

# *LHRS Analysis for $d_2^n$*

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D. Flay<sup>1</sup>

*Subatomic Physics Group*  
*Temple University Physics Department*



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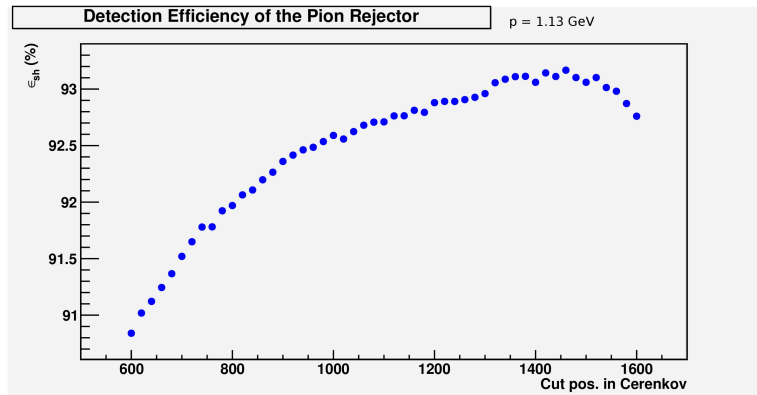
# Outline

- 1 Efficiency of the Pion Rejector
  - Cerenkov Cut Efficiency
- 2 Efficiency of the Cerenkov
  - Selection of Good Electrons
  - Graphical Cuts
  - Preliminary Results
- 3 Summary

# Pion Rejector $e^-$ Detection Efficiency

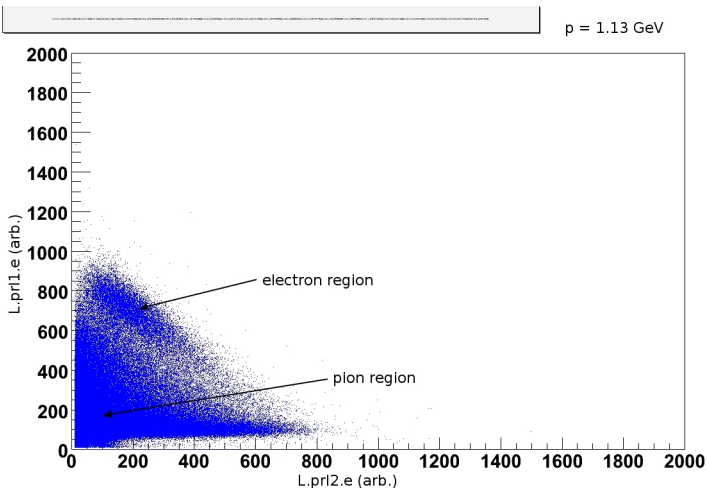
Finer Binning: Cerenkov Cut Efficiency

- Finer binning of the efficiency of the PR as a function of Cerenkov cut



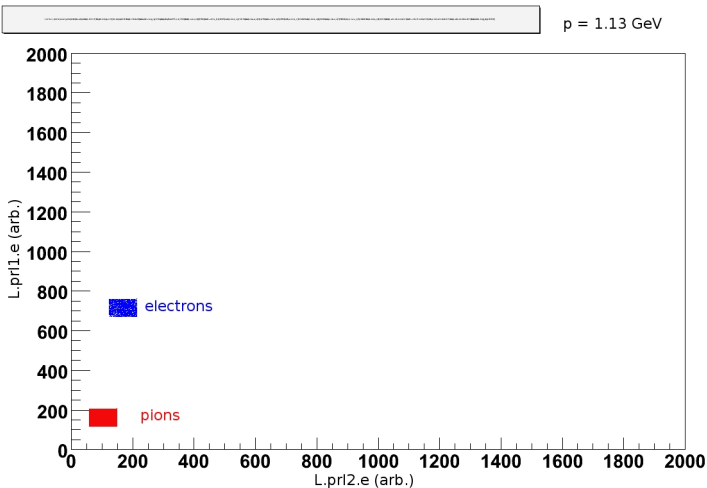
# Cerenkov $e^-$ Detection Efficiency (1)

Graphical Cuts: Selecting  $e^-$ ,  $\pi$



# Cerenkov $e^-$ Detection Efficiency (2)

Graphical Cuts: Selecting  $e^-$ ,  $\pi$



# Cerenkov $e^-$ Detection Efficiency (3)

Application of Graphical Cuts

- Application of the graphical cut for  $e^-$  to Cerenkov sum:

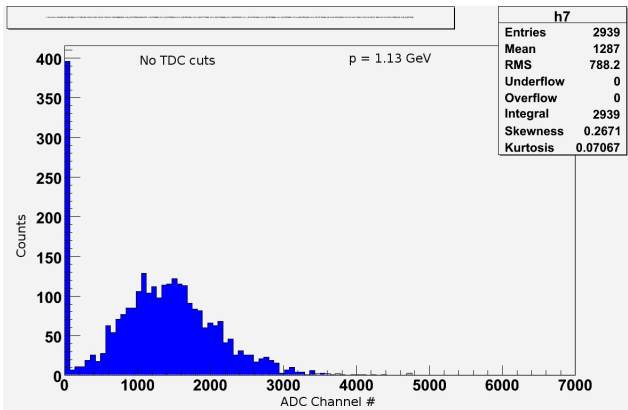


Figure: Cerenkov sum spectrum with graphical cut and cuts that define good events (used to produce shower plot).  
 $\epsilon = 1$  (?)

# Cerenkov $e^-$ Detection Efficiency (4)

Application of Graphical Cuts (With TDC Cut)

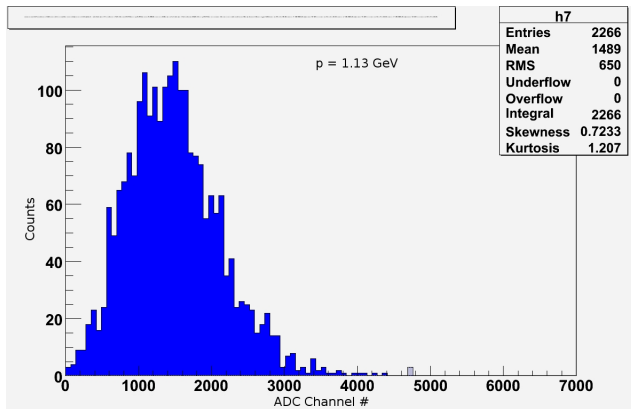


Figure: Cerenkov sum spectrum with cuts from previous slide and TDC cuts.  $\epsilon = 0.77$  (?)

# Cerenkov $e^-$ Detection Efficiency (4)

Preliminary Results

- To look at  $e^-$  detection efficiency, choose the  $e^-$  graphical cut
- Defining the detection efficiency of the Cerenkov as  $\epsilon_{\text{cer}} = \frac{\eta_{\text{cer}}}{\eta_{\text{sh}}}$ , we obtain  $\epsilon_{\text{cer}} = 77\%$  (!)
  - There must be some issue in the method of determination of a clean electron sample in the PR
  - Why all the entries in Cerenkov spectrum at low ADC channels?



## Summary

- Seems that the efficiency of the PR is  $\sim 93\%$ 
  - Coupled with a good Cerenkov cut
  - Best place for Cerenkov cut:  $\sim 1300$  channels (?)
- Efficiency of Cerenkov  $\sim 77\%$ 
  - Maybe a check on  $e^-$  selection should be done?

## What's Next?

- Figure out issue(s) with calculation of efficiencies
- Error bars on efficiencies?
- Fix analyzer issues:
  - Graphical cuts do not work on my machine
    - Possibly an issue with my version of ROOT (v. 5.22)?
  - Replay doesn't recognize my database files to implement my calibration coefficients