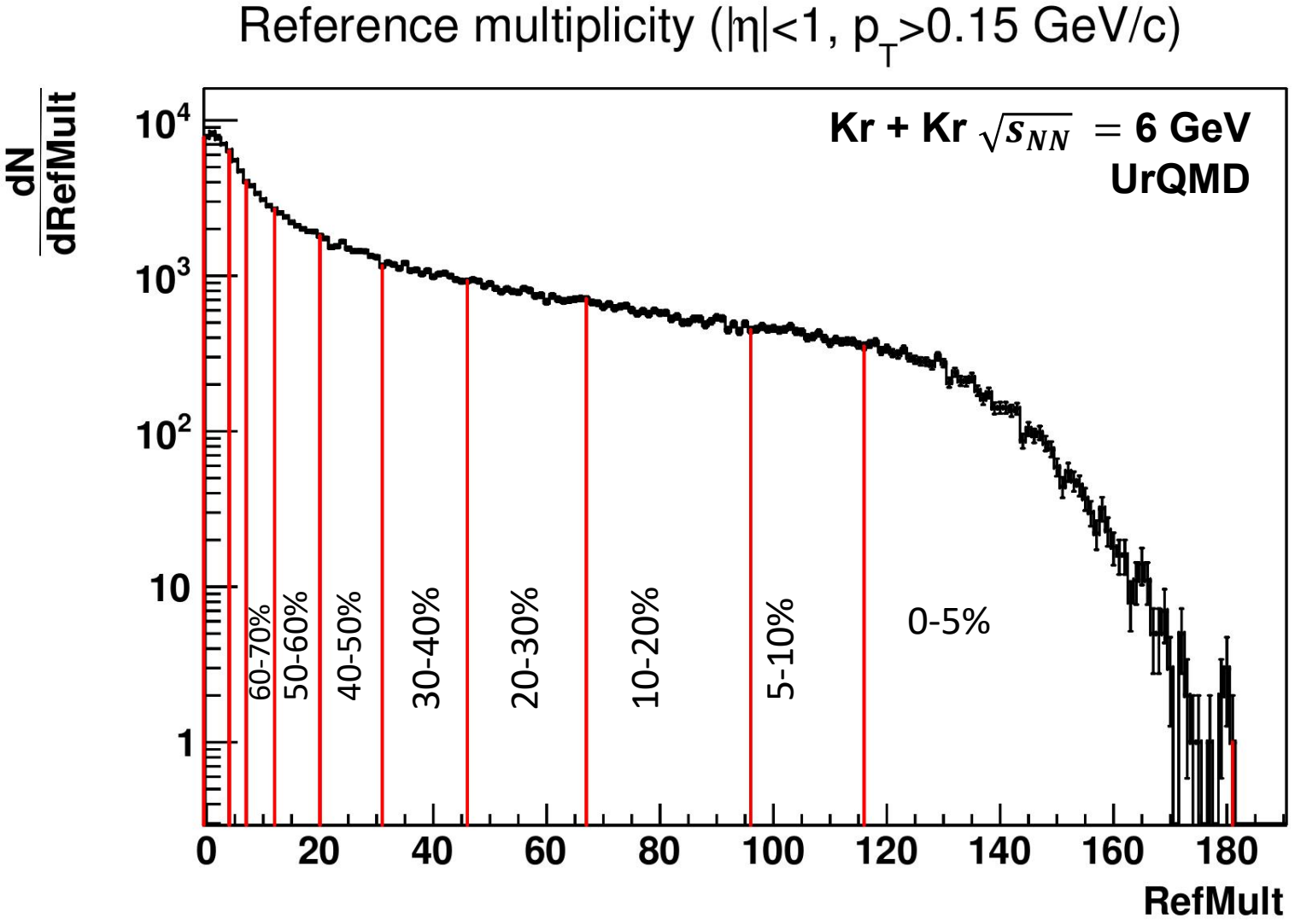
Reference multiplicity ($|\eta|<0.5$, $p_T>0.15$ GeV/c)



Collision centrality determiantion using reference multiplicity ($|\eta| < 1.0$)

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

Reference multiplicity (RefMult) is calculated as a number of charged particles with **$|\eta| < 1.0$ and $p_T > 0.15$ GeV/c**



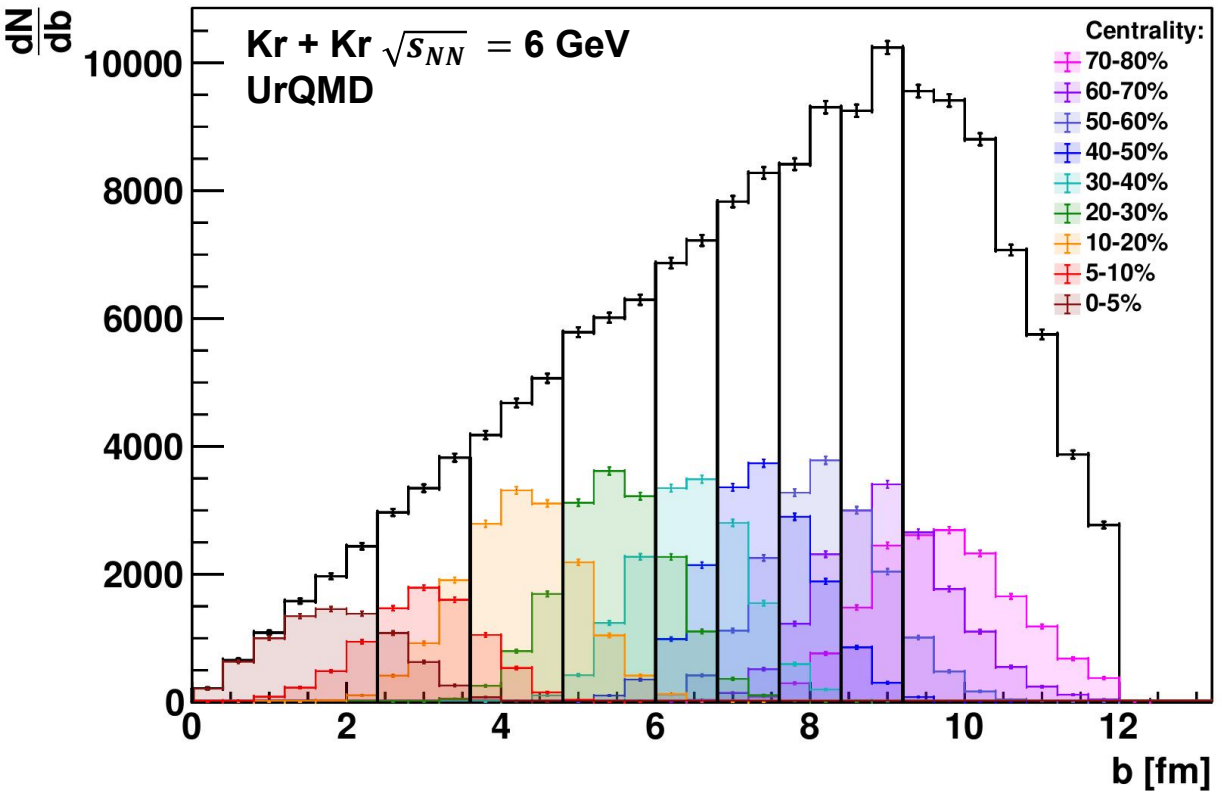
Centrality	RefMult	Fraction
0 - 5%	116 - 181	0.04918
5 - 10%	96 - 116	0.10029
10 - 20%	67 - 96	0.19986
20 - 30%	46 - 67	0.30084
30 - 40%	31 - 46	0.39844
40 - 50%	20 - 31	0.50015
50 - 60%	12 - 20	0.60801
60 - 70%	7 - 12	0.71200
70 - 80%	4 - 7	0.81301

Collision centrality determiantion using reference multiplicity ($|\eta| < 1.0$)

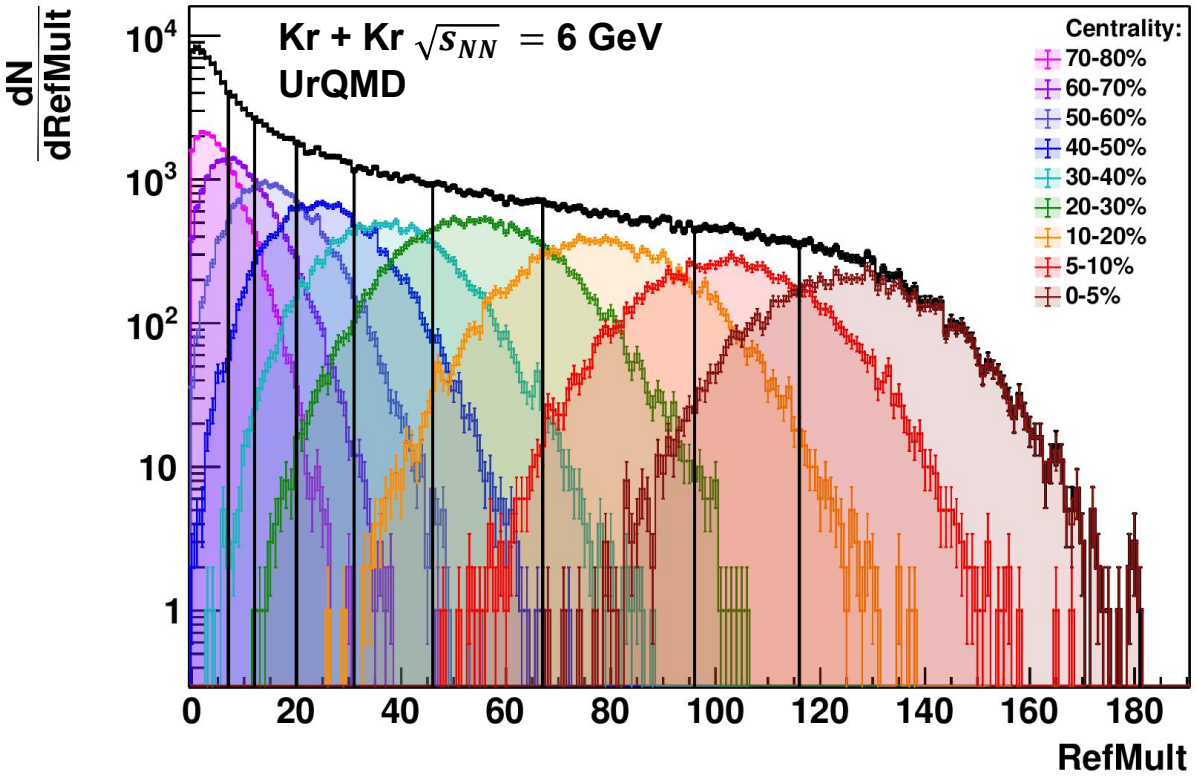
System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

Reference multiplicity (RefMult) is calculated as a number of charged particles with **$|\eta| < 1.0$ and $p_T > 0.15$ GeV/c**

Impact parameter

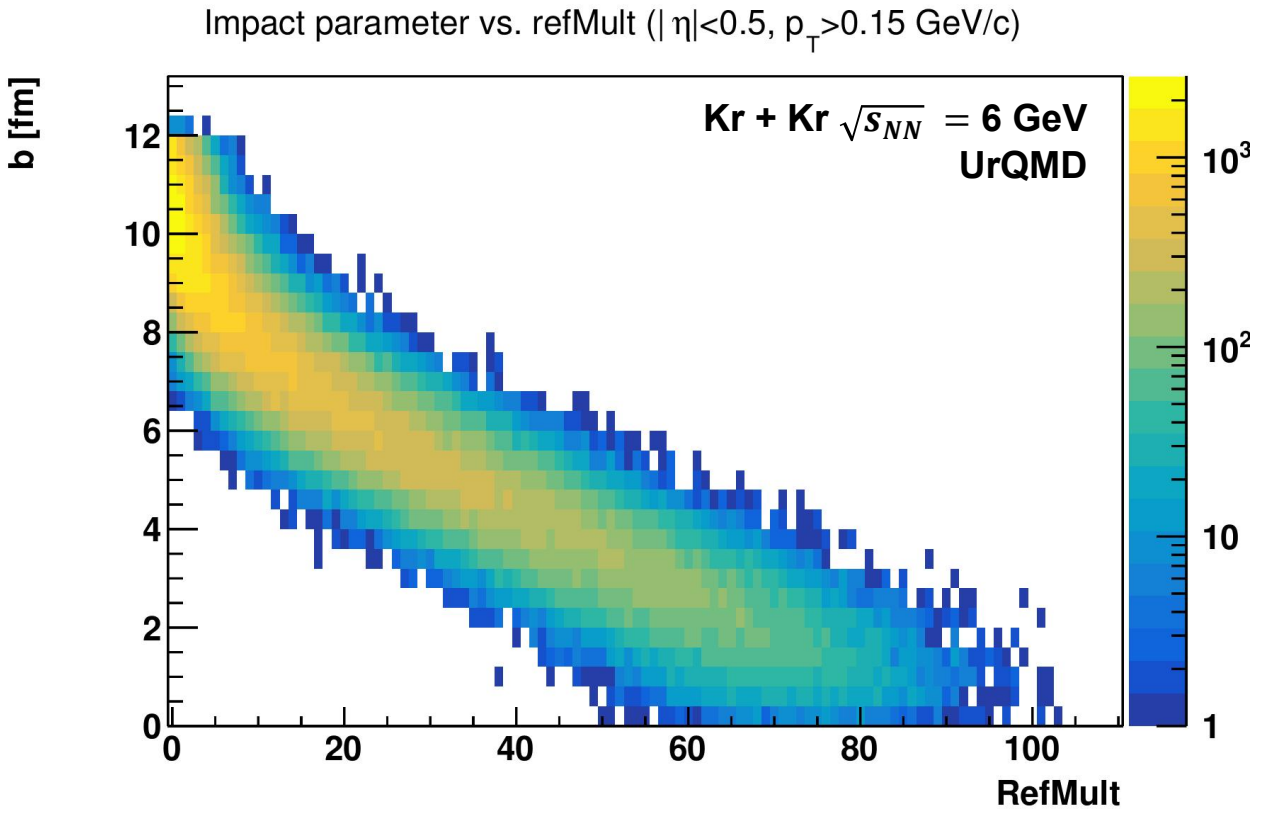


Reference multiplicity ($|\eta|<1$, $p_T>0.15$ GeV/c)

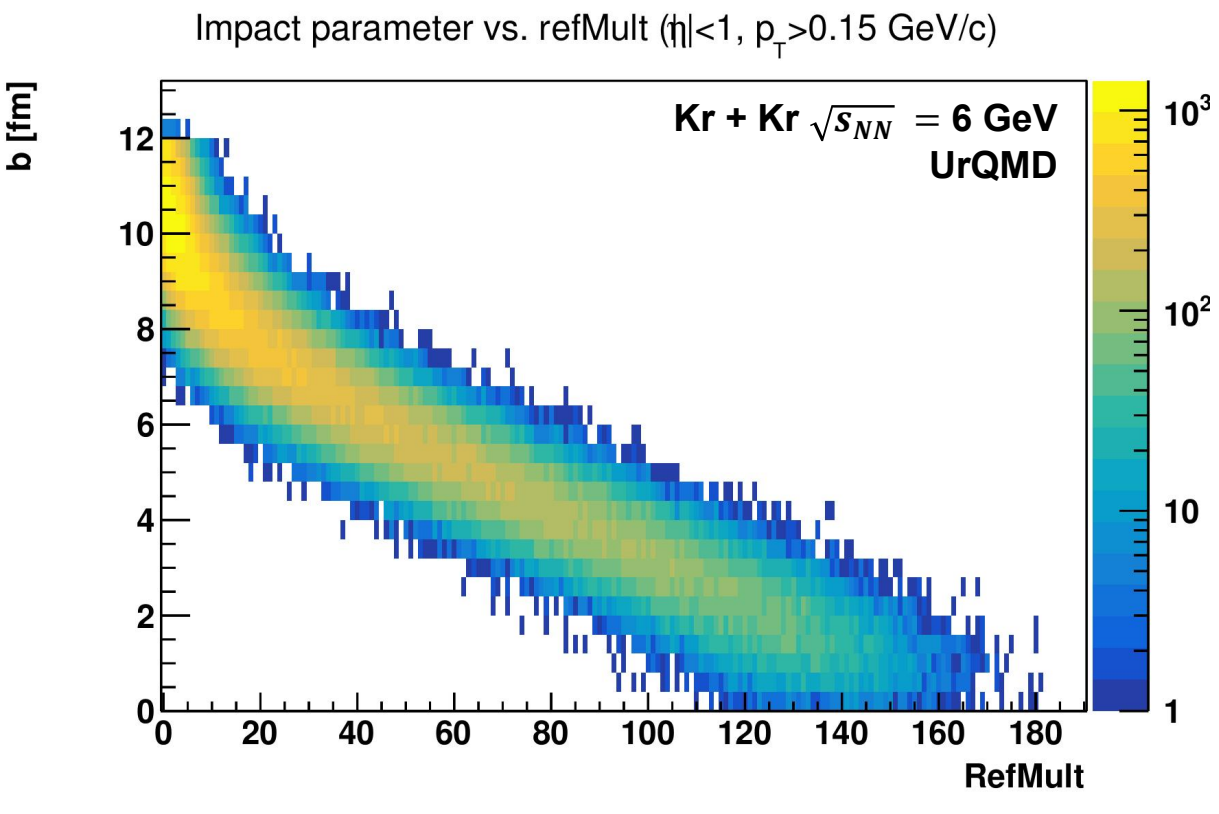


Impact parameter vs RefMult

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV



Reference multiplicity is calculated as a number of charged particles with **$|\eta| < 0.5$ and $p_T > 0.15$ GeV/c**



Reference multiplicity is calculated as a number of charged particles with **$|\eta| < 1.0$ and $p_T > 0.15$ GeV/c**

Data & Cuts

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

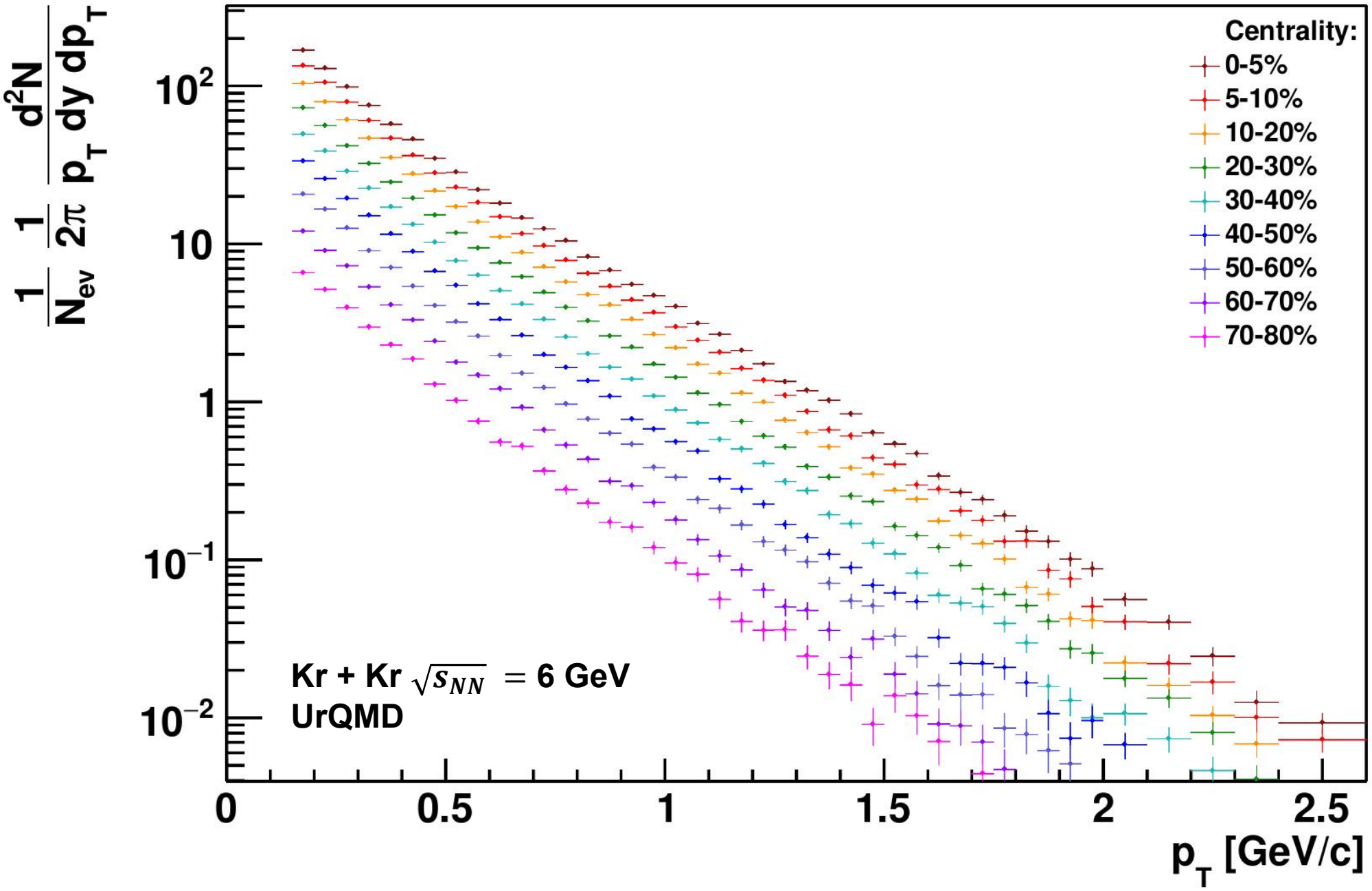
UrQMD, statistics: ~1.7×10^5 events

Track cuts:

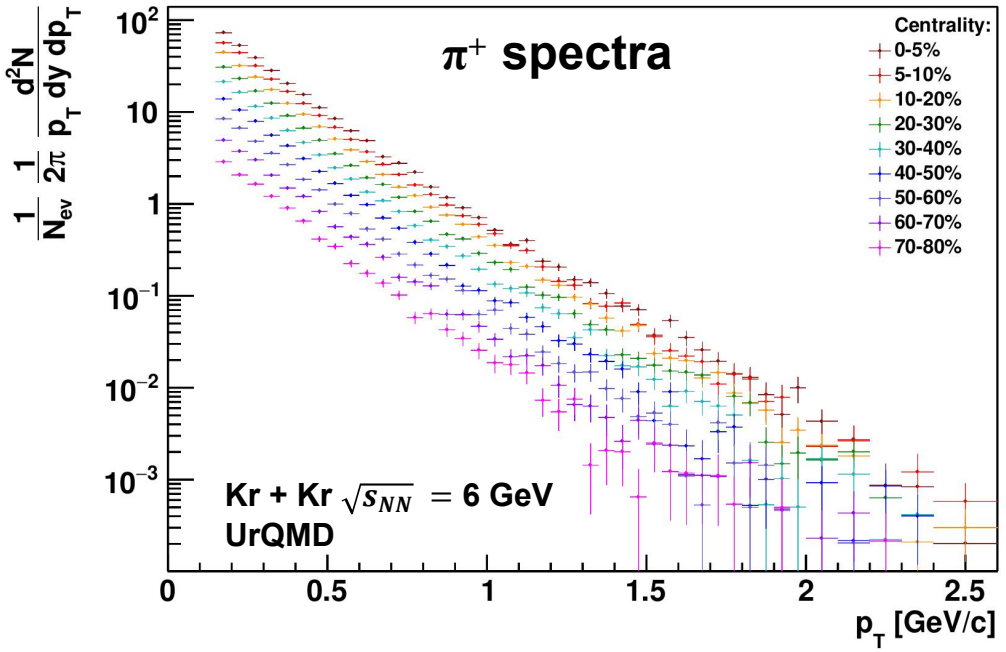
- $|y| < 0.1$
- $|\eta| < 1.0$
- $p_T > 0.15$ GeV/c

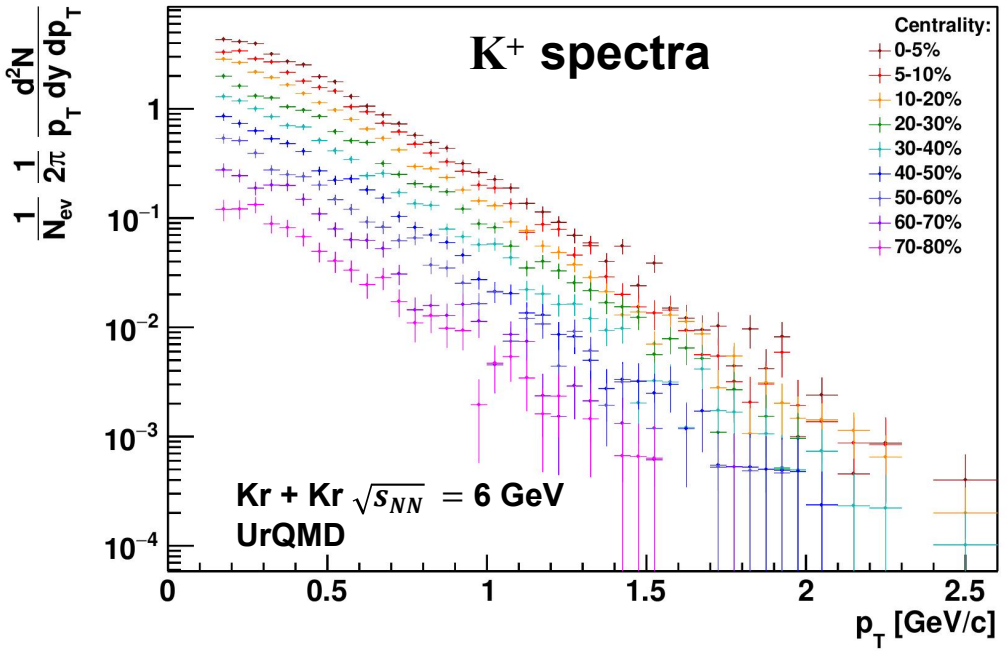
Centrality is calculated using **reference multiplicity** ($|\eta| < 1.0$, $p_T > 0.15$ GeV/c)

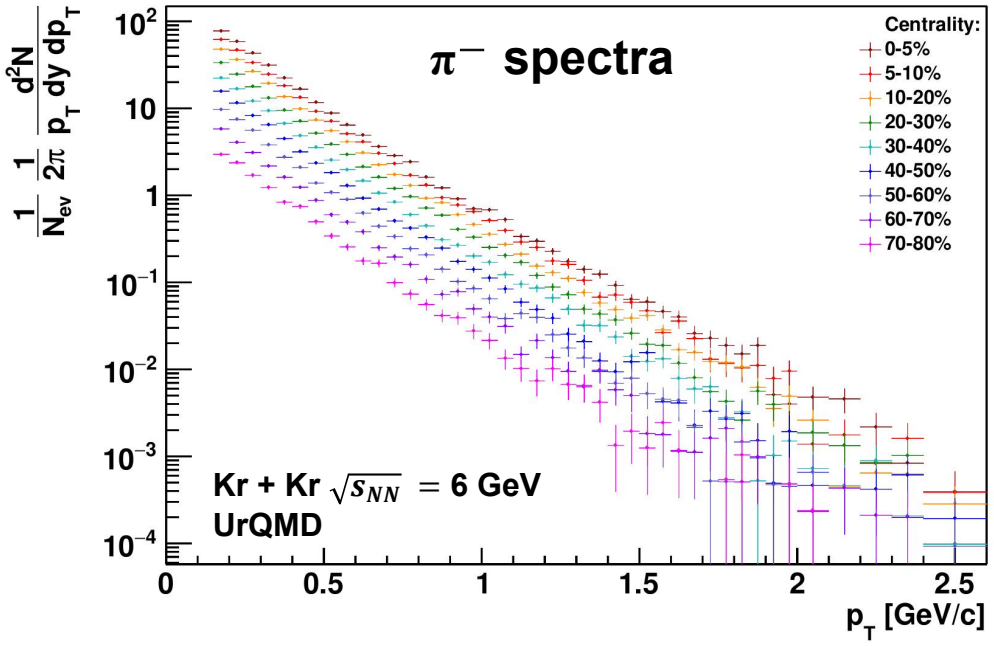
Charged hadron spectra for different centrality classes (RefMult10)

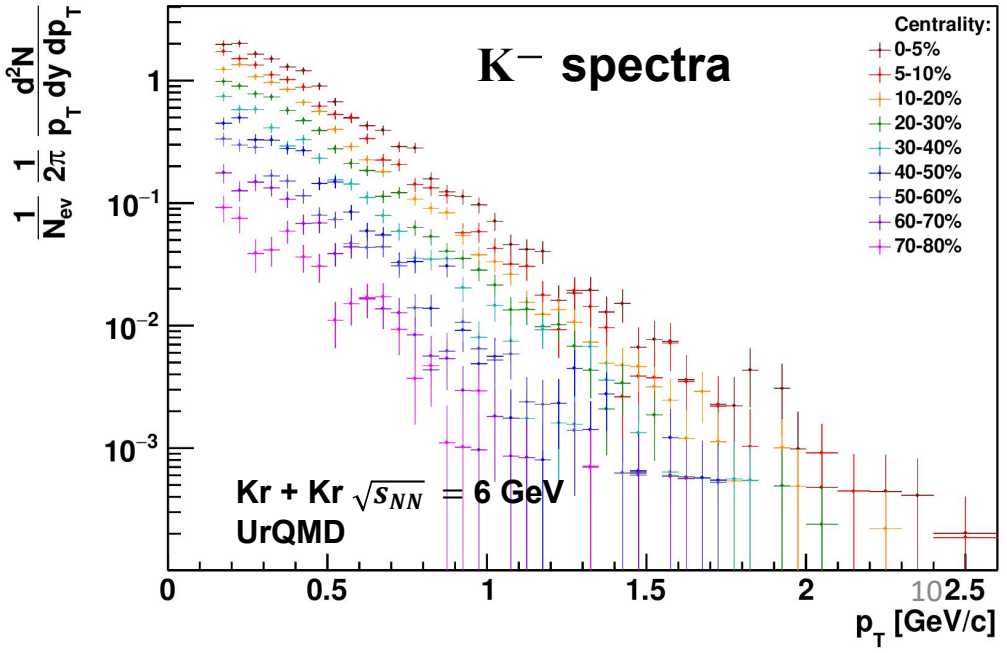


Identified hadron spectra for different centrality classes (RefMult10)



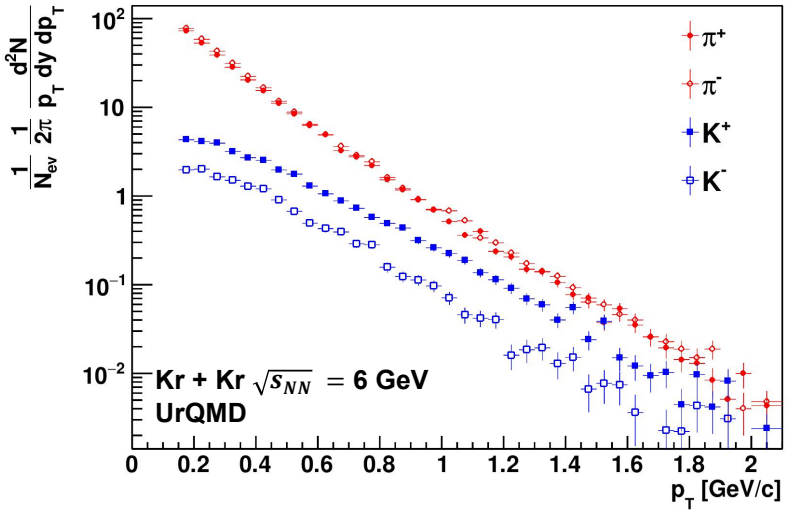




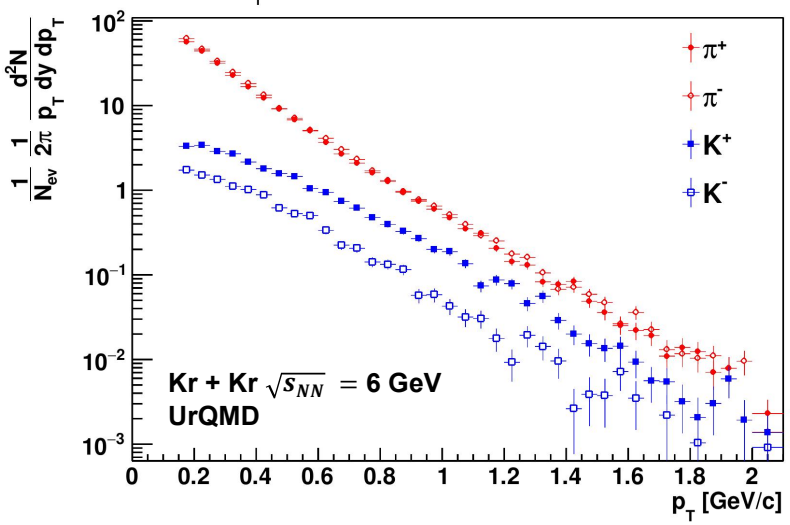


Identified hadron spectra for different centrality classes (RefMult10)

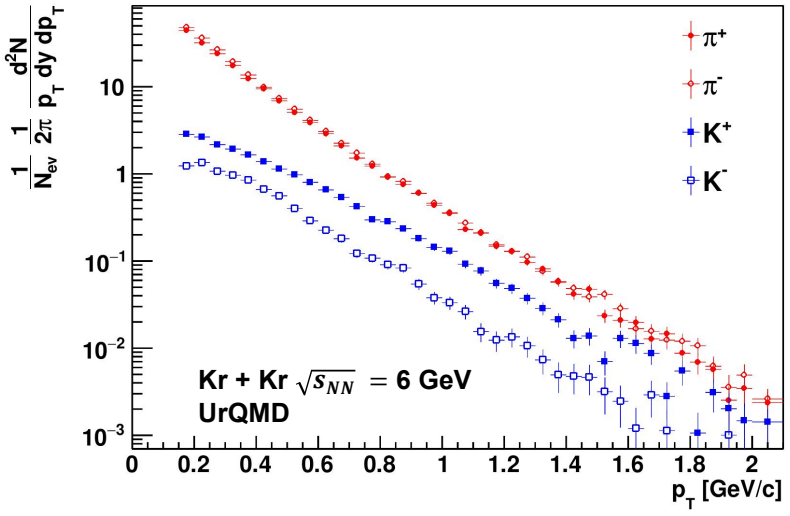
p_T spectra for centrality 0-5%



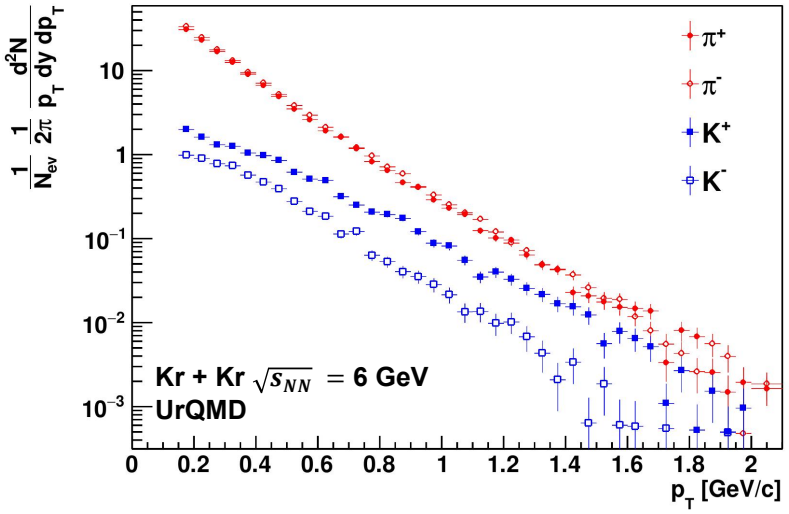
p_T spectra for centrality 5-10%



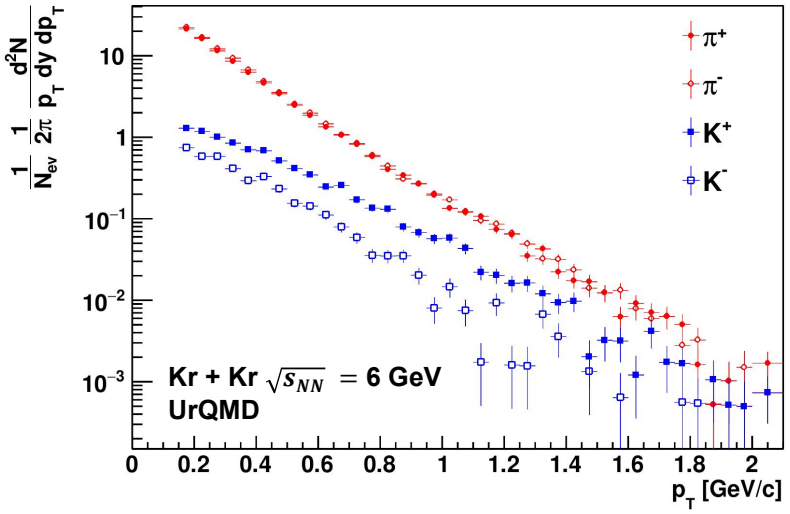
p_T spectra for centrality 10-20%



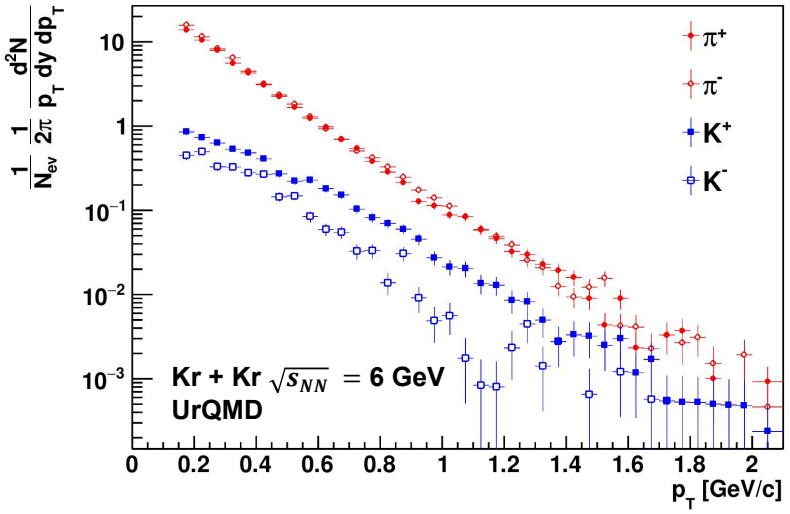
p_T spectra for centrality 20-30%



p_T spectra for centrality 30-40%



p_T spectra for centrality 40-50%



Data & Cuts

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

UrQMD, statistics: ~1.7×10^5 events

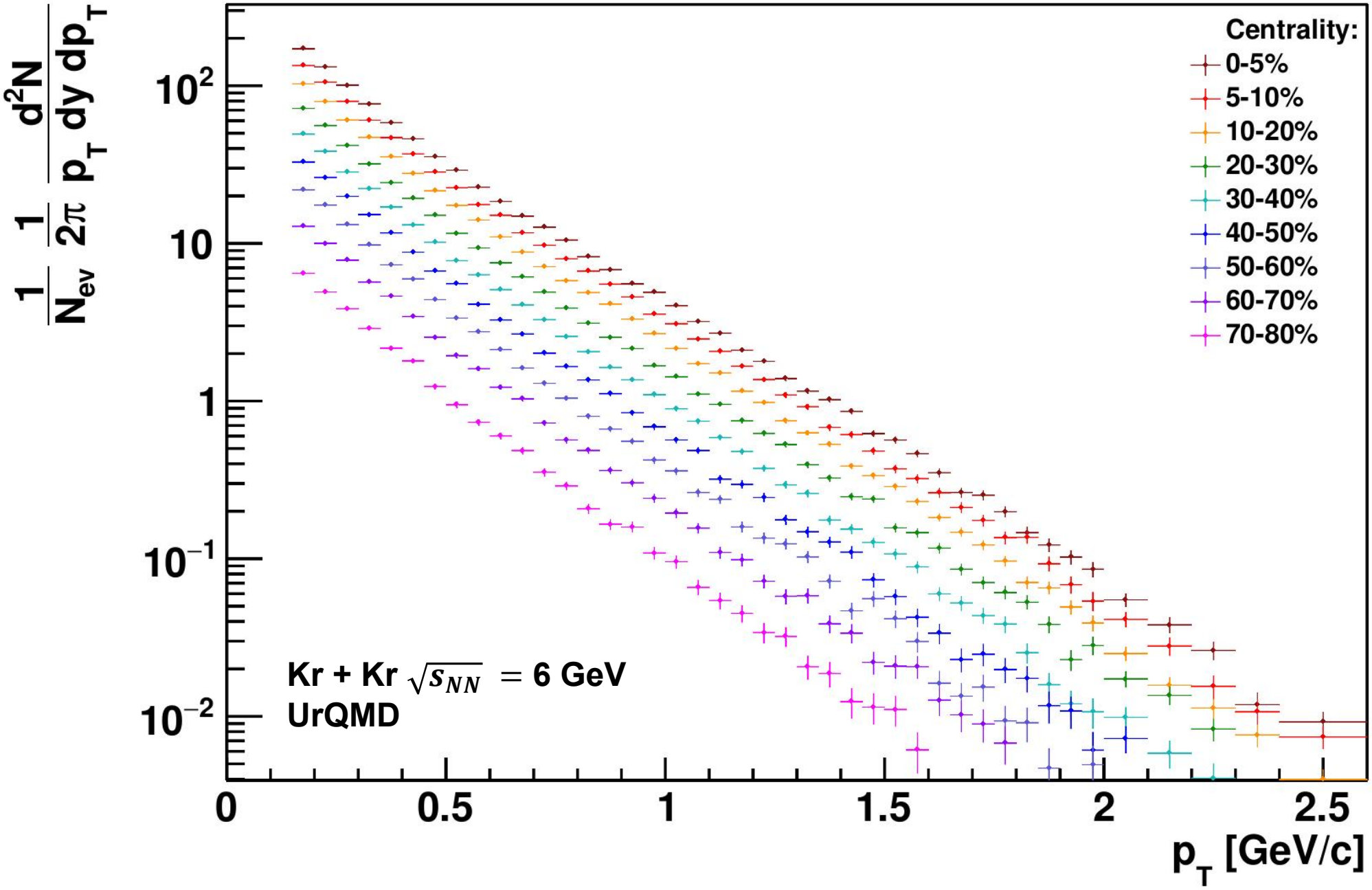
Track cuts:

- $|y| < 0.1$
- $|\eta| < 0.5$
- $p_T > 0.15$ GeV/c

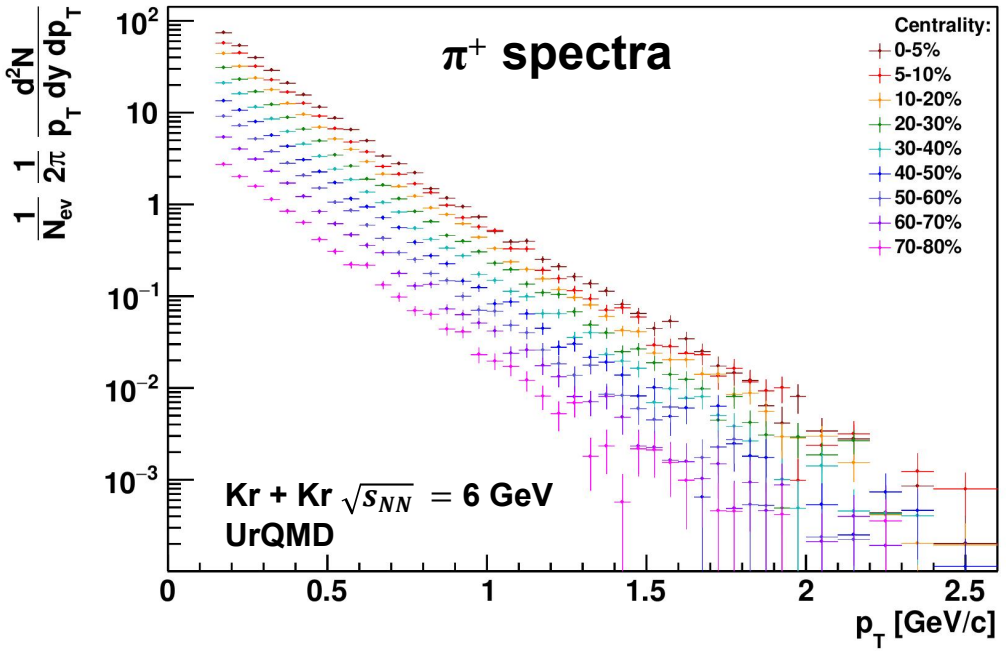
Centrality is calculated using **reference multiplicity** ($|\eta| < 0.5$, $p_T > 0.15$ GeV/c)

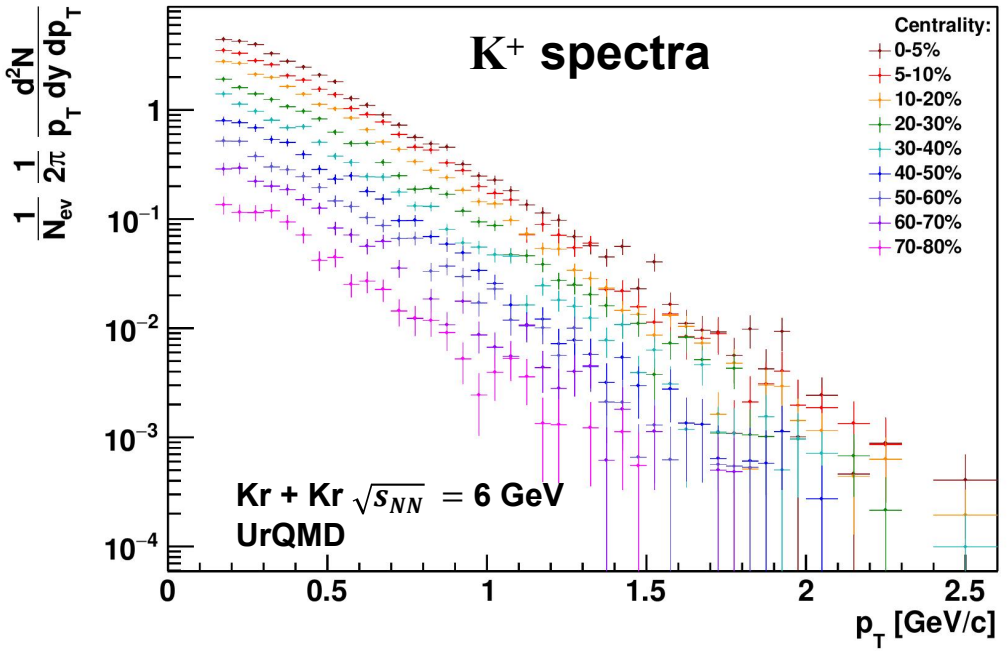
Сейчас пойдут спектры, полученные при определении центральности столкновений другими способами:
1) относительная множественность, но для $|\eta| < 0.5$
2) прицельный параметер

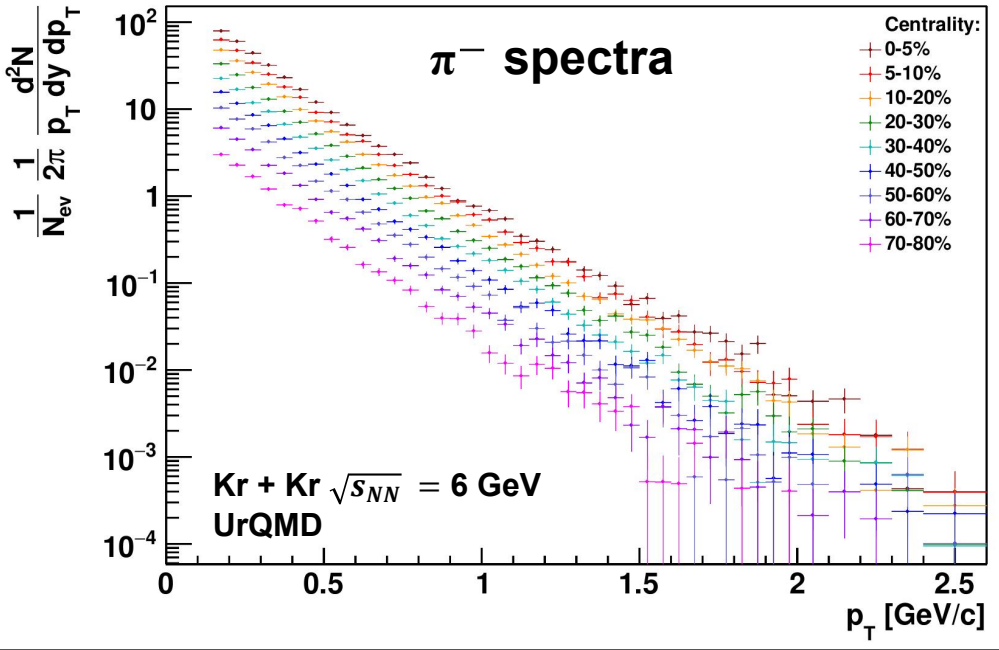
Charged hadron spectra for different centrality classes (RefMult05)

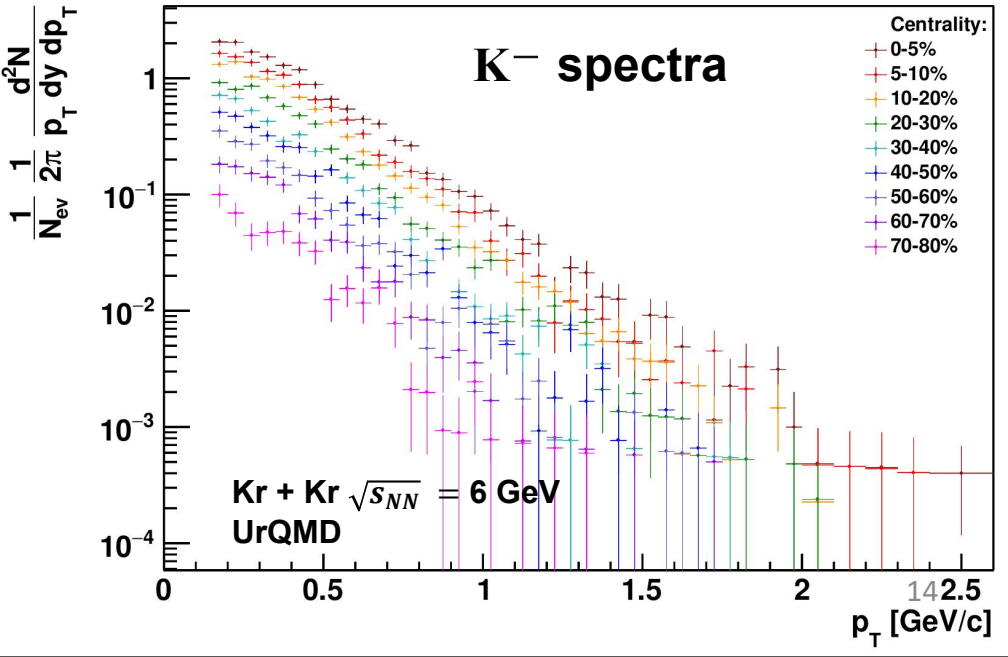


Identified hadron spectra for different centrality classes (RefMult05)



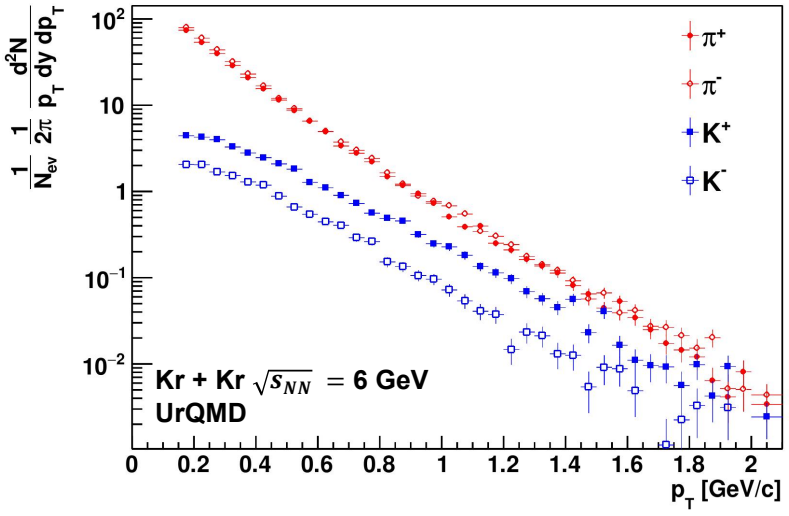




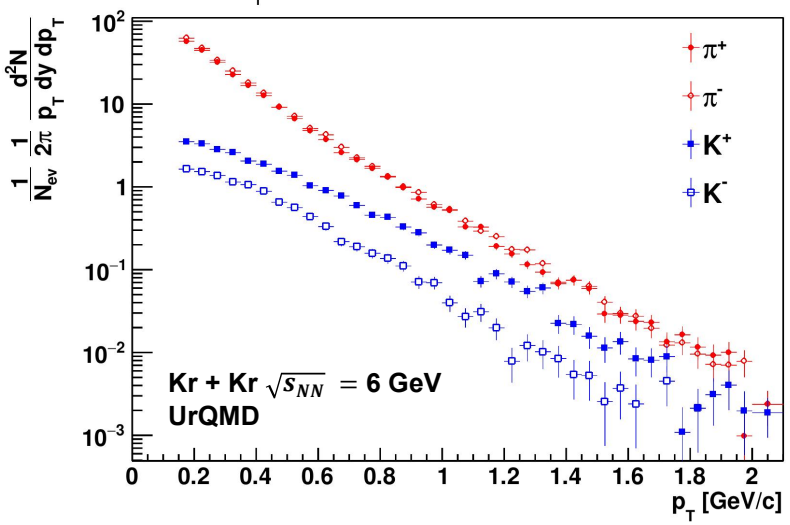


Identified hadron spectra for different centrality classes

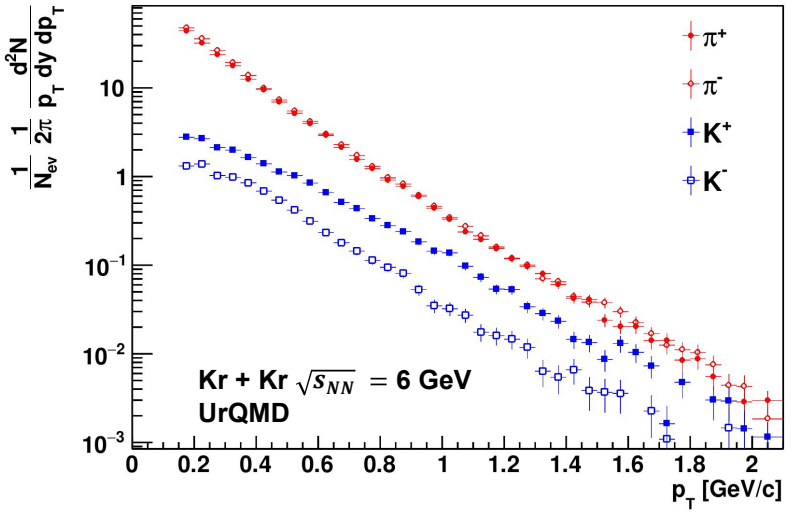
p_T spectra for centrality 0-5%



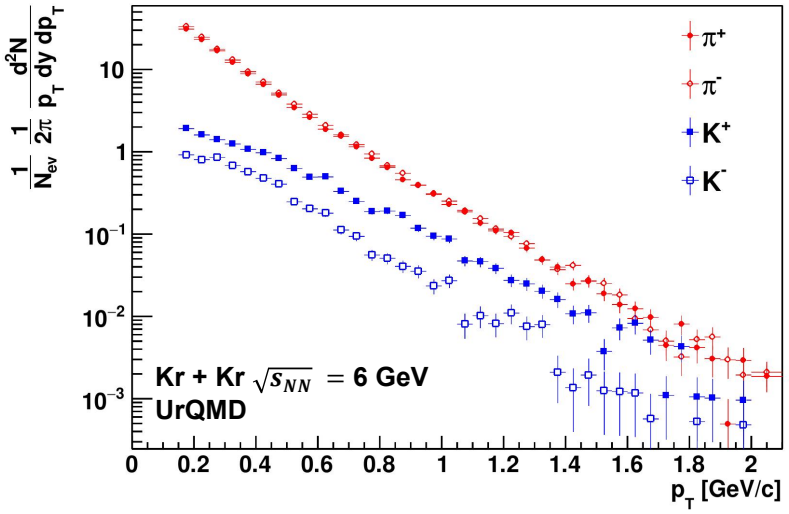
p_T spectra for centrality 5-10%



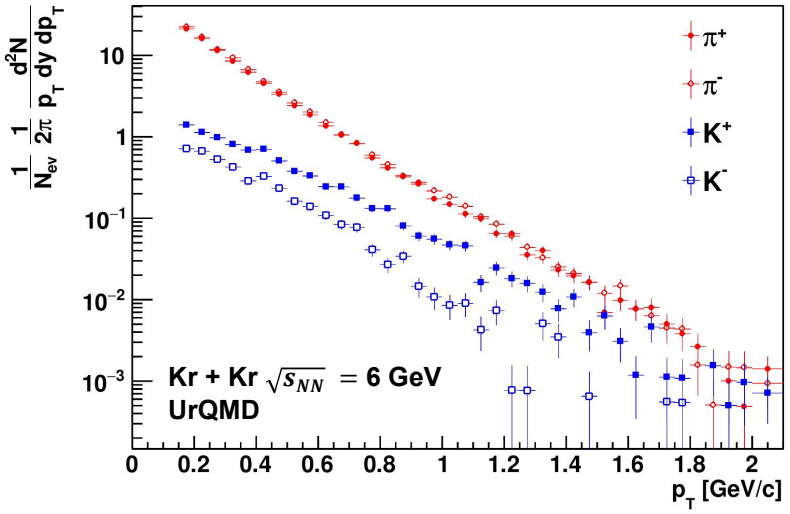
p_T spectra for centrality 10-20%



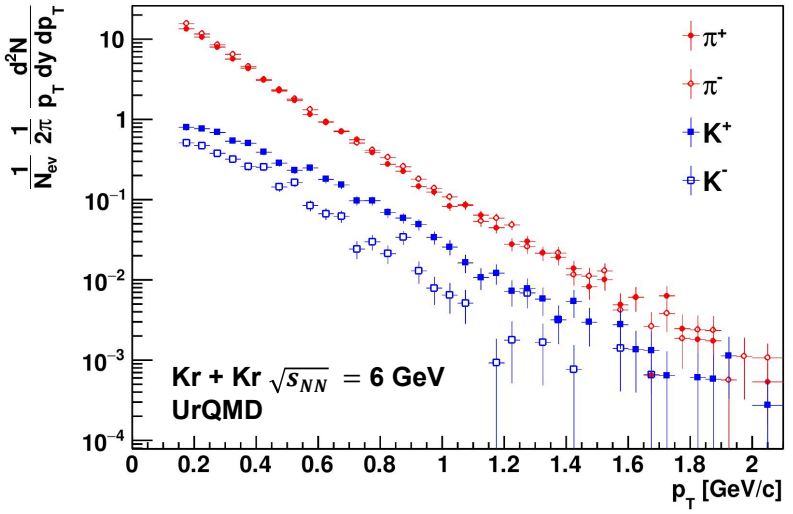
p_T spectra for centrality 20-30%



p_T spectra for centrality 30-40%



p_T spectra for centrality 40-50%



Data & Cuts

System: Kr + Kr $\sqrt{s_{NN}} = 6$ GeV

UrQMD, statistics: ~1.7×10^5 events

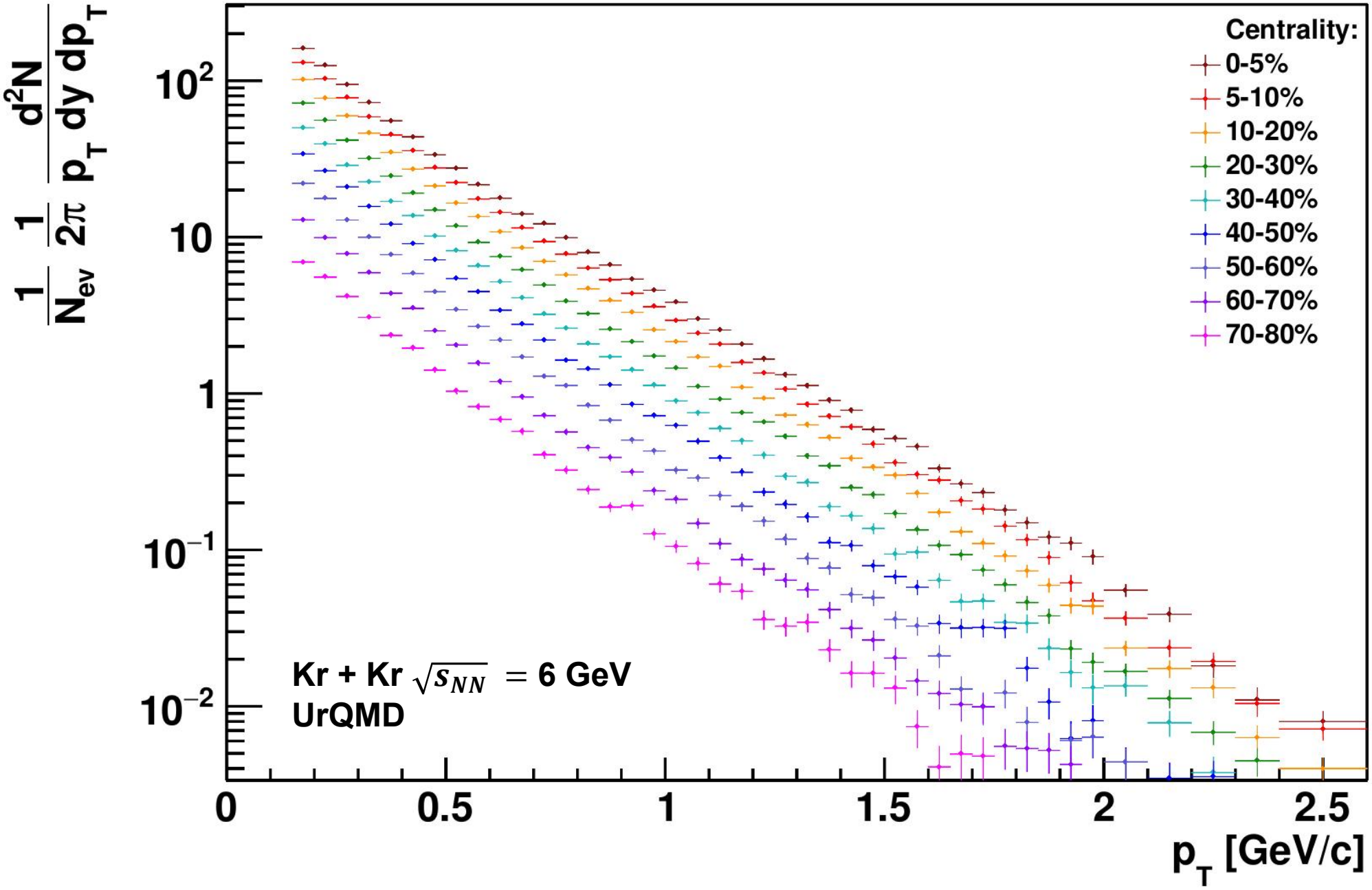
Track cuts:

- $|y| < 0.1$
- $|\eta| < 0.5$
- $p_T > 0.15$ GeV/c

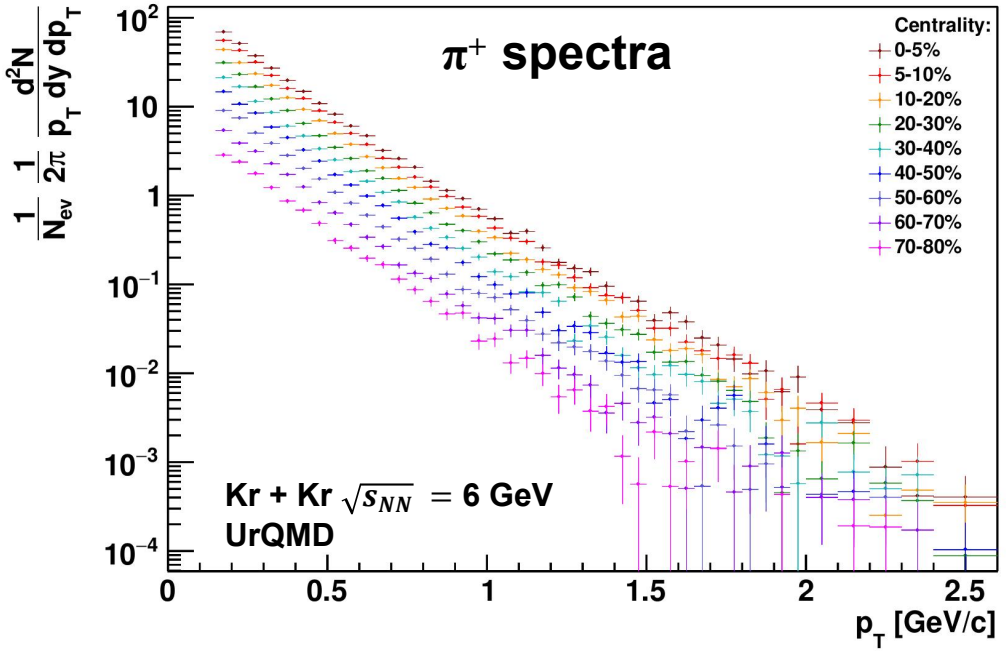
Centrality is calculated using **reference multiplicity** ($|\eta| < 0.5$, $p_T > 0.15$ GeV/c)

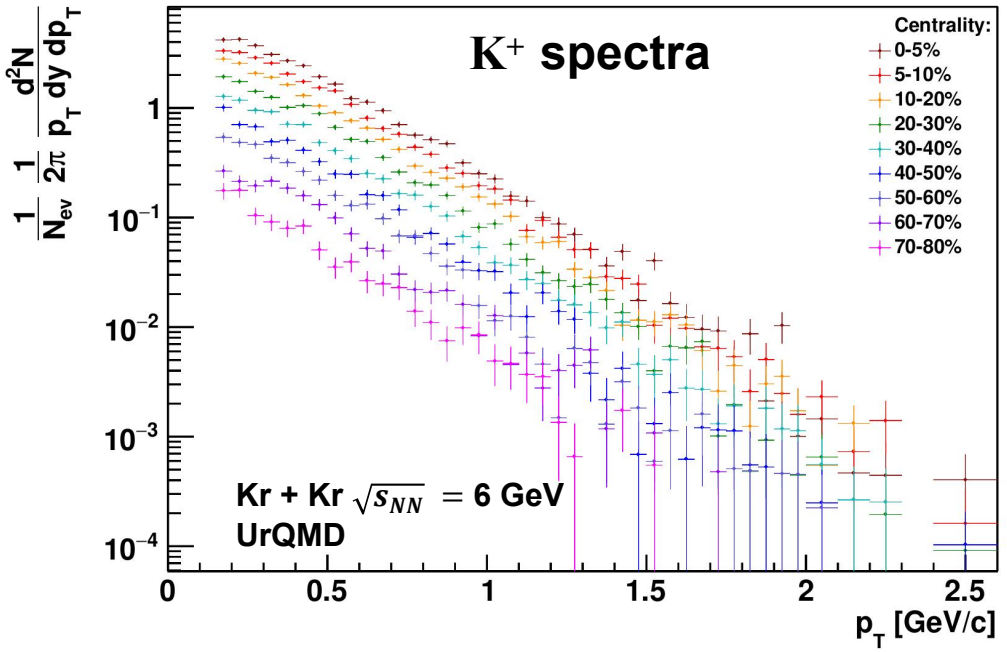
Сейчас пойдут спектры, полученные при определении центральности столкновений другими способами:
1) относительная множественность, но для $|\eta| < 0.5$
2) прицельный параметер

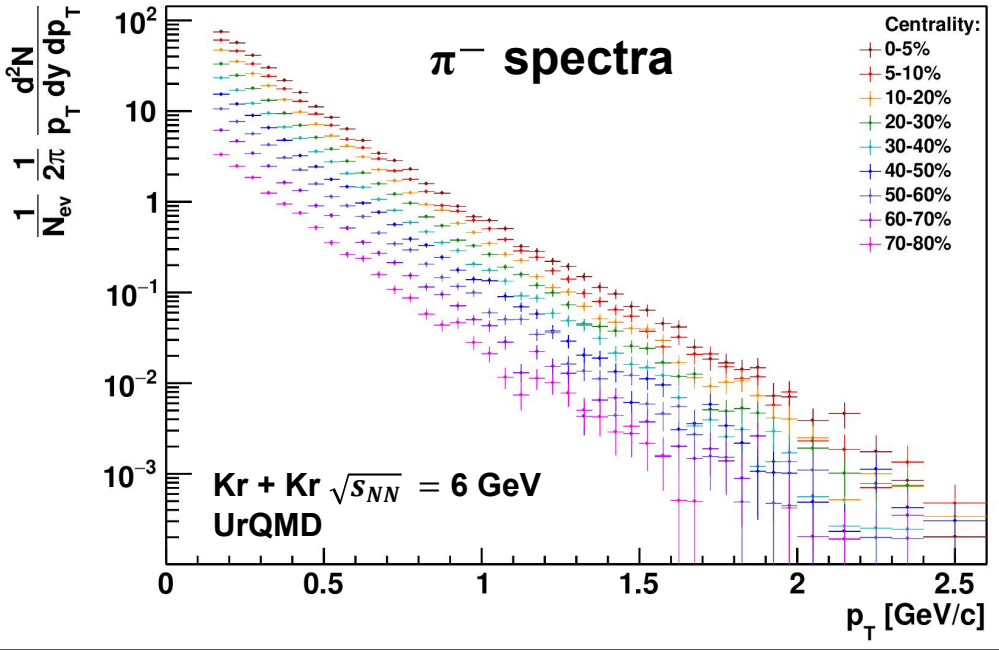
Charged hadron spectra for different centrality classes (ImpactPar)

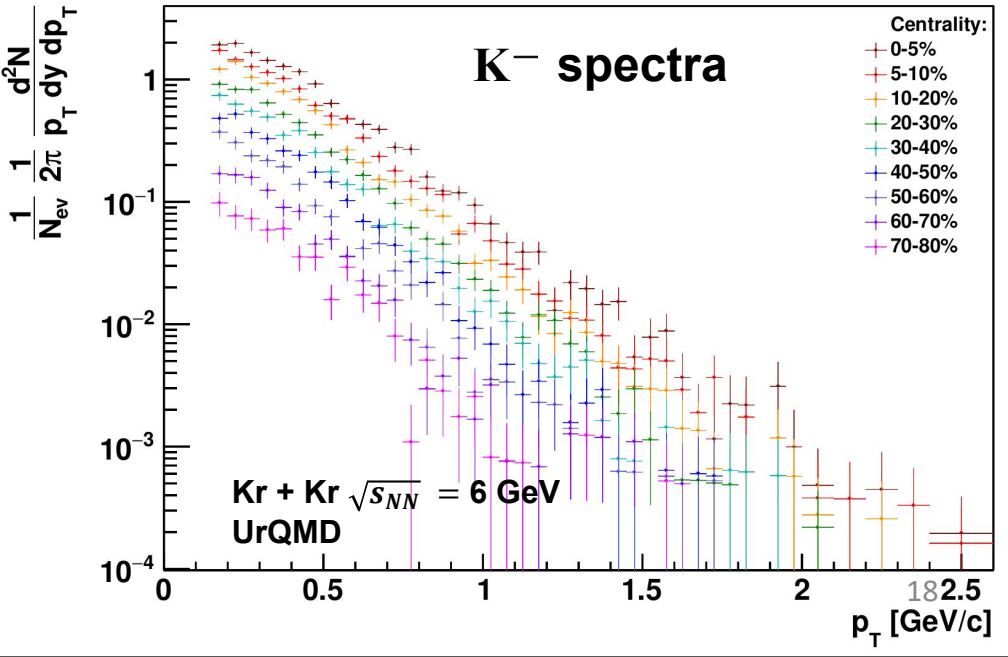


Identified hadron spectra for different centrality classes (ImpactPar)



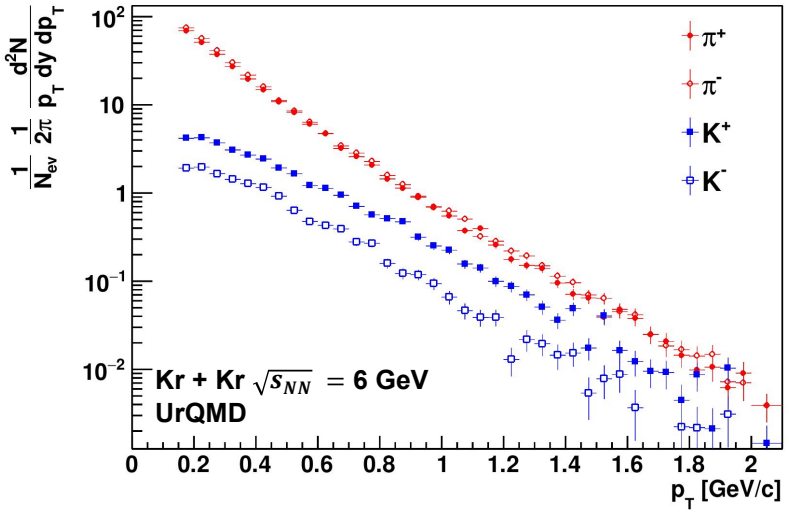




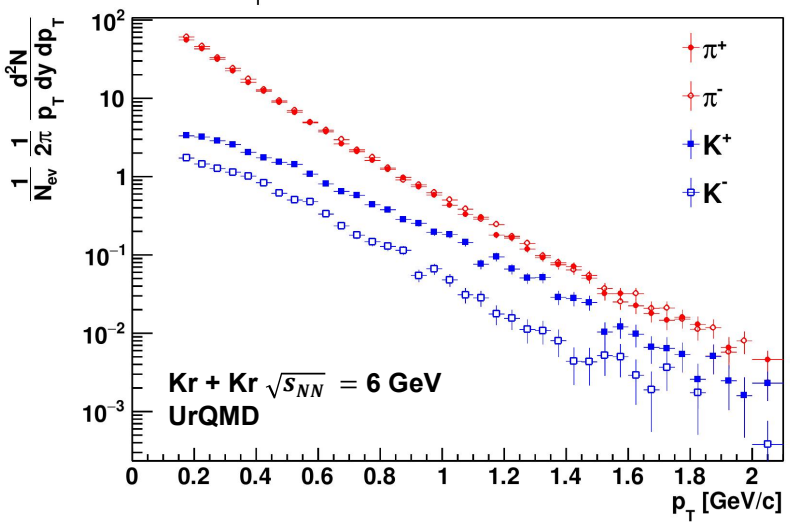


Identified hadron spectra for different centrality classes

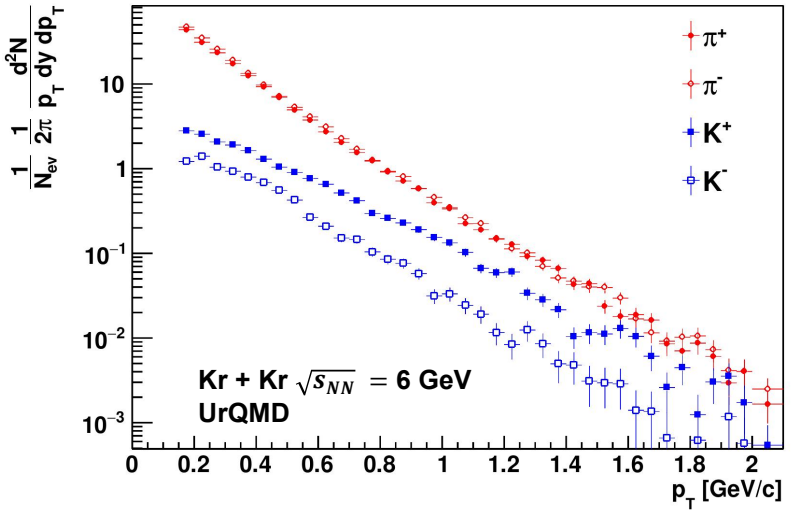
p_T spectra for centrality 0-5%



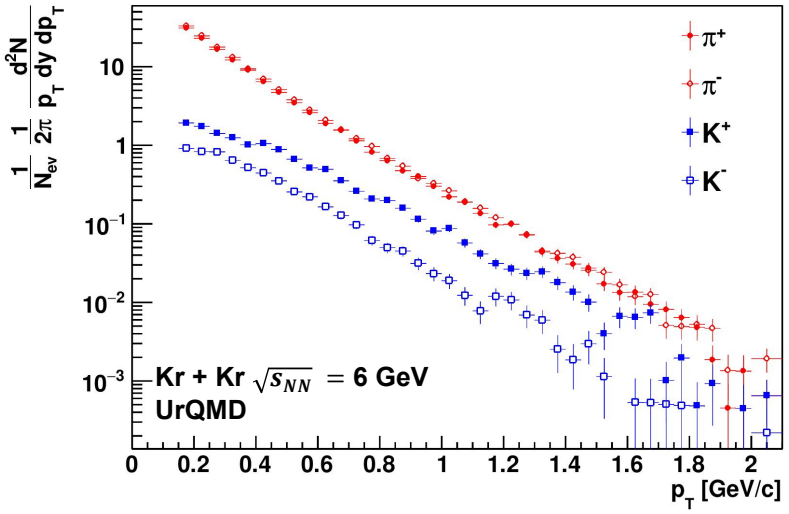
p_T spectra for centrality 5-10%



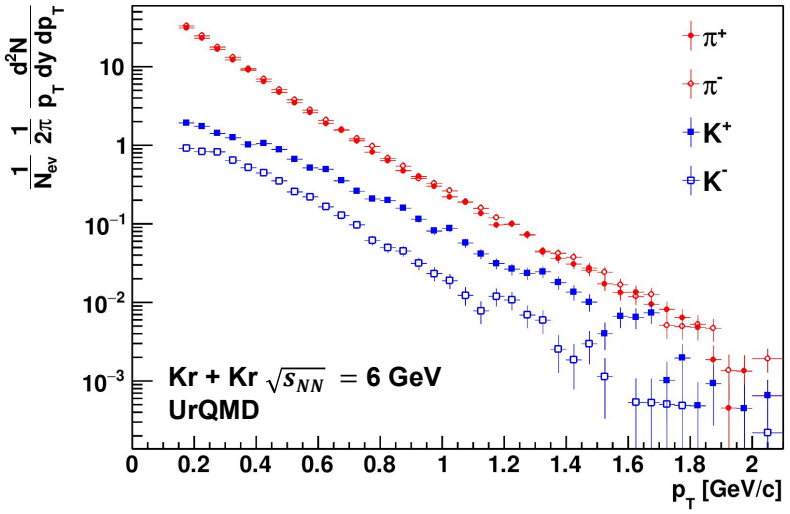
p_T spectra for centrality 10-20%



p_T spectra for centrality 20-30%



p_T spectra for centrality 20-30%



p_T spectra for centrality 40-50%