Lumi Evaluation.
Preliminary.

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Goal & Solution.

For the production cross section the luminosity evaluation is the crucial point.

In Run-6 data there is no information about beam particle parameters : X/Y position on the target.

The proposed solution based on X/Y position of the reconstructed vertices on the target.

Data.

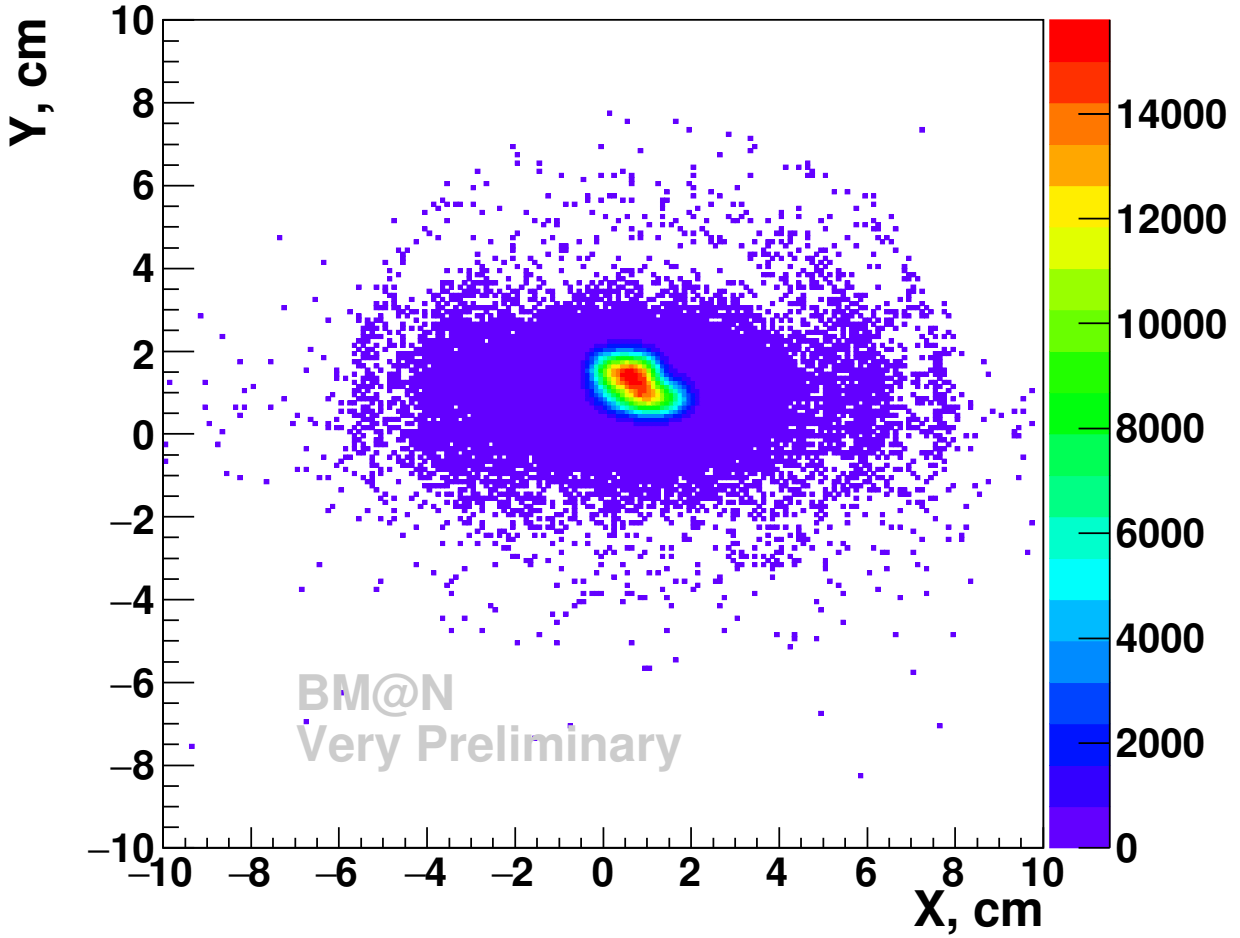
Analysis based on RUN-6 data set.

In total : 160 runs, 27287963 events = 27M

Single track in the event - 6315640 = 6M

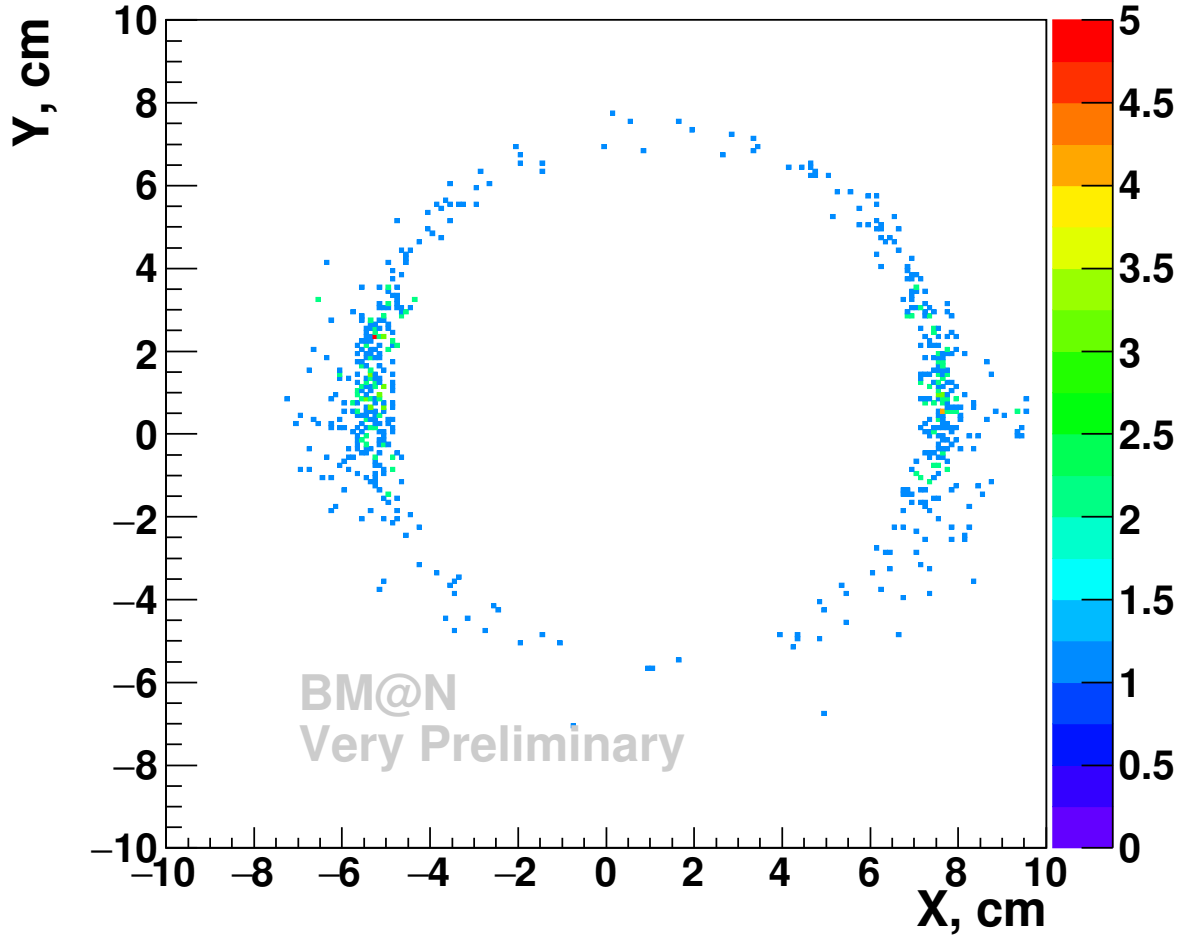
Single track in the event - 7790136 = 8M

Target Region, as it is .



At least 3 tracks in Primary vertex.
Maximum 10 tracks per event.

Tube Trace, clean .

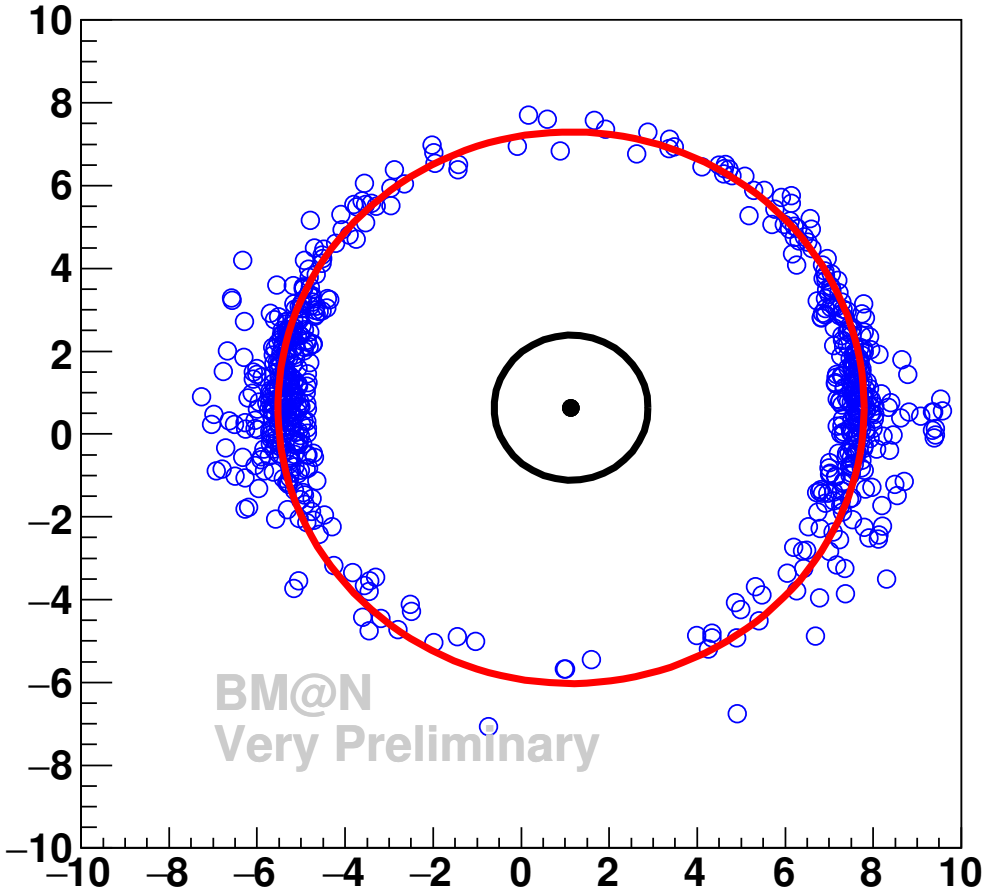


At least 3 tracks in Primary vertex.

Maximum 10 tracks per event.

The central part of the distribution is removed.

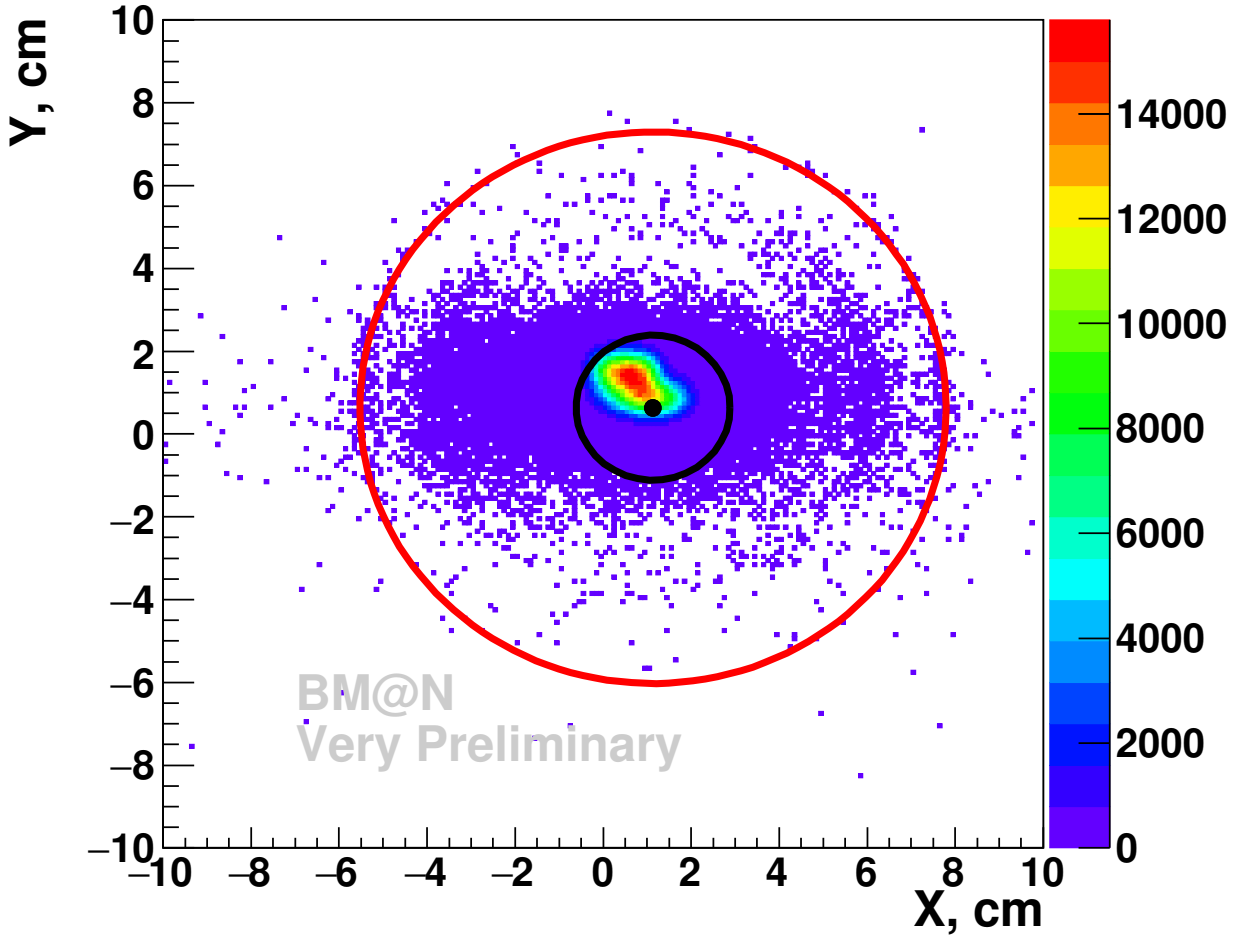
Tube Trace, fit .



At least 3 tracks in Primary vertex. Maximum 10 tracks per event.

1	Mean	6.56164e+00 +/-	1.19551e-02
2	Sigma	2.19681e-01 +/-	1.24890e-02

Beam Spot.

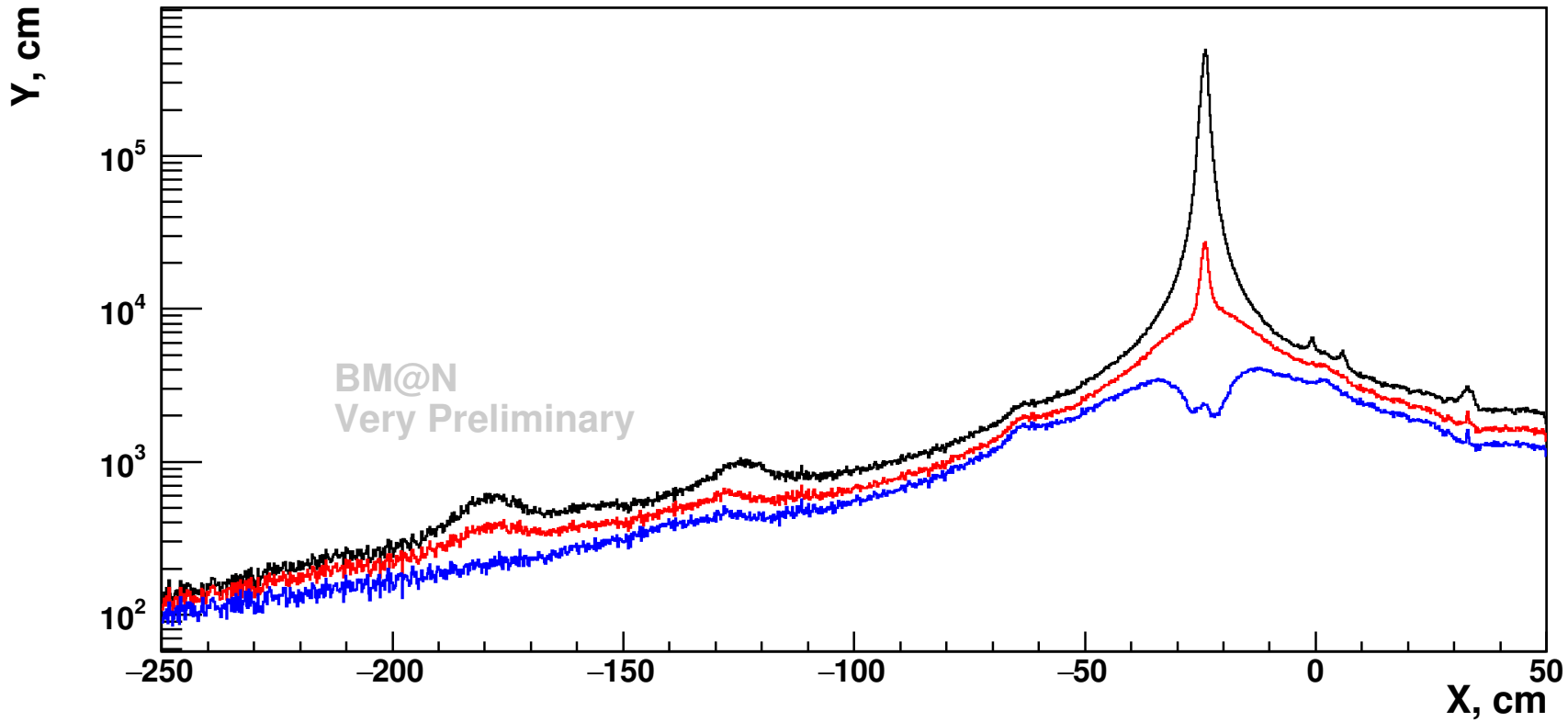


At least 3 tracks in Primary vertex.

Maximum 10 tracks per event.

The beam spot formed be X/Y coordinates of the primary vertex in the event.

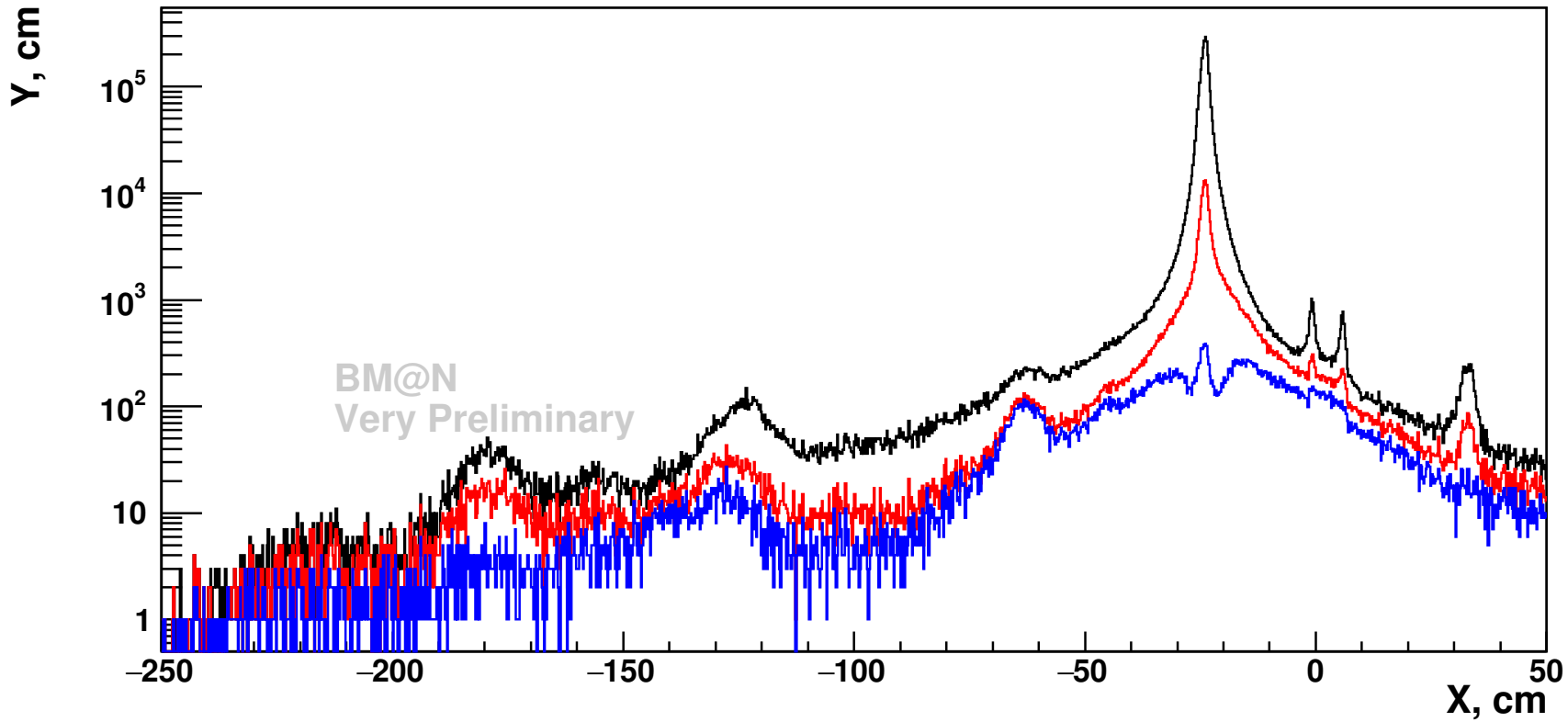
Z of Vertices, >2 tracks .



At least 3 tracks in Primary vertex. Maximum 10 tracks per event.

Black - all Vertices, Red - $\rho > 1.cm$,, Blue $\rho > 1.75cm$,

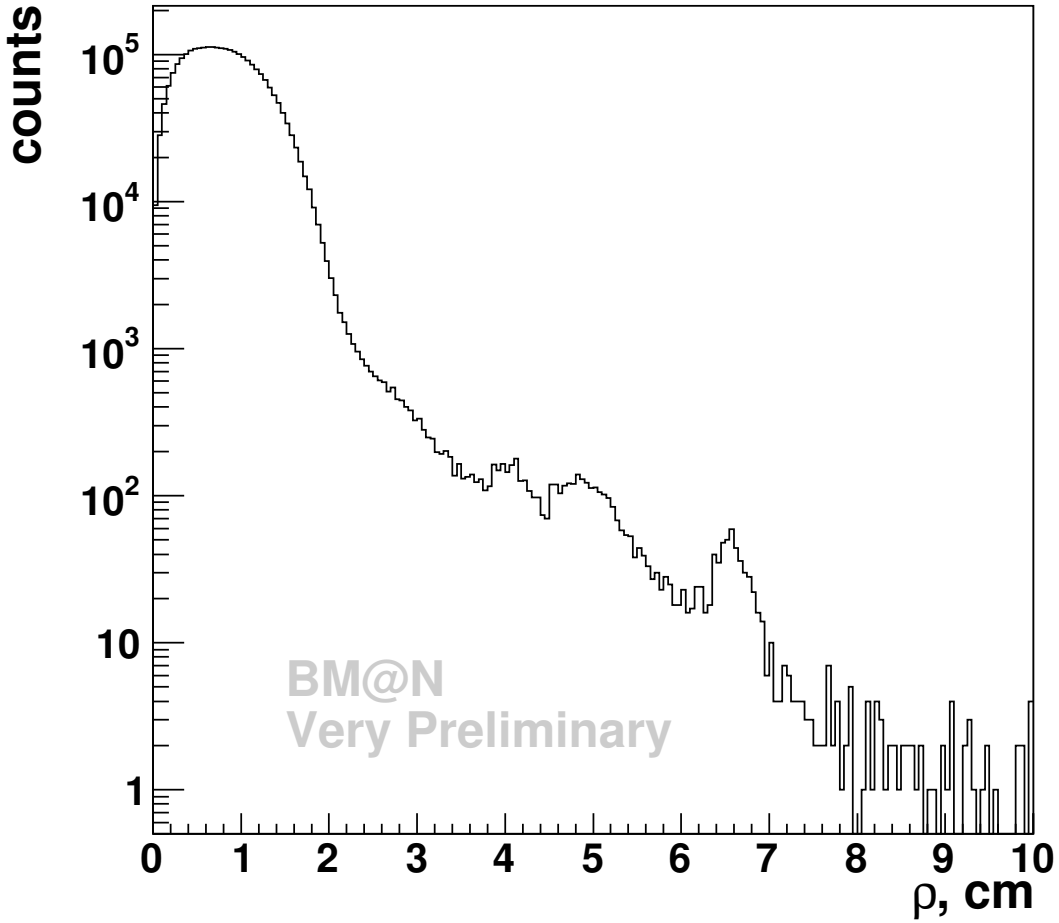
Z of Vertices, >3 tracks .



At least 4 tracks in Primary vertex. Maximum 10 tracks per event.
Black - all Vertices, Red - $\rho > 1.cm$,, Blue $\rho > 1.75cm$,

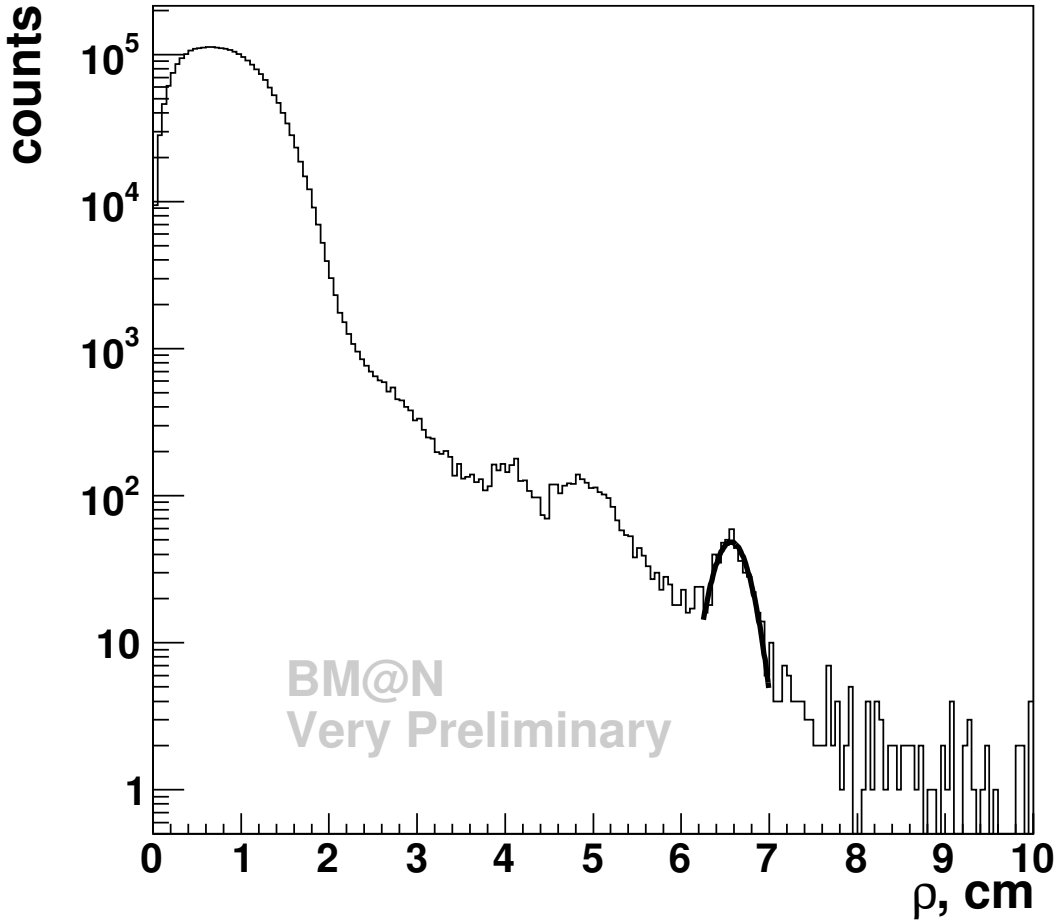
$$
\begin{aligned}
z(TG) &= -23.850 \\
z(VC) &= -127.850 \\
z(BC2) &= -157.350 \\
z(T0) &= -178.850
\end{aligned}
$$

ρ of Vertices, $>$3 tracks .



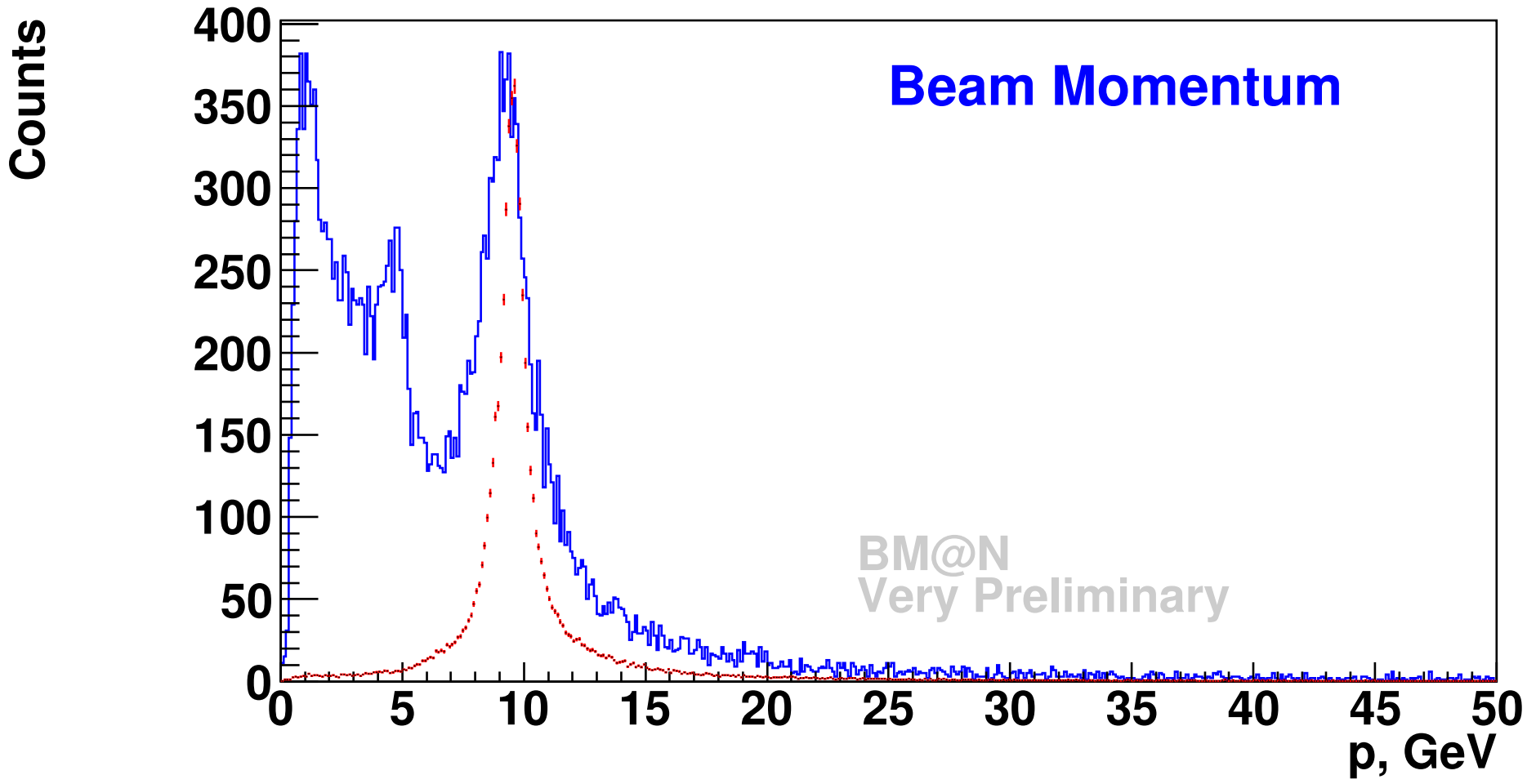
At least 4 tracks in Primary vertex. Maximum 10 tracks per event.

ρ of Vertices, fit $>$3 tracks .



1	Mean	6.6	+/-	1.2e-02
2	Sigma	2.2e-01	+/-	1.2e-02

Beam Momentum

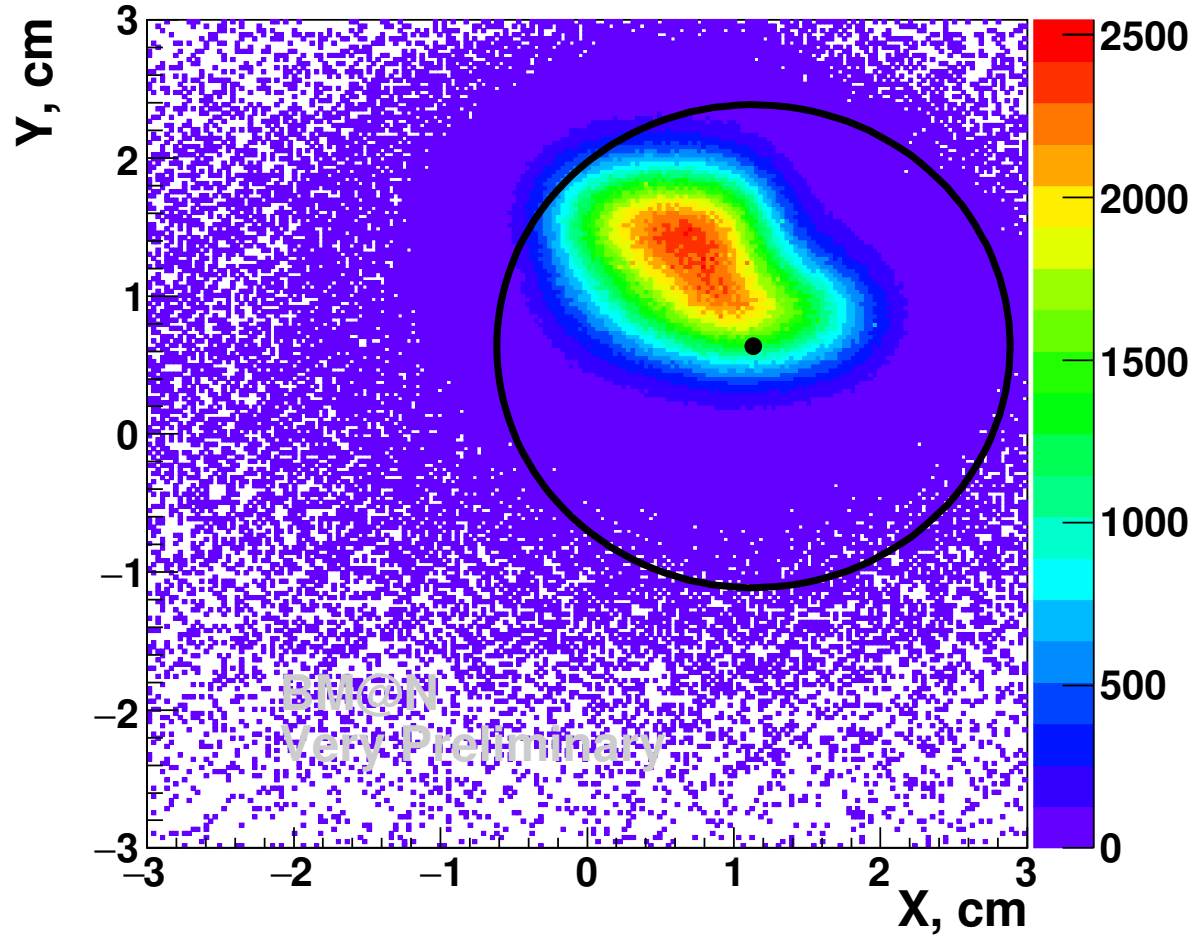


Only one positive track per event. Momentum is limited by region 7-11GeV.

Blue - data.

Red - beam data.

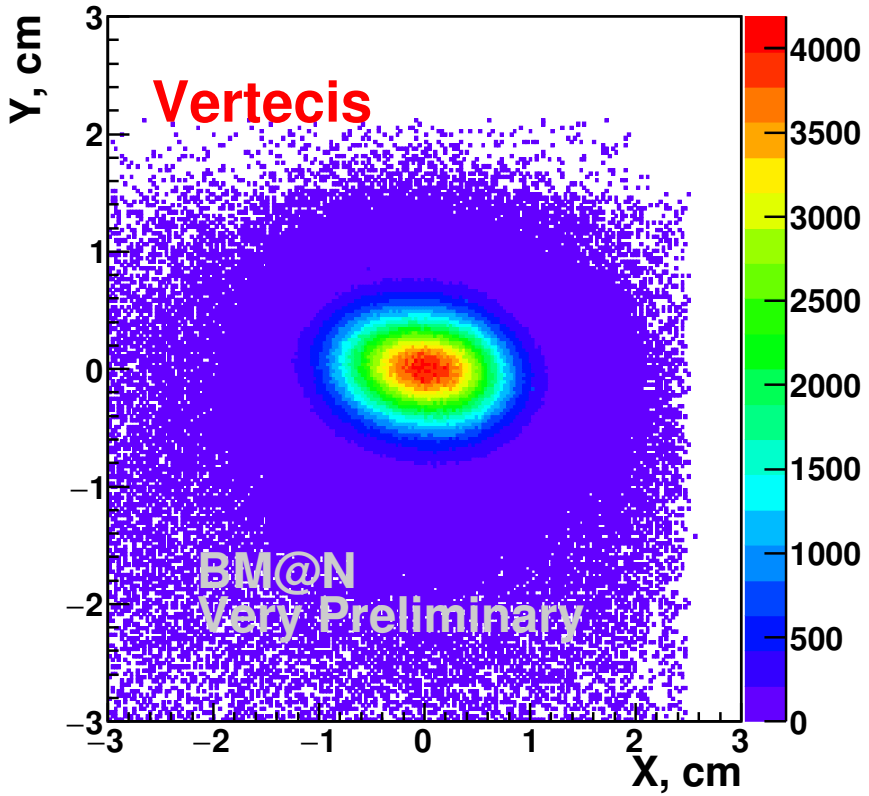
X/Y of Vertices, no shift.

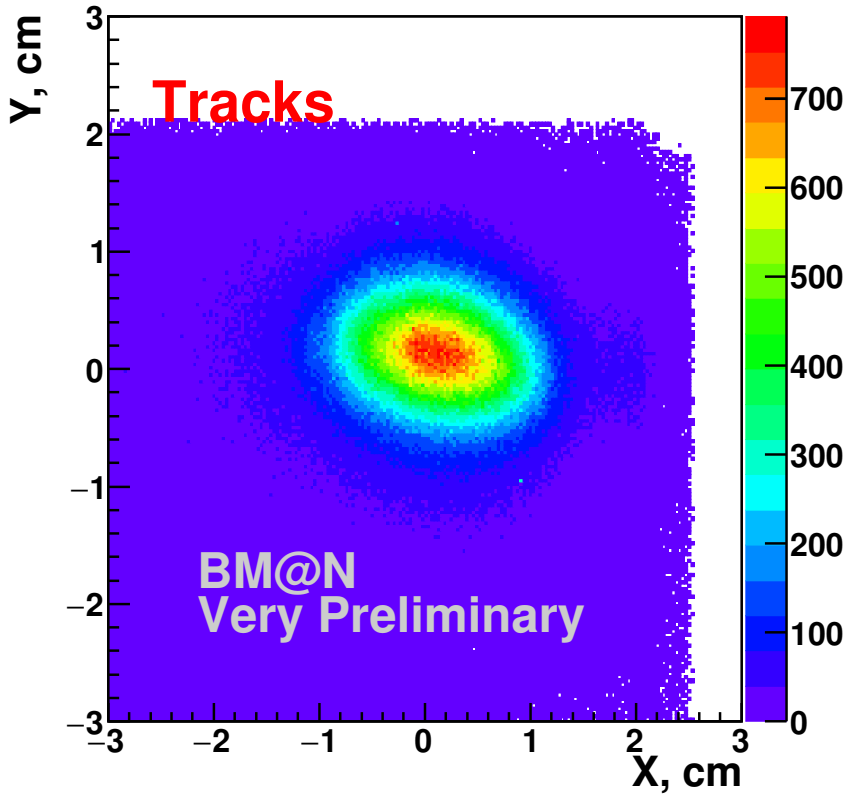


At least 3 tracks in Primary vertex. Maximum 10 tracks per event.

The beam spot touches the target edge.

X/Y Vertex-Beam Shifted



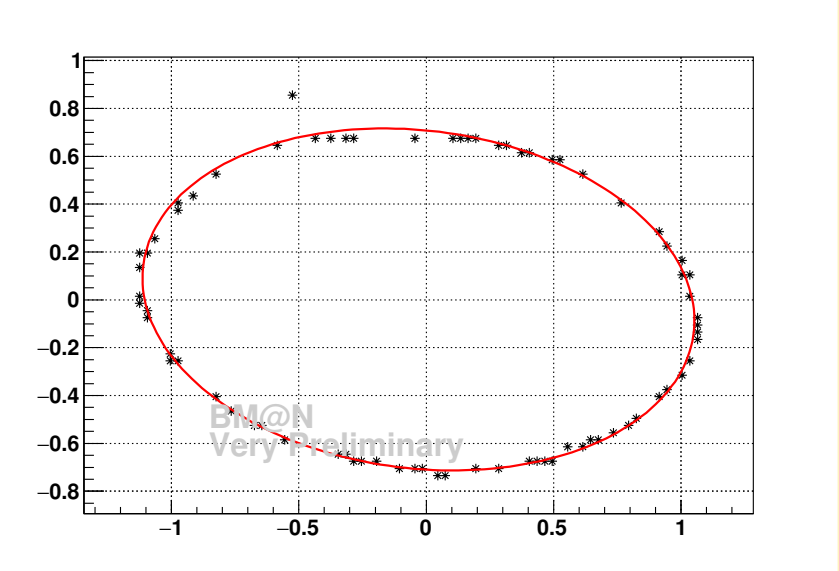


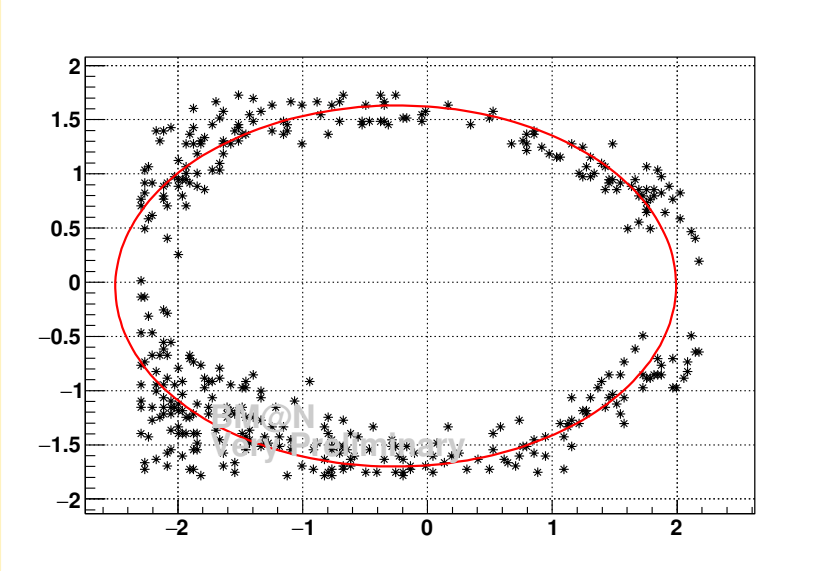
Left - X/Y of Vertices. Right - X/Y of tracks.
The actual X/Y position is shifted to (0,0).

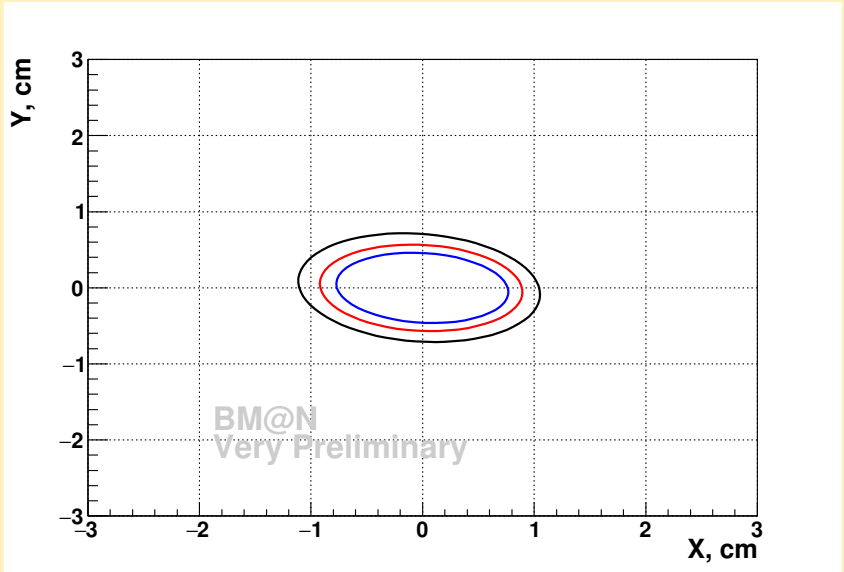
The integral of the right histogram is accepted as 100%.

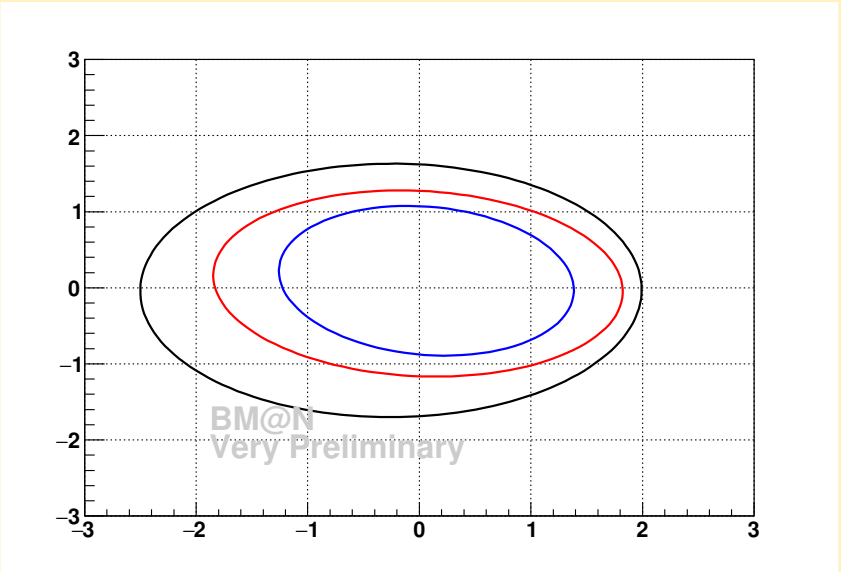
Cut the distribution from bottom to top keeping each time 90%,80%, 70% ... of the histogram counts.

X/Y Vertex-Beam Shifted



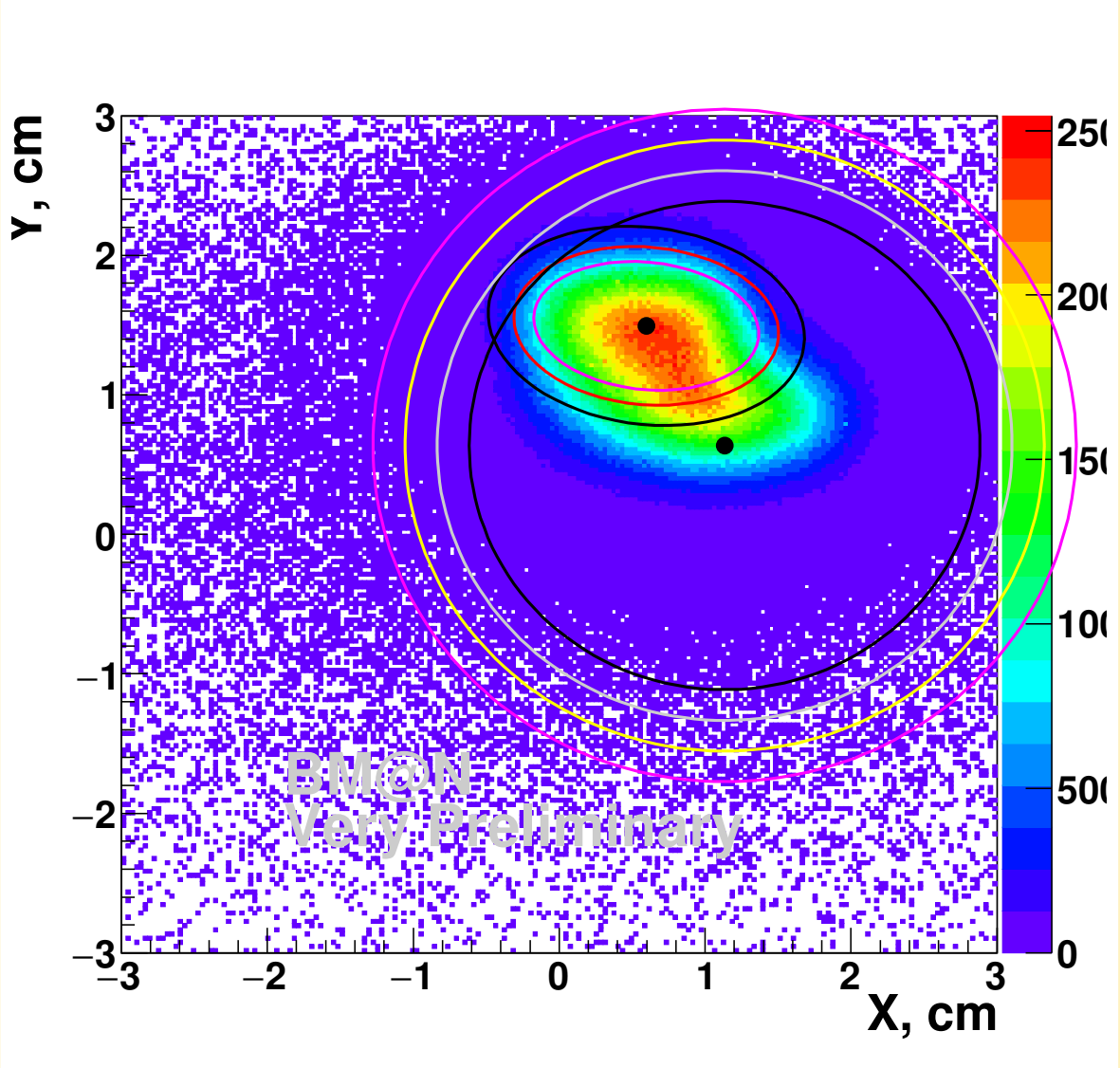






Black - 90%, Red - 80%, Blue - 70% of Vertices/Tracks inside the ellipse.

X/Y of Vertices and geometry.



Ellipses : Black - 90%, Red - 80%, Blue - 70% of Vertices inside the ellipse

Target : Gray - $+1\sigma$, Yellow - $+2\sigma$, Magenta- $+3\sigma$

How to use.

1. Choose the BEAM ELLIPSE. Accept the only events with X/Y of the primary vertex inside the ellipse area.
   It gives proper Λ statistic.

2. Watch the ELLIPSE size and Target areas,
   do the correction to the Lumi values.