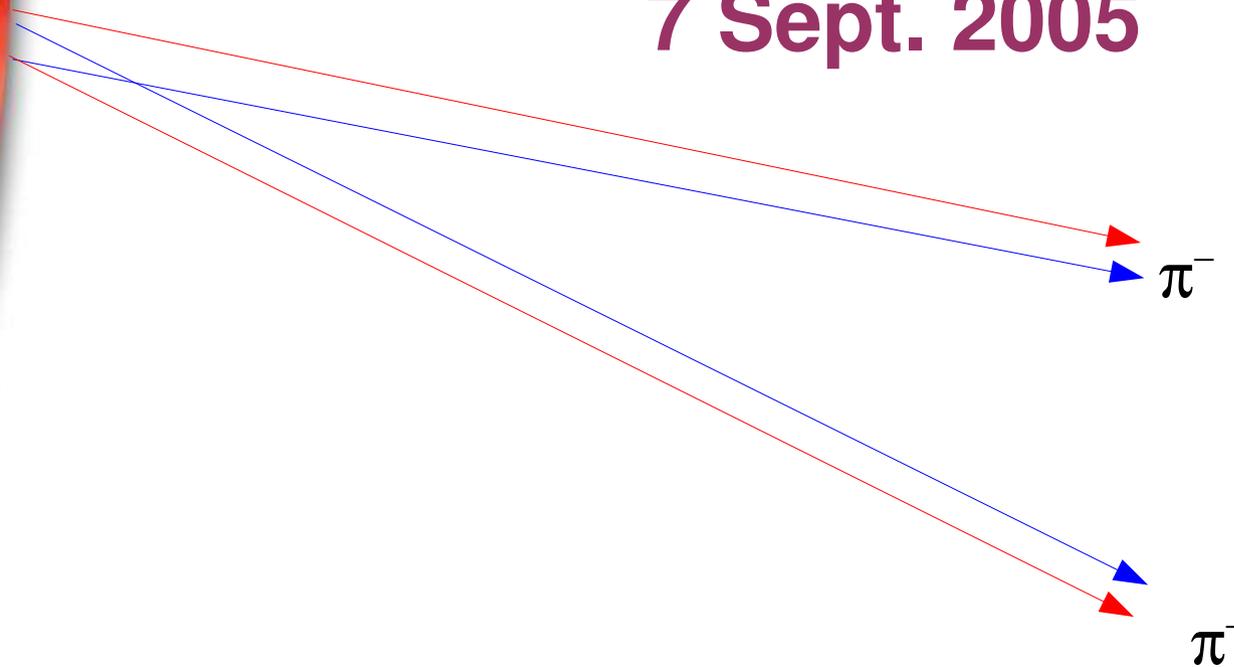


First attempt to see HBT interference in MIPP TPC tracks

Dmitry Ratnikov and Nick Solomey

7 Sept. 2005

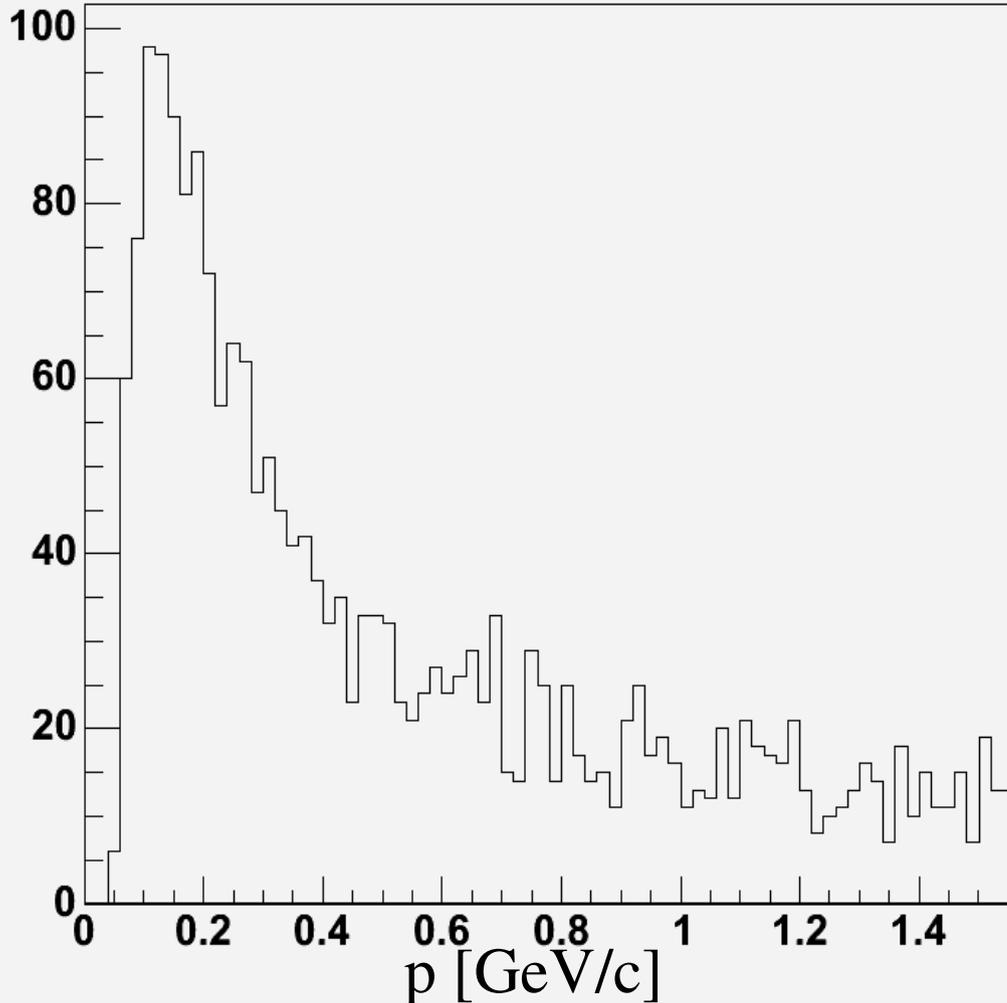


Events used:

- **We used events with more than 2 negative tracks and not more than 20 total tracks.**
- **All beam particles were used from a run of 50 GeV on LH2 target.**

TPC Track momentum

Momentum Distribution



momentumHist

Entries	10589
Mean	0.6562
RMS	0.5402

- Negative charged tracks momentum.
- This is using only a fixed 0.69 T B-field in TPC
- Most tracks are 0.2 GeV/c momentum
- For HBT use only tracks < 1 GeV/c

Calculations:

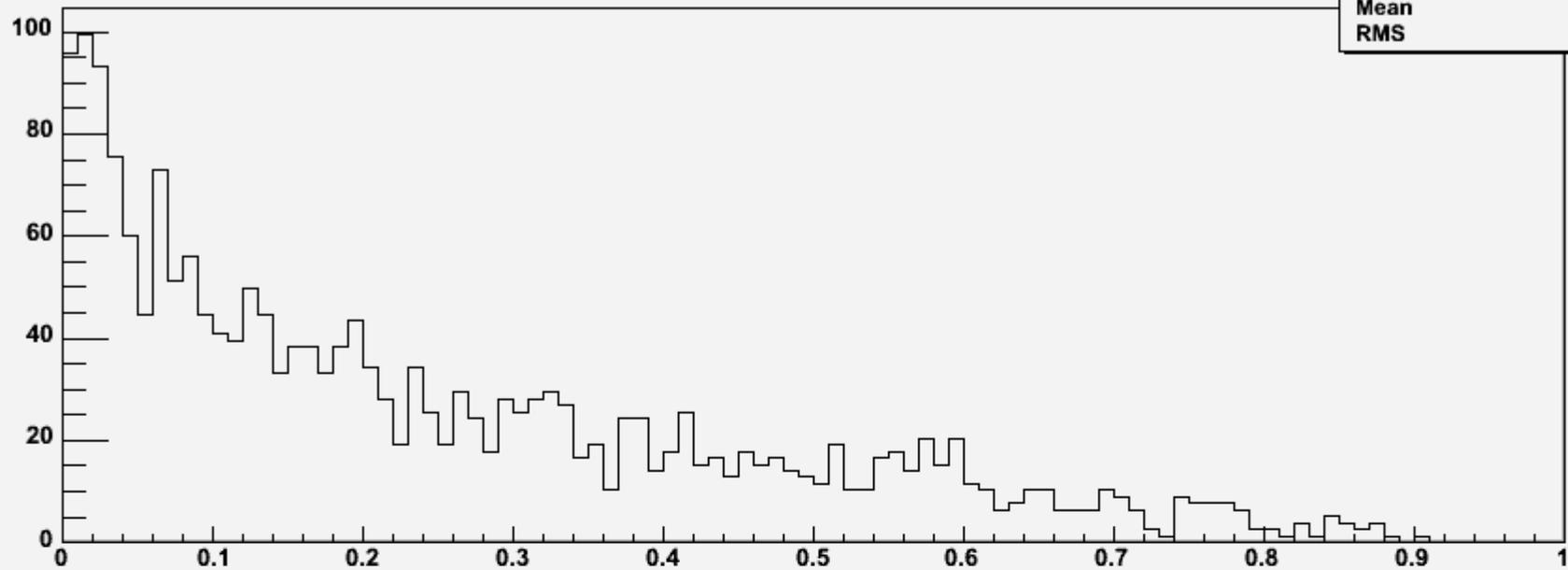
- **Using the momentum difference**

$$q = |\mathbf{p}_1 - \mathbf{p}_2| \text{ for:}$$

1) All combinatoric pairs between negative tracks in a single event, gives us the "dependent" q plot.

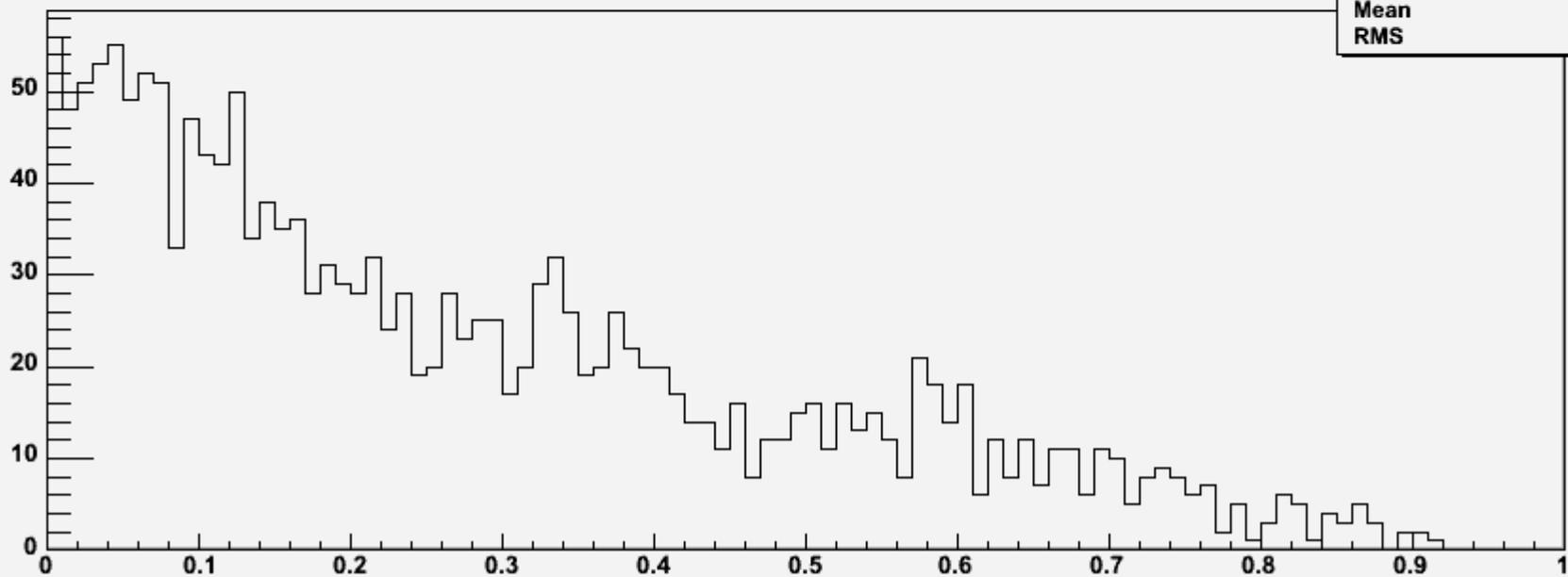
2) Using a negative track in one event with all negative tracks in the next event, gives us the "independent" q plot for the non-interfering background.

Dependent interactions



depHist	
Entries	1617
Mean	0.2478
RMS	0.2162

Independent interactions

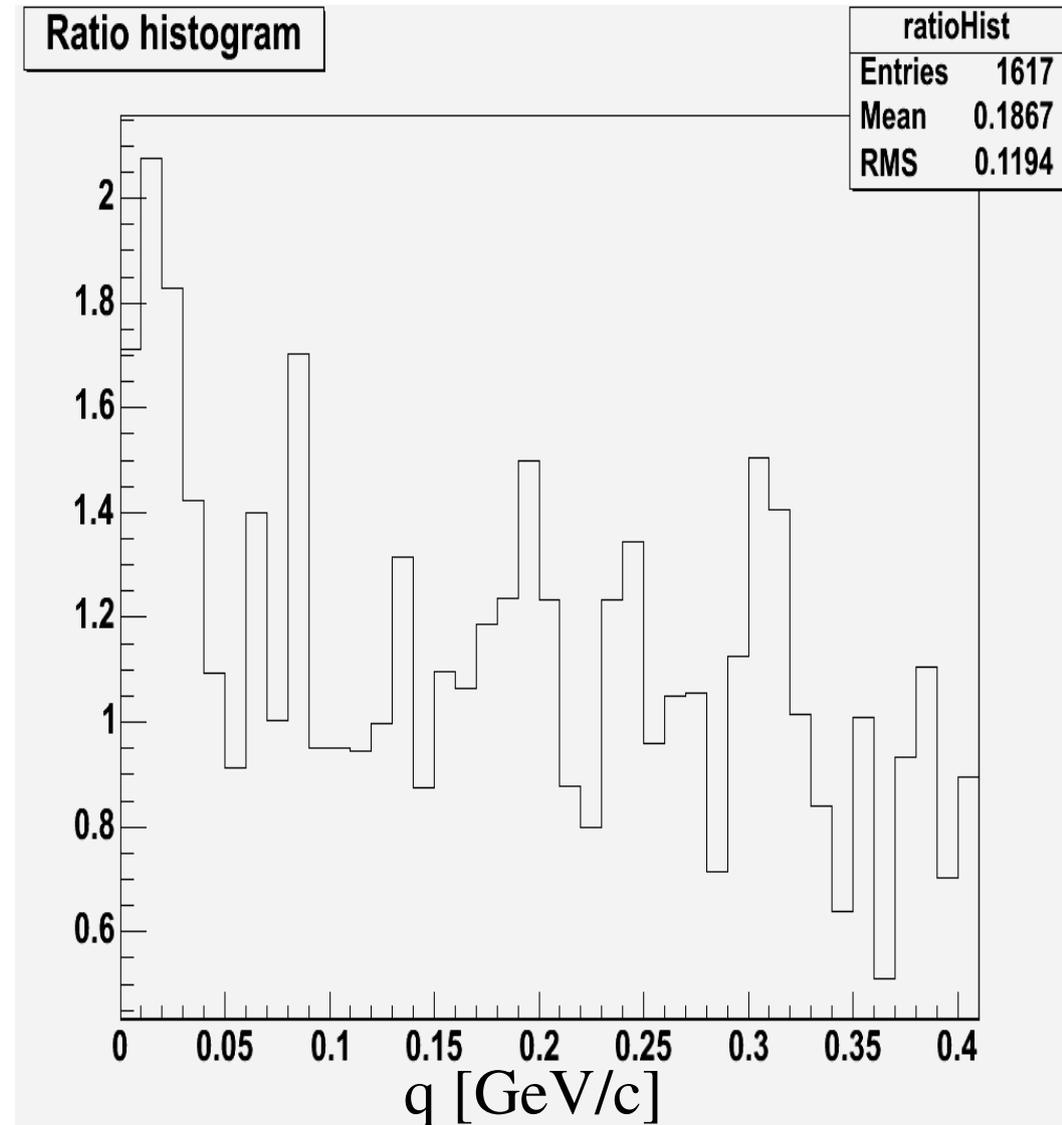


indepHist	
Entries	1825
Mean	0.2754
RMS	0.2202

q [GeV/c]

Interference:

- Normalizing the dependent and independent q plots to each other in the tail between 0.25 and 1.0 GeV/c and taking the bin-by-bin ratio gives us the HBT correlation interference peak at small q .



Problems:

- **Poor momentum calculations**
- **Small statistics**
- **Interference does not occur between proton, K^- and π^- , and we have not separated these.**
- **Not all tracks from the same vertex.**

Future:

- **Improve momentum calculations using B-field map.**
- **Select tracks that come from the same vertex.**
- **More runs.**
- **Select tracks from one interaction point.**
- **Use dE/dx from TPC for selecting pions.**