BigBite Analysis

BB Shower Calibration, BB Cer Pion Rejection and Detection Efficency

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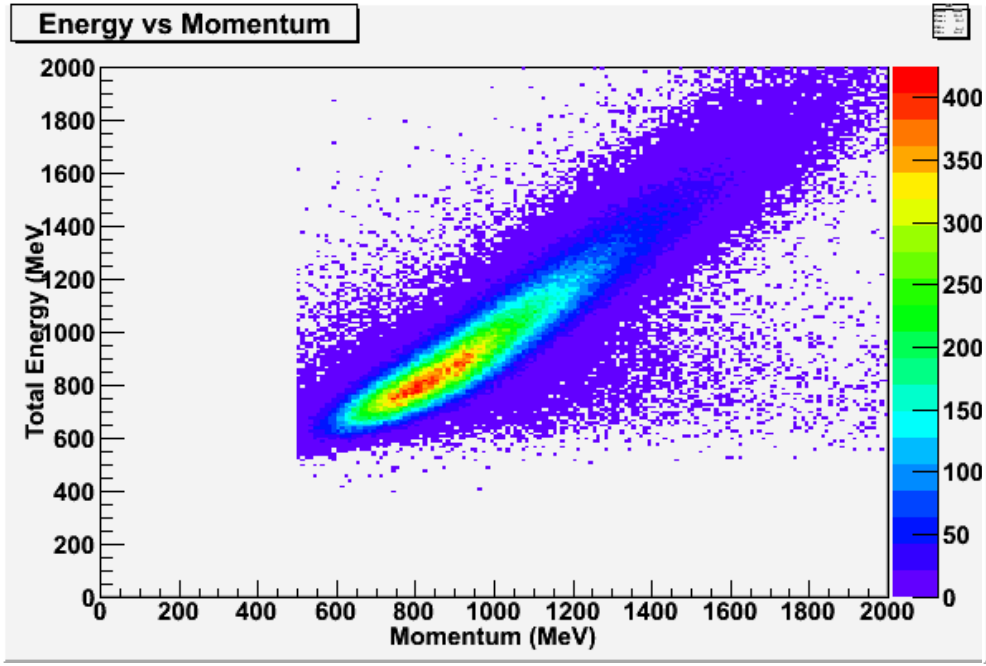
Outline

4-pass Shower Calibration: Energy and Momentum

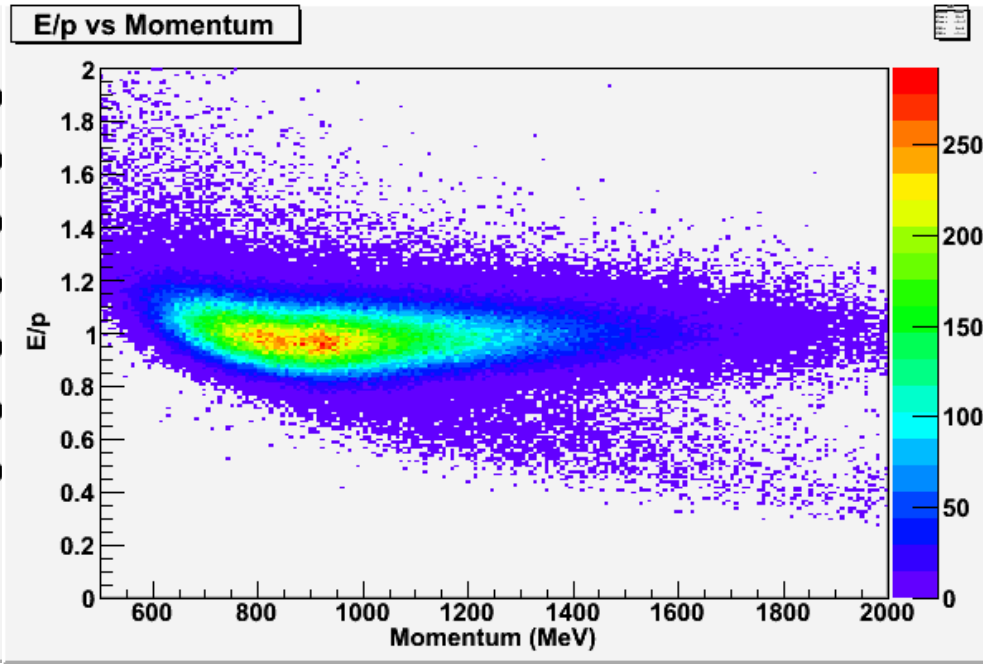
- Added loose E/p cut to calibration script
- Fixed the preshower peds

4-pass Shower Calibration: Energy and Momentum

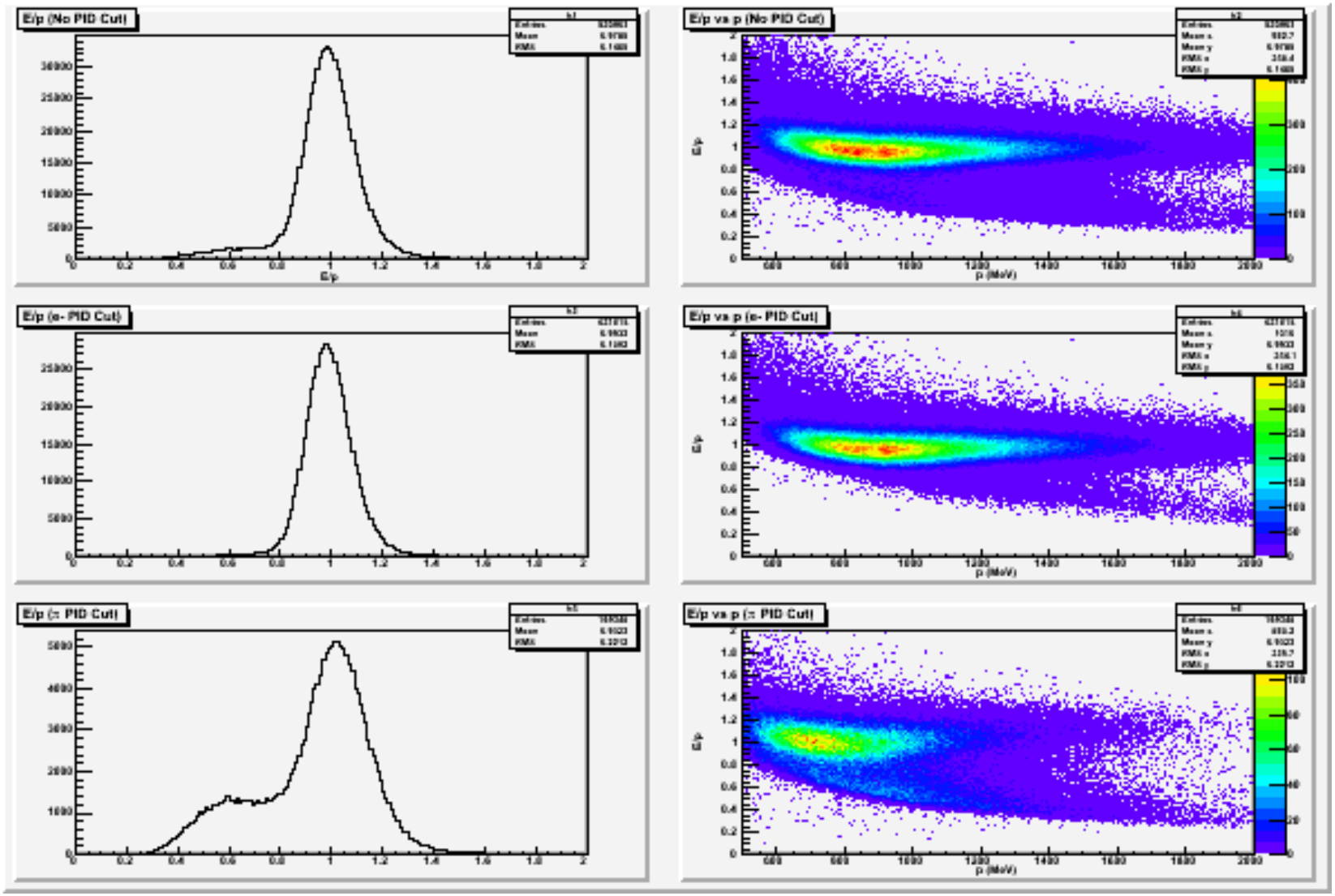
Energy and Momentum



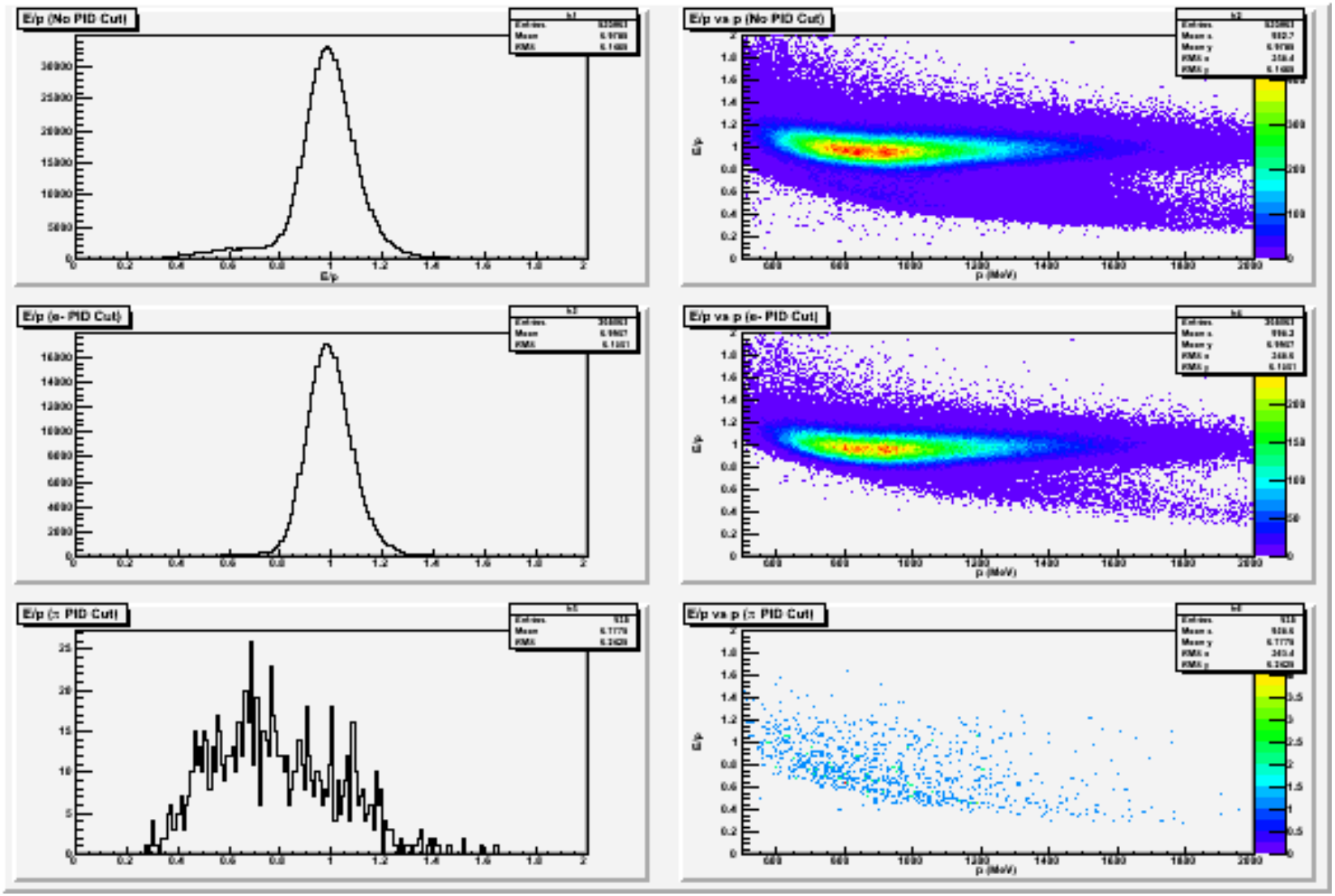
E/p and momentum



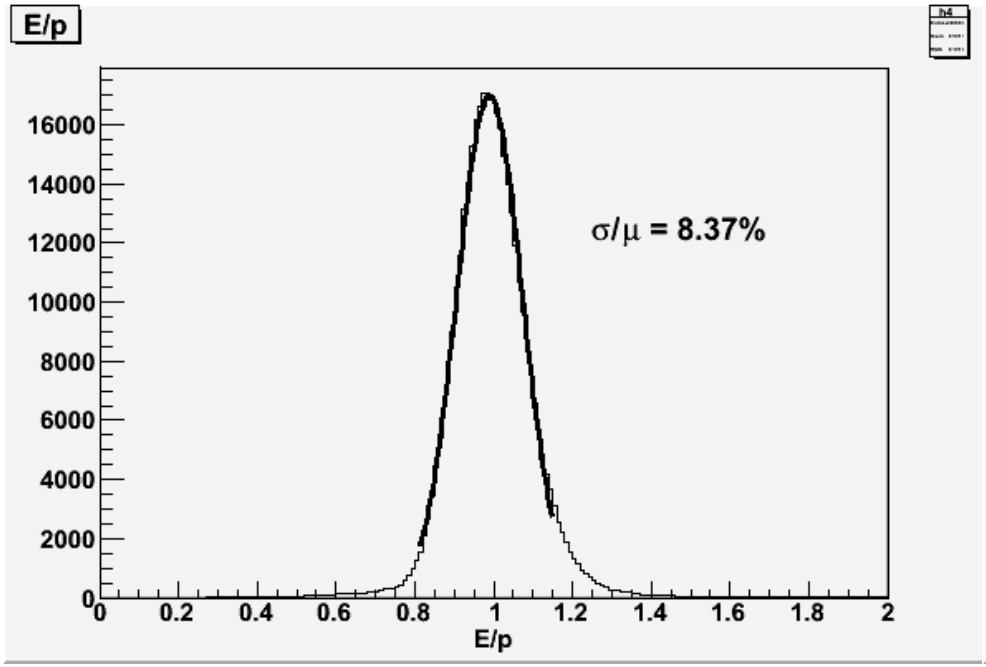
4-Pass Shower Calibration: BB No Cerenkov PID

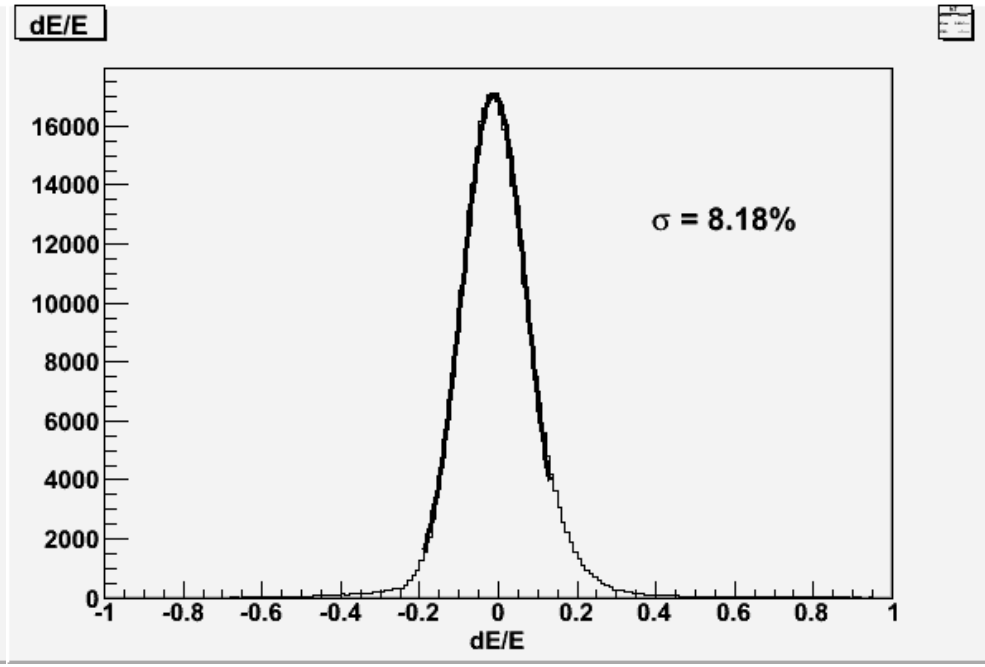


4-Pass Shower Calibration: With BB Cerenkov PID



4-Pass Shower Calibration: Resolutions

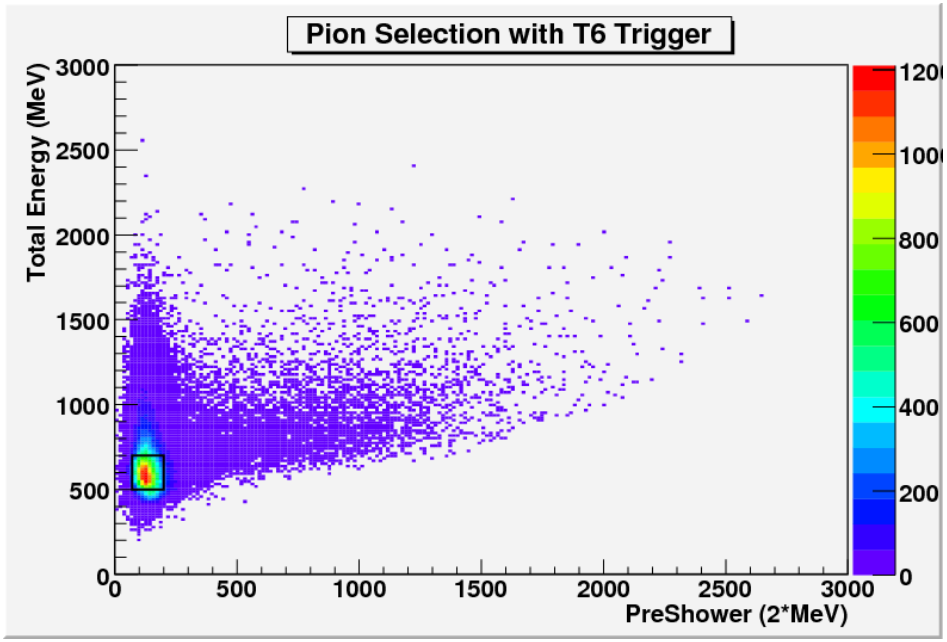




Pion Rejection Procedure

- Select pions and see how many show up in E/p
- Make a Čerenkov cut and see how many are left in E/p
- Pion rejection is then the ratio of pions selected to the pions remaining after Čerenkov cut.
- I treated each Čerenkov side separately
- I then found the rejection factor of each mirror and averaged the rejection factors for each side together

Photo Electron Cut Study: Pion Selection



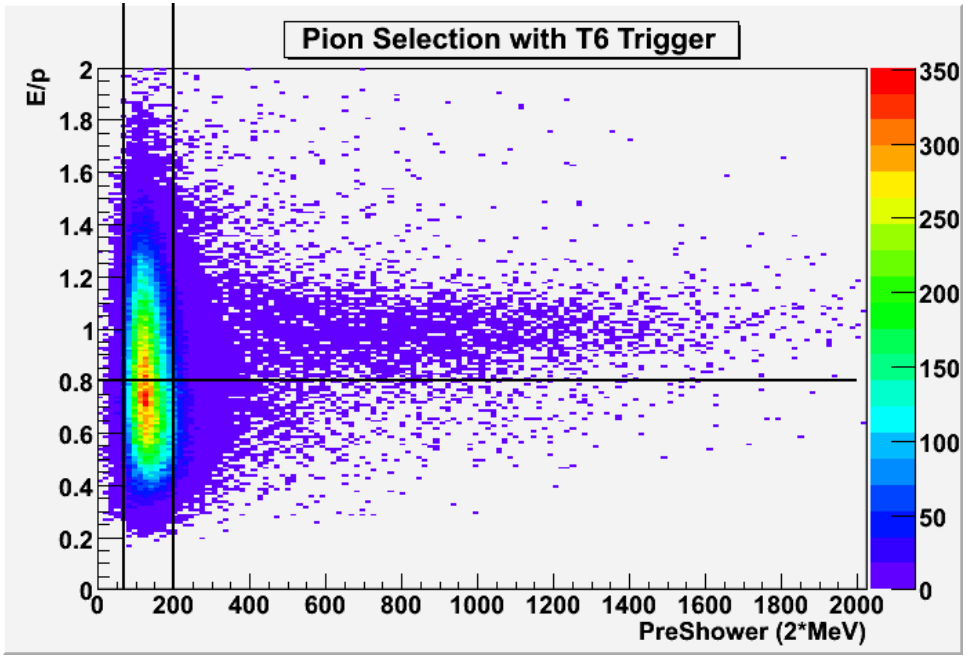
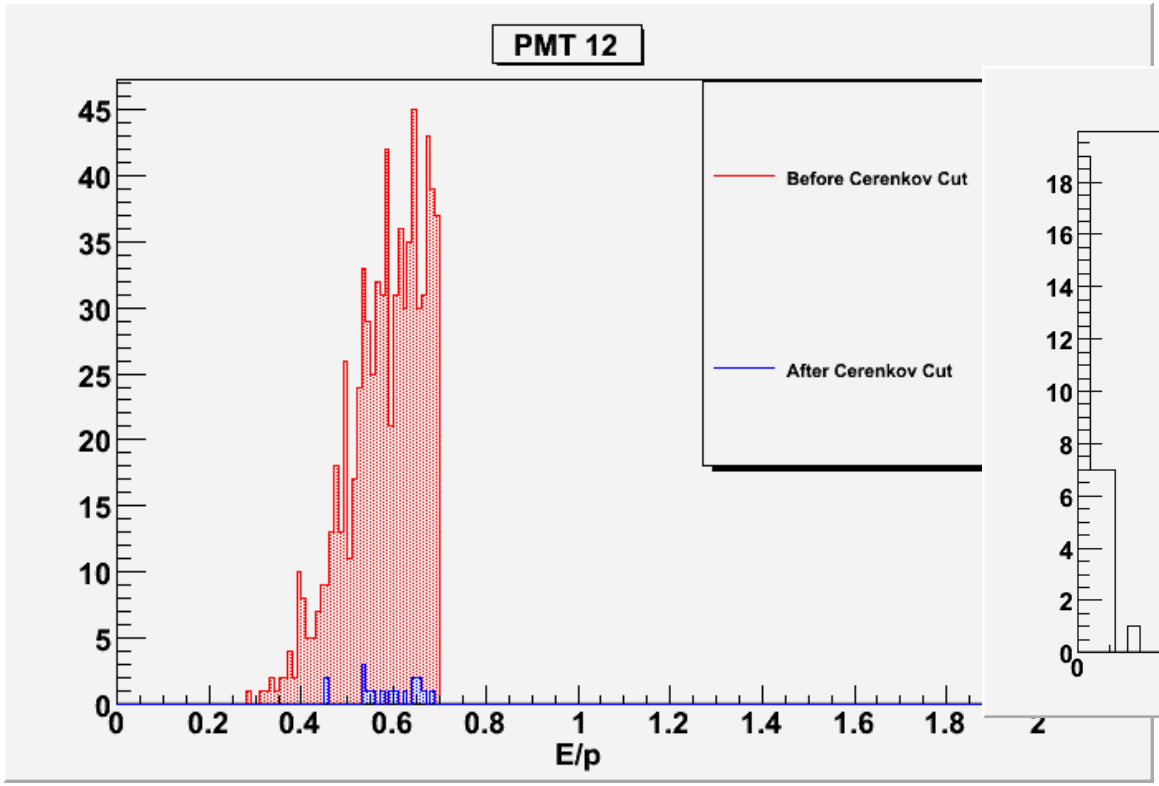


Photo Electron Cut Study: Sample Plots



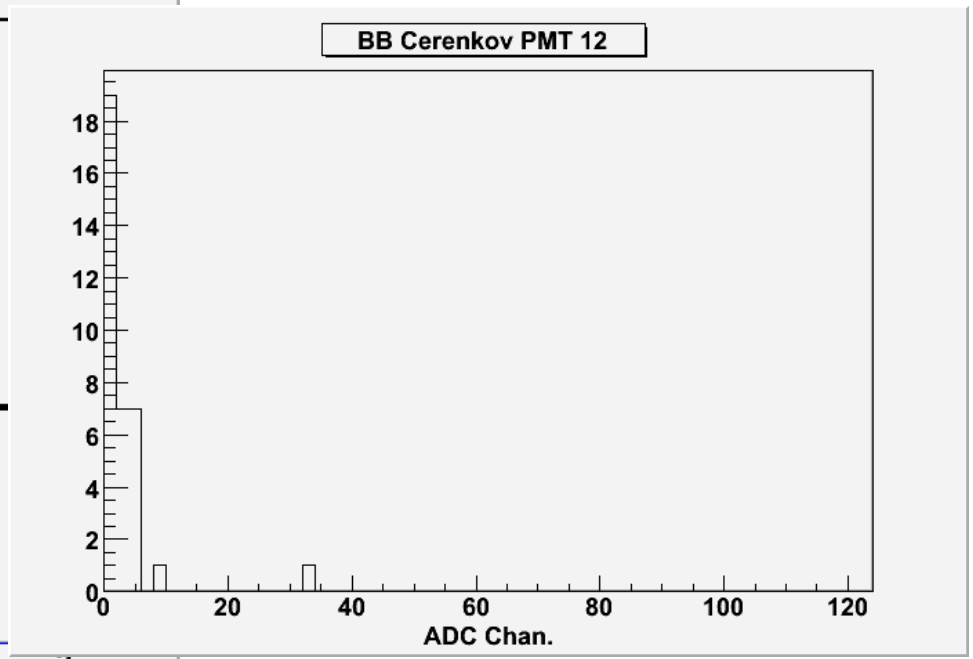
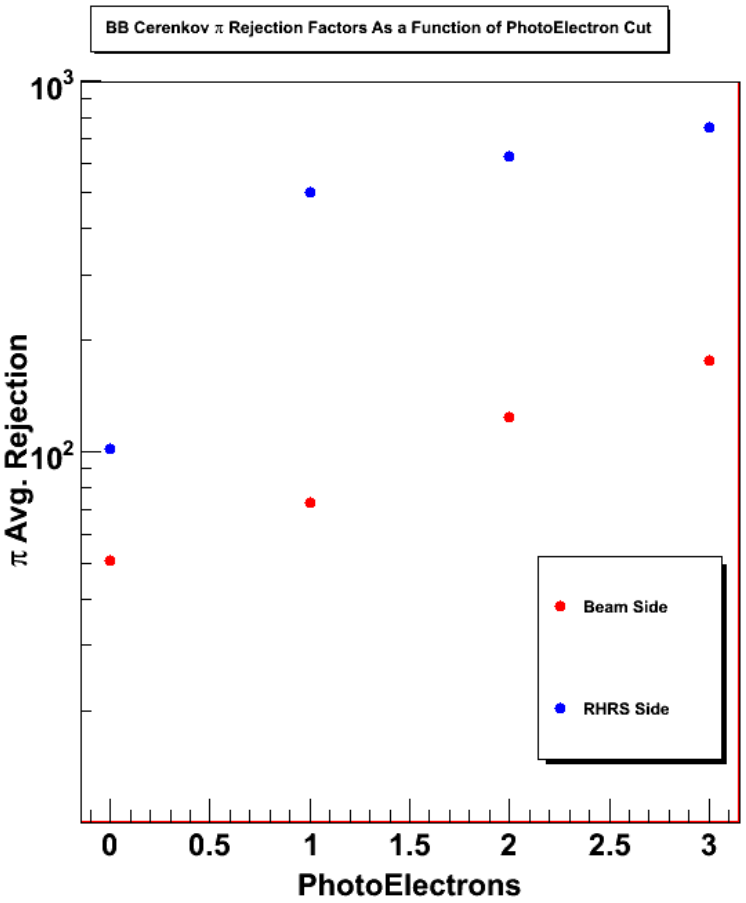
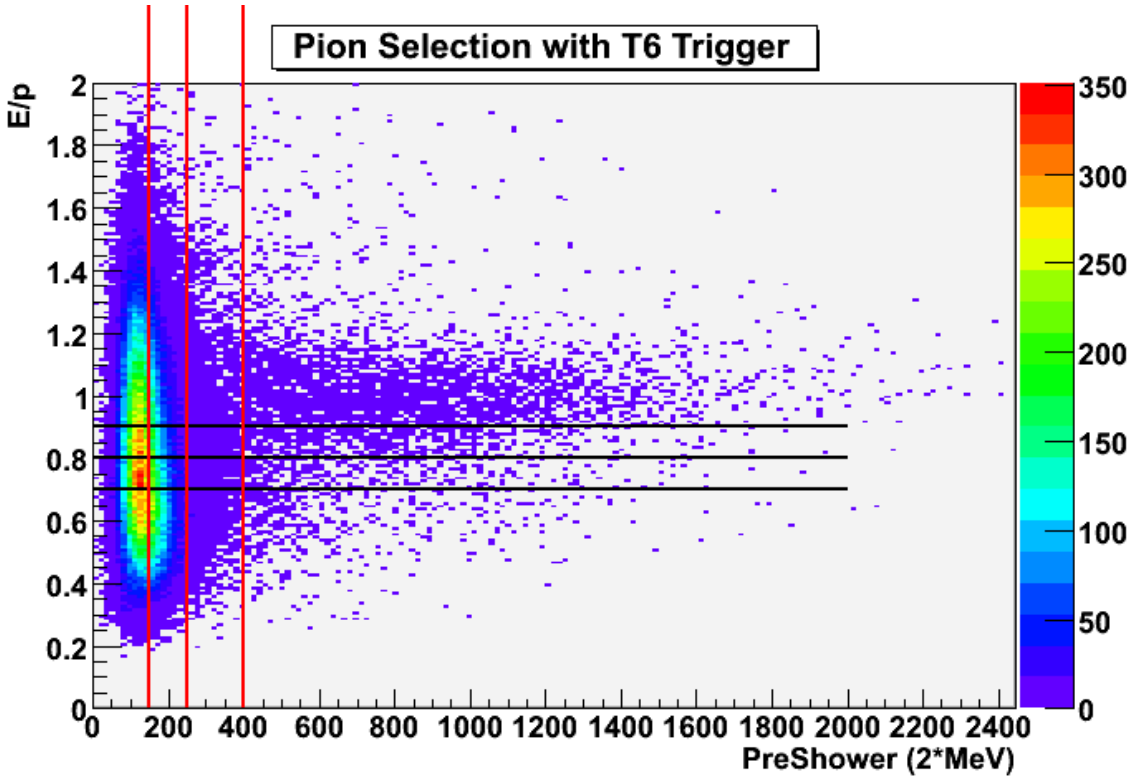


Photo Electron Cut Study: Results

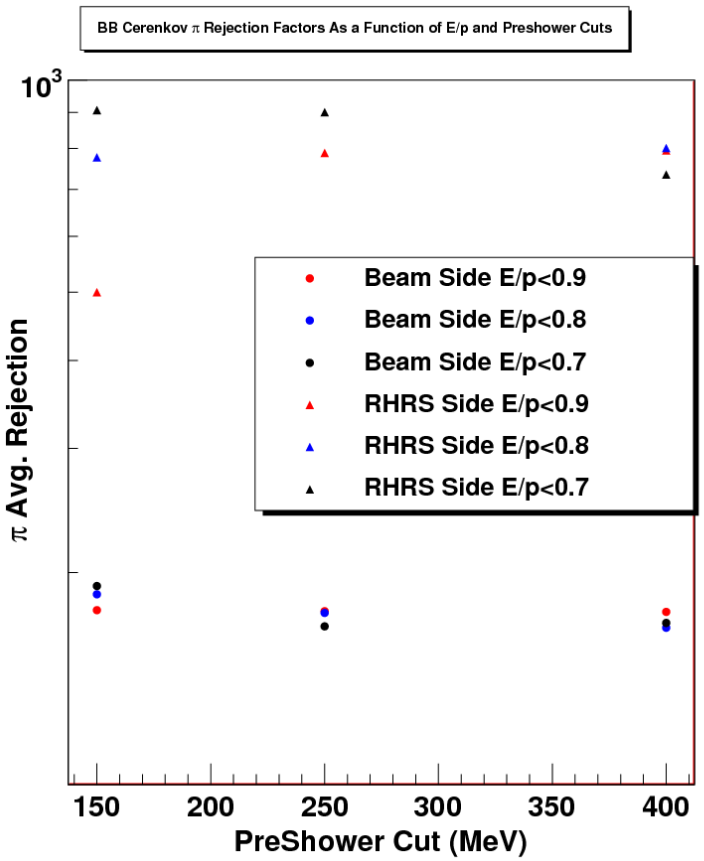


- 3 photo-electrons seems best
- This gives the beam-line side a π rejection of ~ 200
- This gives the rhrs-line side a π rejection of ~ 800

E/p and Preshower Cut Study: Pion Selection



E/p and Preshower Cut Study: Results

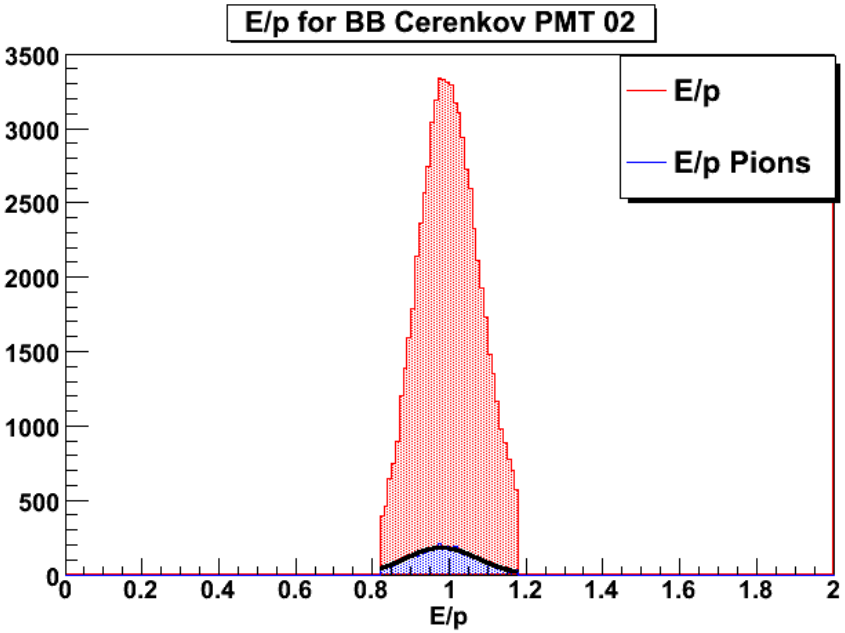


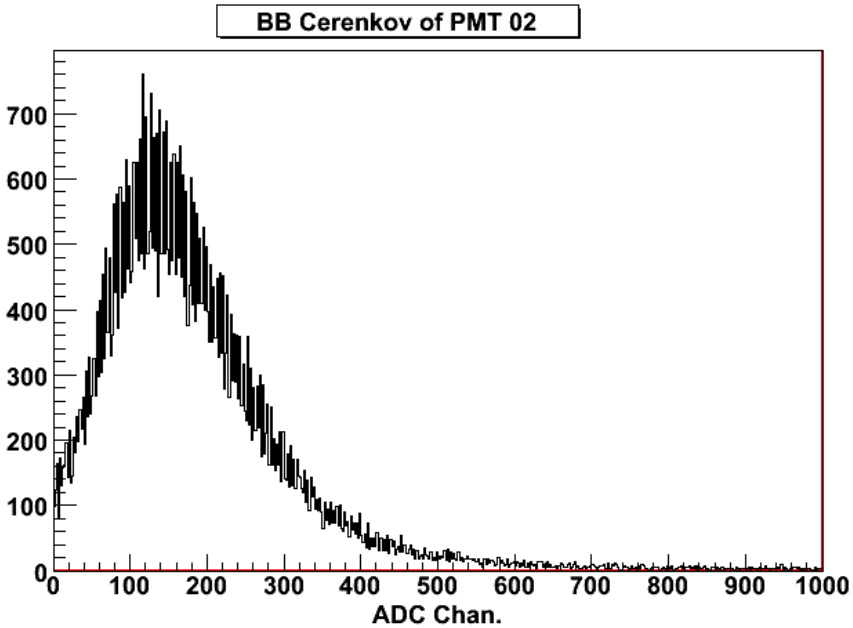
- 0.8 E/p and preshower less than 250 seems best
- This gives the beam-line side a π rejection of ~ 200
- This gives the rhrs-line side a π rejection of ~ 900

Electron Detection Efficiency

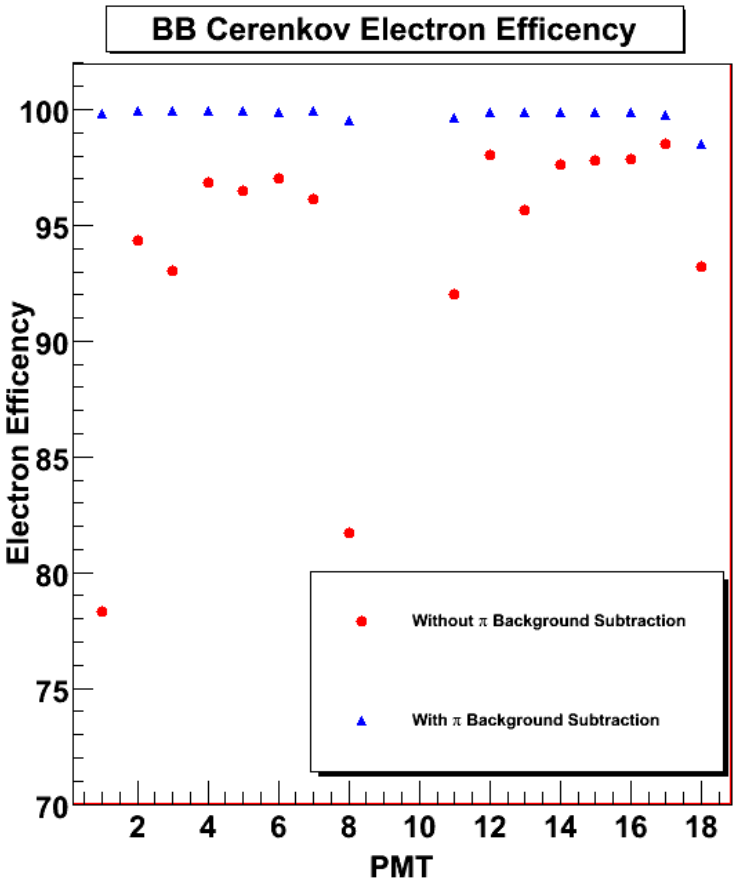
- Select electrons and see how many show up in E/p
- Make a Čerenkov ADC cut and see how many are left in E/p
- For Detection efficiency Čerenkov ADC cut is greater than 0.
- Detection efficiency is than the ratio of the events in the E/p and the events in the Čerenkov
- A pion background was also subtracted from the E/p
- This was done by fitting the events that failed to fire the Čenerkov and subtract that number from the E/p events
- Had to use T2 trigger, not enough electron events with the T6

Electron Detection Efficiency: Sample Plots





Electron Detection Efficiency: Results



- Detection efficiencies look good
- With pion background subtraction from E/p, efficiencies are $\sim 99\%$

For Next week

- Look at BB Čerenkov electron efficiency as function of photoelectrons cuts
- Have first draft of Hall A Collaboration talk out tomorrow