

Proto-code for MIPP Cross Section Measurements

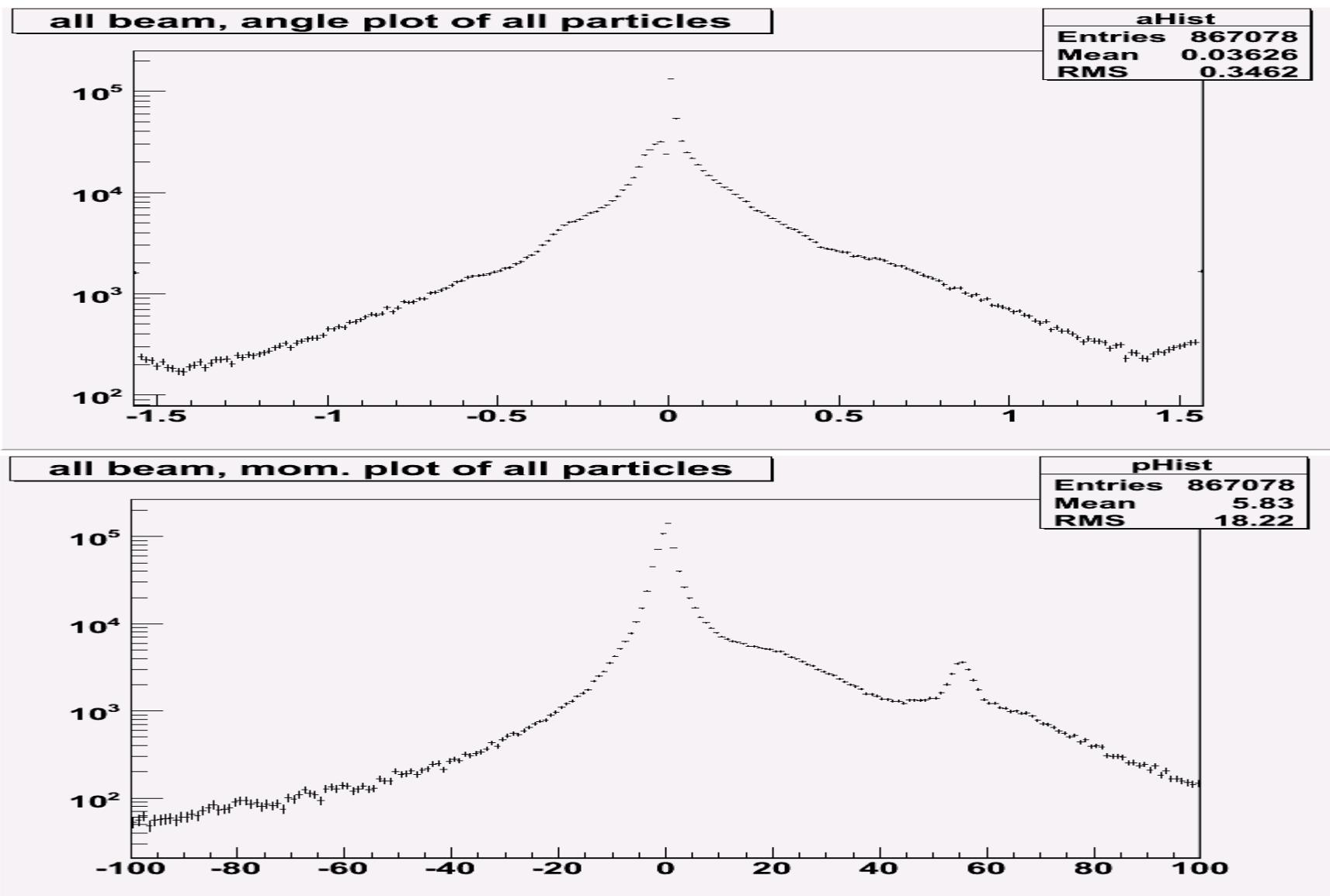
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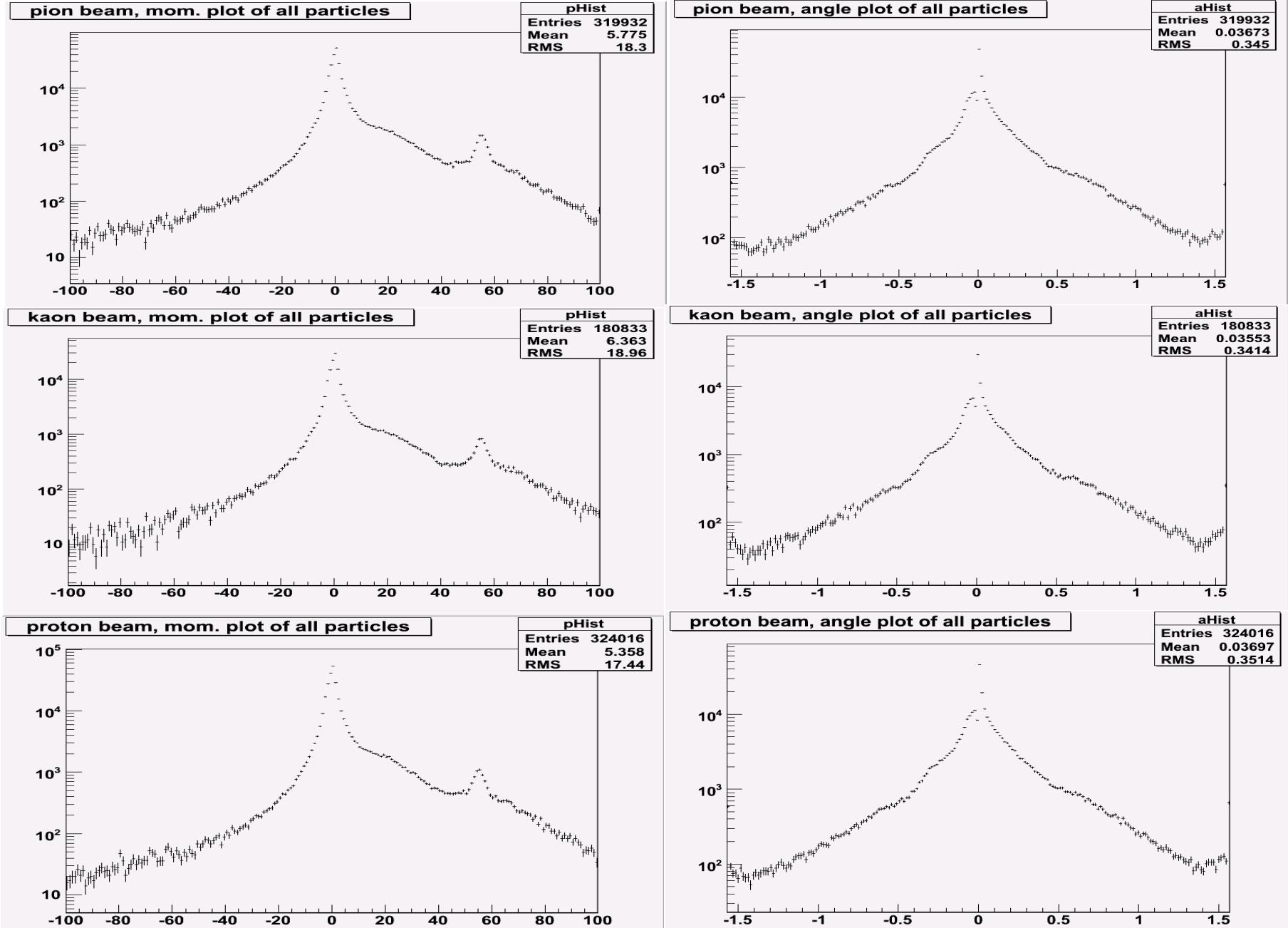
Status

- I wanted to develop code that uses pass 3 DST to:
 - exercise the data to see what works and find problems
 - push the development of preliminary code forward to see if all the variables one would need for getting physics out of the pass 3 DST are available
 - develop code that would eventually become a Bin-Wise Cross Section measurement, i.e. uses each bin of a histogram distribution of produced particle momentum and angle like a single channel analyzer cross section measurement as historically done in the olden days of nuclear physics.
- Some nice plots are now shown for internal discussion.
- We can even see some peaks that can be attributed to known physics processes, tagging problems and beamline problems.

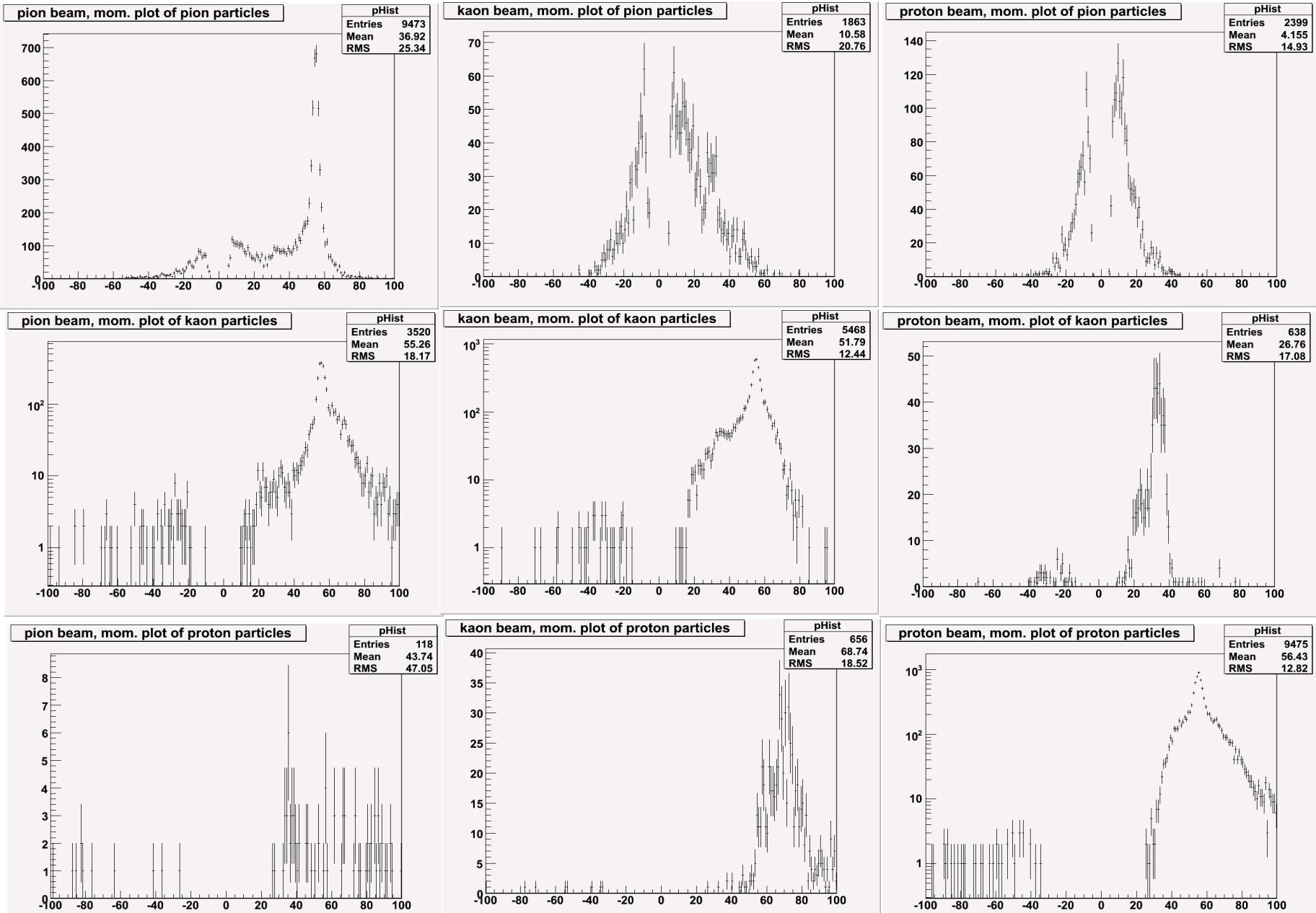
For +59 GeV/c beam hitting Liquid Hydrogen target,
all the particles produced have the following distribution:



This can be broken down into beam types:



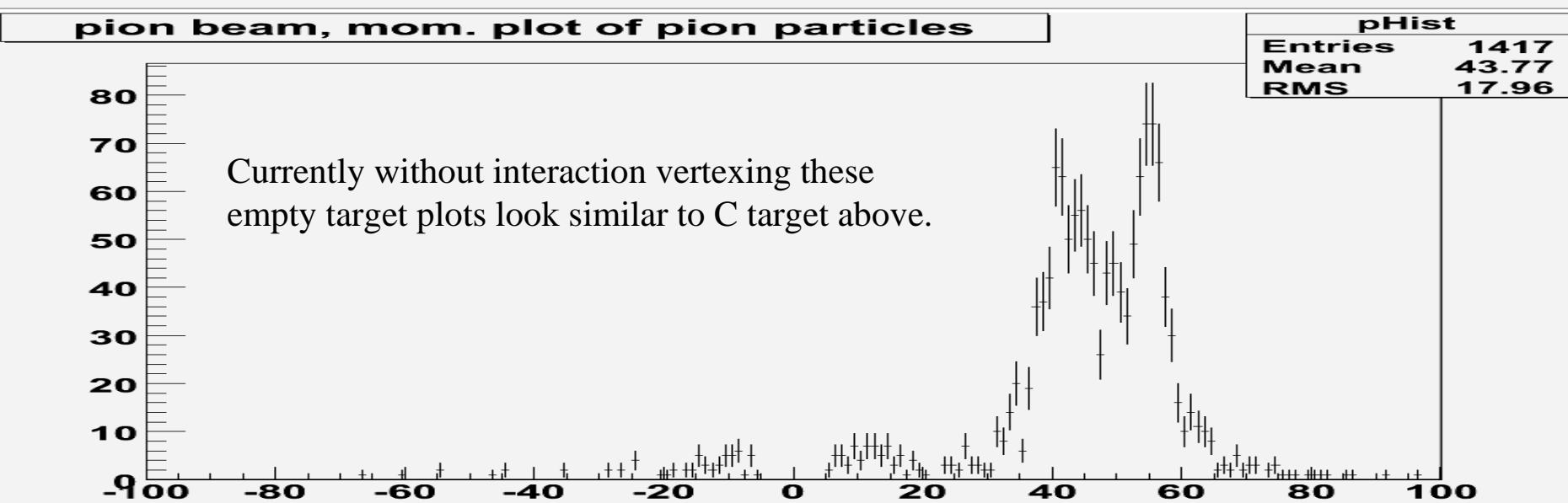
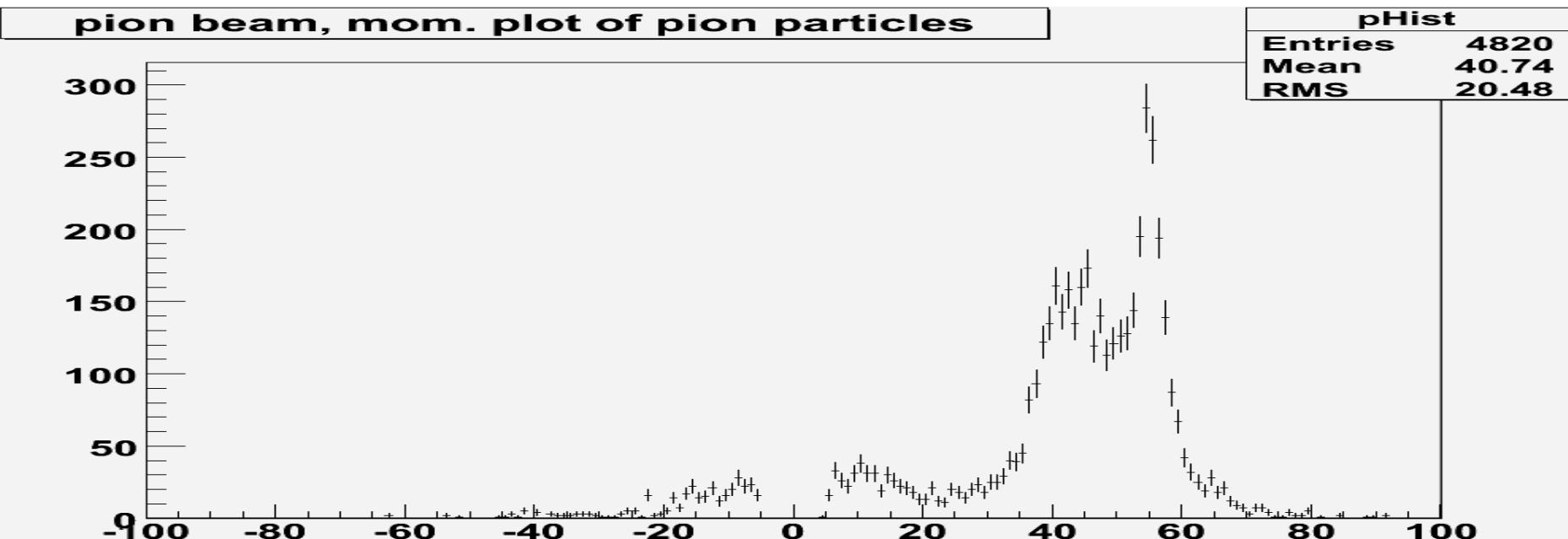
Using PID of produced particle, only RICH working right now, we have:



Towards true physics CS plots:

- Need to scale these plots for:
 - true prescales
 - interaction trigger inefficiencies
- When combined with empty target runs also scaled to prescales and trigger efficiencies then subtracted off.
- Corrected for MC acceptance which is a bin-by-bin adjustment.
- This would then give our first preliminary physics plots that would need systematic errors understood well enough to defend.

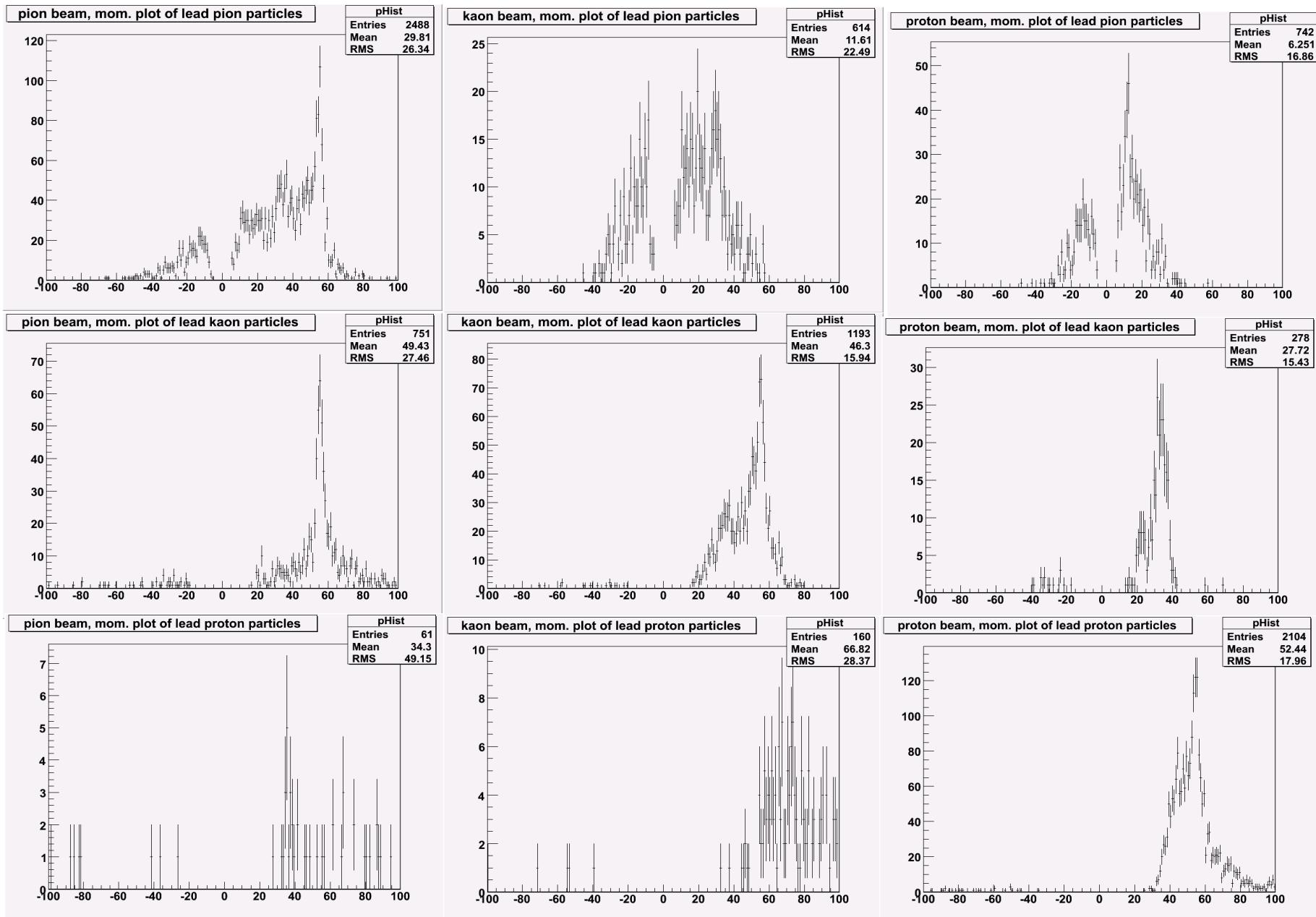
Thin Carbon target data top, and Empty target bottom for +59 GeV/c:



Physics tree branches to develop:

- All produced particles
- Leading particle
- Elastic Scattering
- Inelastic Scattering
- Associate Production Cross Section
- etc.....

Leading particle as ID by RICH in an event for different beams:



Conclusion:

- Working with data to see physics plots started, but still a long way to go to preliminary physics.
- It was nice that we could see some peaks attributable to physics process, but at the same time see some problems in the distributions
- All problems will be improved or even eliminated once vertexing, improved tracking, full PID etc...
- Plan to give at April 8 MIPP collaboration meeting a 30 minute talk going over all the steps of a cross section.