

## FIXED TARGETS AU AND AL; TWO AU BEAM ENERGIES

Objective: If backward BBC rejects errant upstream beam, what percent of good events are rejected by back-scatter BBC?

All these are:

5000 URQMD events

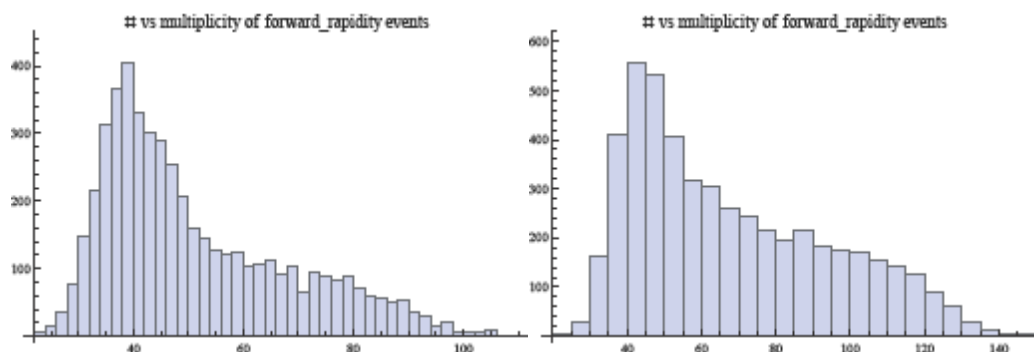
$|p_z/p| = 0.9496$  to  $0.9995$  (i.e. polar angle 1.8 to 18.3 degrees) to define forwards and backwards.

Larger backward BBC subtends 18.3 degrees polar angle from  $z=2$  m location of fixed target.

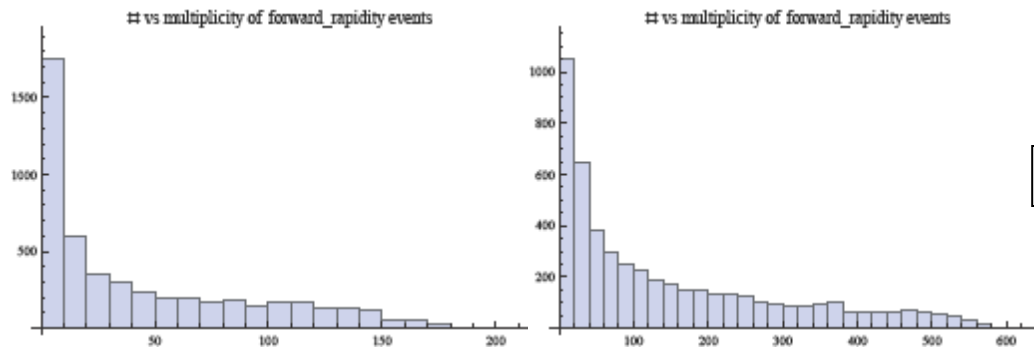
All charged particles are included – mostly protons and pions.

I used light and heavy targets, Al and Au, to indicate range of effects.

Number vs multiplicity of forward-rapidity particles:

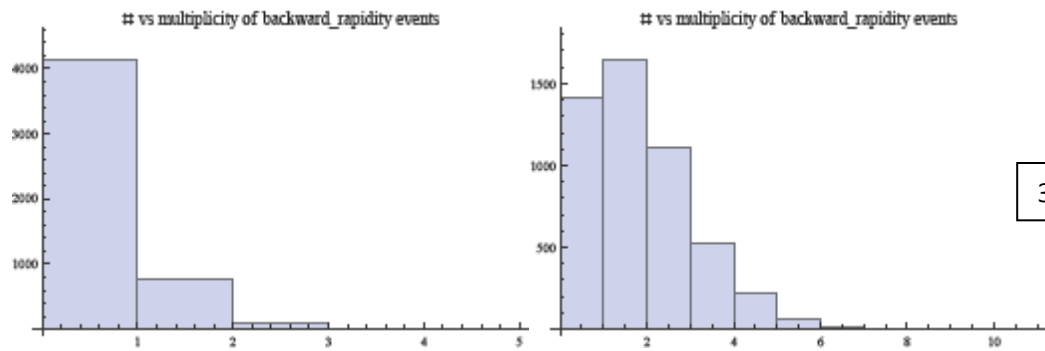


3.85 GeV AuAl; AuAu

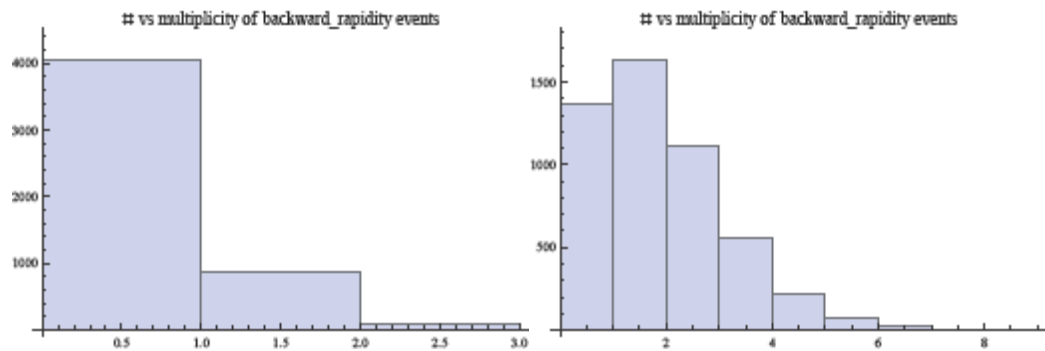


31 GeV AuAl; AuAu

# Number vs multiplicity of backward-rapidity particles



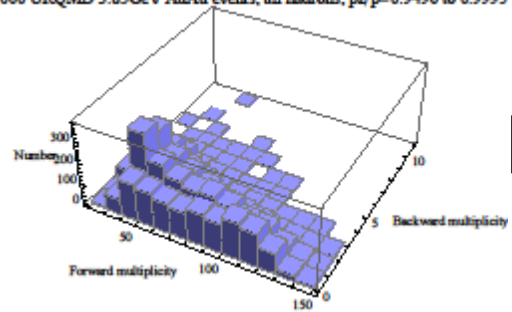
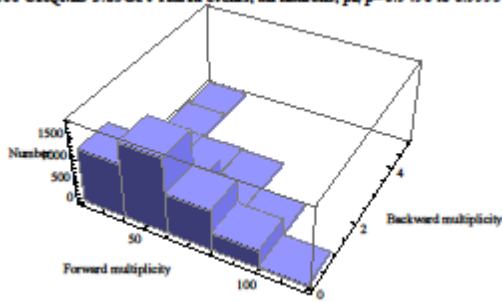
3.85 GeV AuAl; AuAu



31 GeV AuAl; AuAu

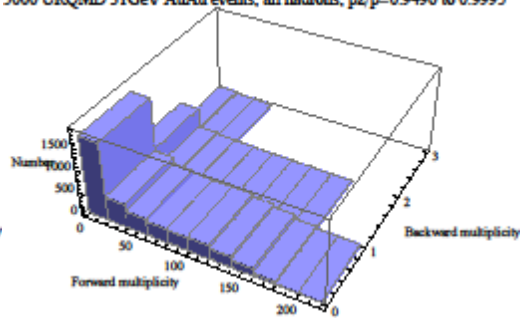
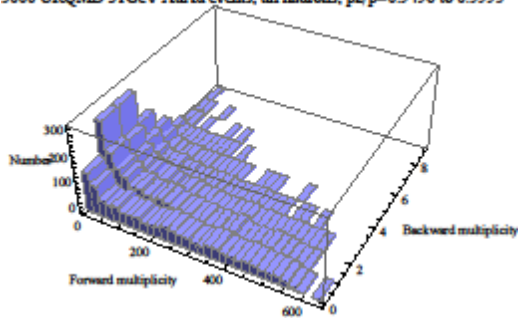
Correlation between backward- and forward-rapidity particles (same event each point):

5000 URQMD 3.85 GeV AuAu events; all hadrons;  $p_z/p = -0.9496$  to  $0.9995$  5000 URQMD 3.85 GeV AuAu events; all hadrons;  $p_z/p = -0.9496$  to  $0.9995$



3.85 GeV AuAl; AuAu

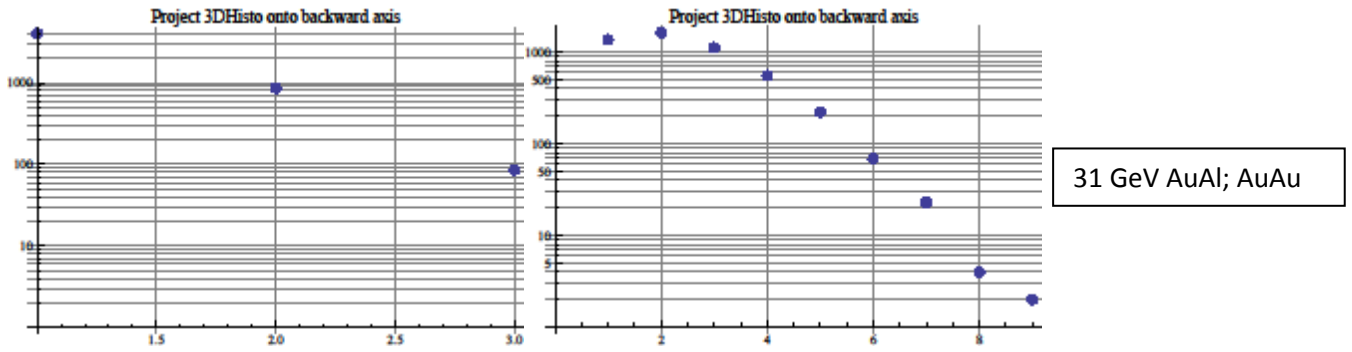
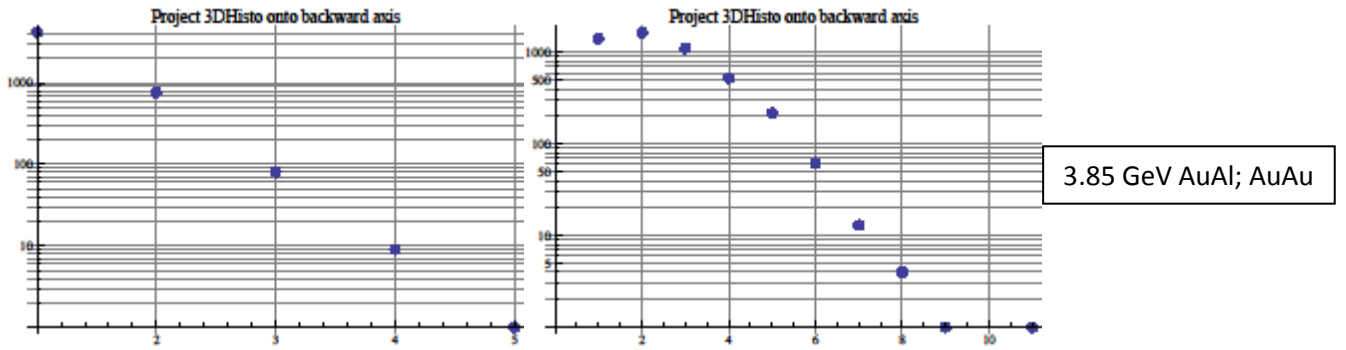
5000 URQMD 31 GeV AuAu events; all hadrons;  $p_z/p = -0.9496$  to  $0.9995$  5000 URQMD 31 GeV AuAu events; all hadrons;  $p_z/p = -0.9496$  to  $0.9995$



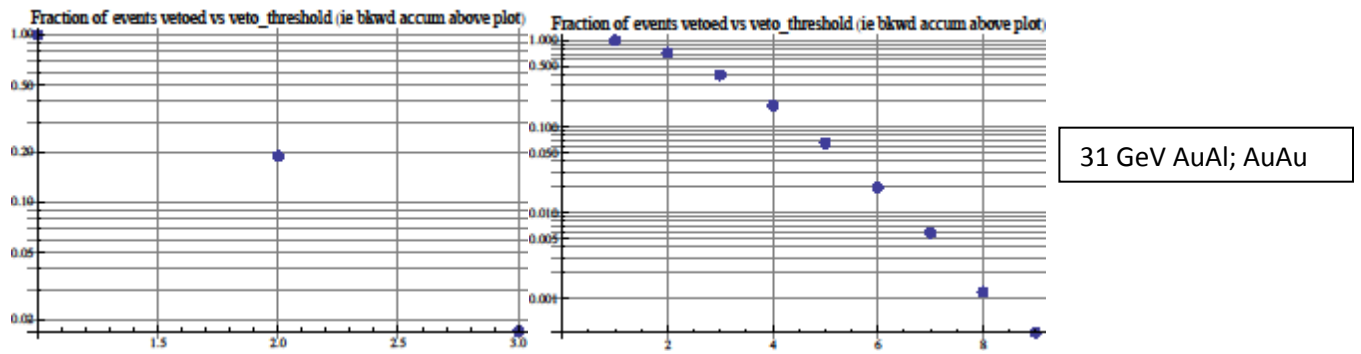
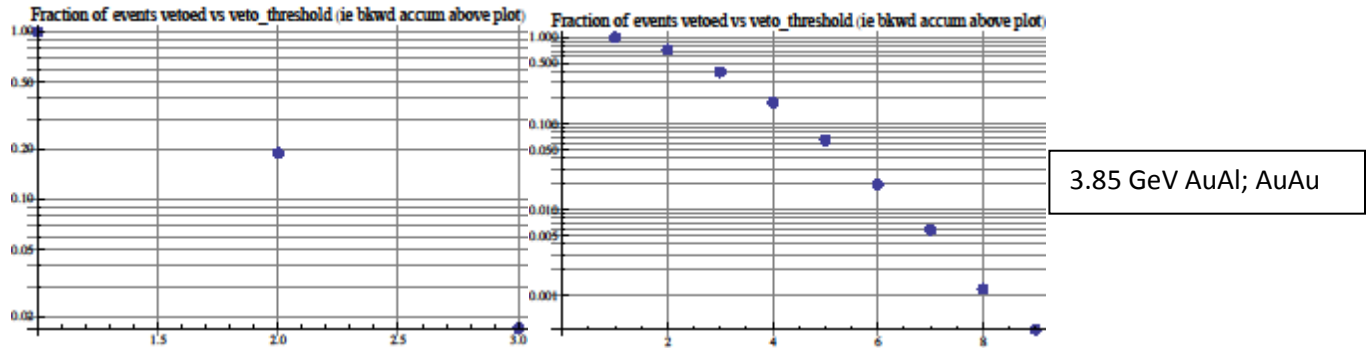
31 GeV AuAl; AuAu

Fraction of events with zero counts in backward BBC: 3.85 GeV AuAu  $\rightarrow$  28%; 31 GeV AuAu  $\rightarrow$  27%;  
3.85 GeV AuAl  $\rightarrow$  83%; 31 GeV AuAl  $\rightarrow$  81%.

Projection of 3D histograms onto backward axis:



Fraction of falsely-rejected events vs threshold for veto by backward-rapidity BBC: obtained from cumulative backwards sum of preceding page.



Example: for 31 GeV Au on fixed Au, a rejection threshold of 4 particles falsely vetoes ~18% of events. This rejection varies with impact parameter so larger threshold is an advantage.