

Hall A DVCS Collaboration Meeting
Old Dominion University
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Electron (Cherenkov) Trigger Efficiency 2010 DVCS run

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M. Mazouz: <https://hallaweb.jlab.org/dvcslog/DVCS2/57>

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C.E.H.: <https://hallaweb.jlab.org/dvcslog/DVCS2/47>

Cerenkov Trigger Signal

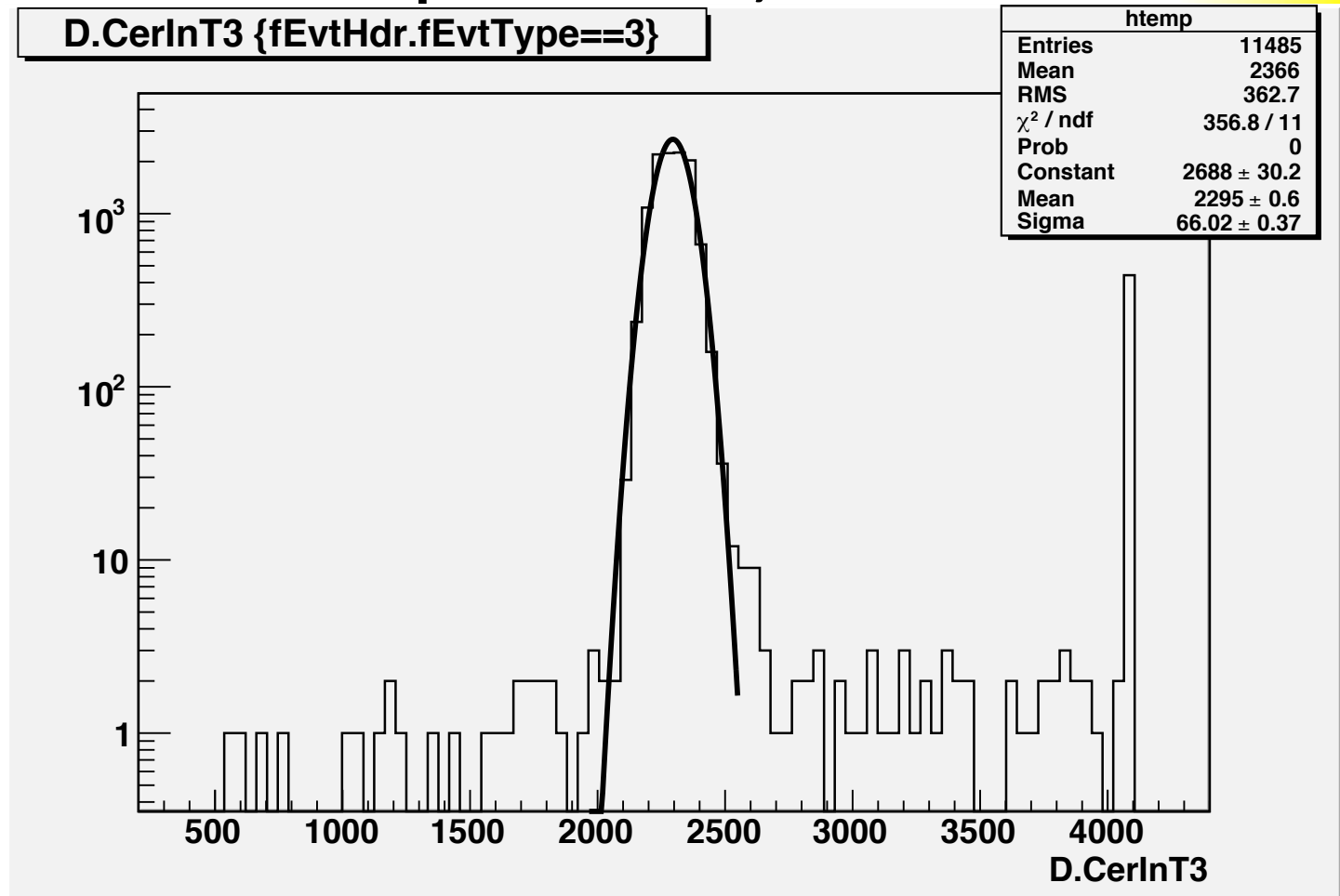
- Discriminator on analog sum of 10 PMT signals
 - At start of run, threshold = 200 mV
 - After run 8205, 1 Nov 2010 14:00, lower Cherenkov threshold to 50 mV
- Study of Cherenkov efficiency before and after adjustment
 - Use 'Normalization' runs, HRS-L singles S1&S2 trigger, study Cherenkov response.

Run 8161 Analysis Cuts

- Single track
- $|x| < 0.8$ & $|y| < 0.2$ & $|\phi| < 0.05$
- $|z_{\text{vertex}}| < 7\text{cm}$ & $|\theta_{\text{tg}}| < 0.1$ & $|\phi_{\text{tg}}| < 0.05$ & $|\delta p/p| < 5\%$

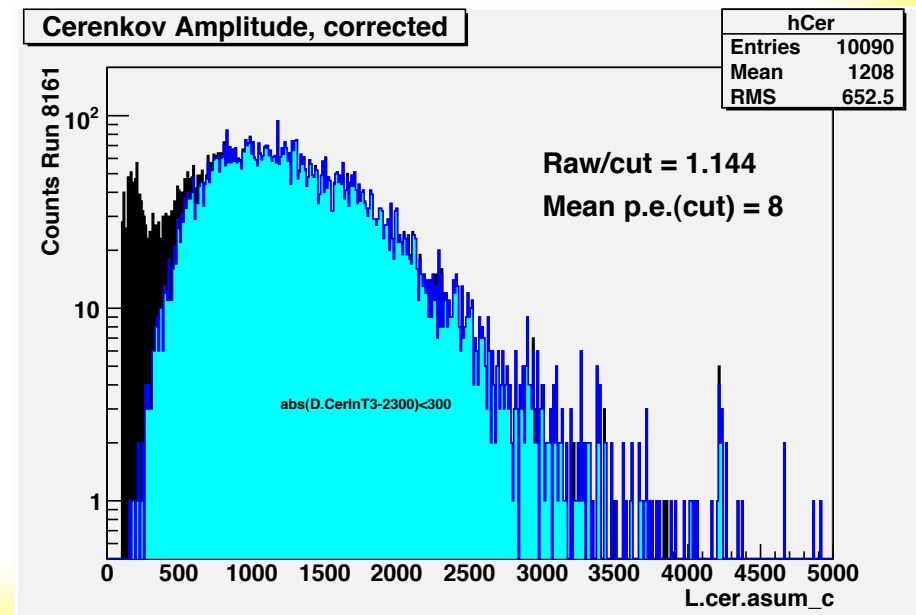
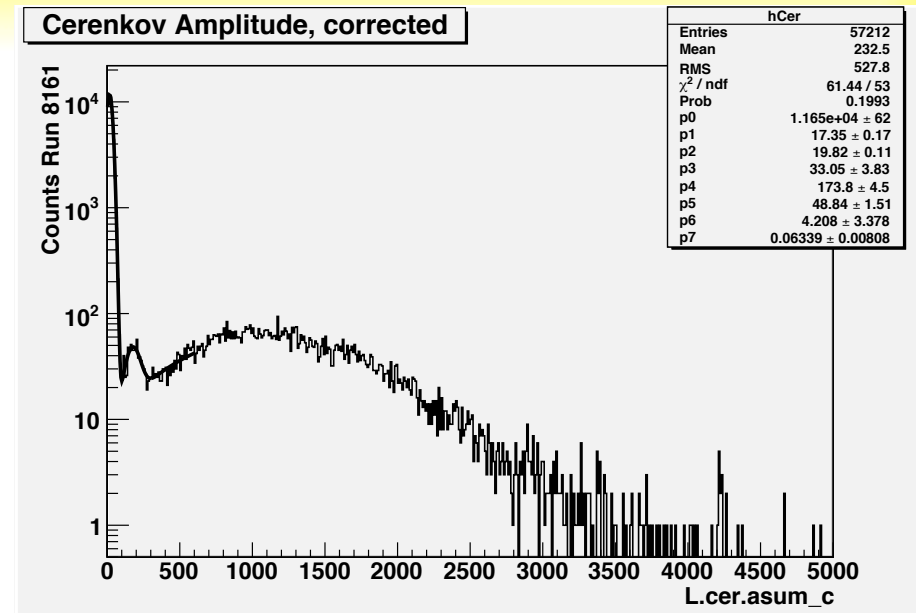
Cerenkov Time Spectrum, T3 events

- 50 ps/channel
- All events in spectrum passed discriminator



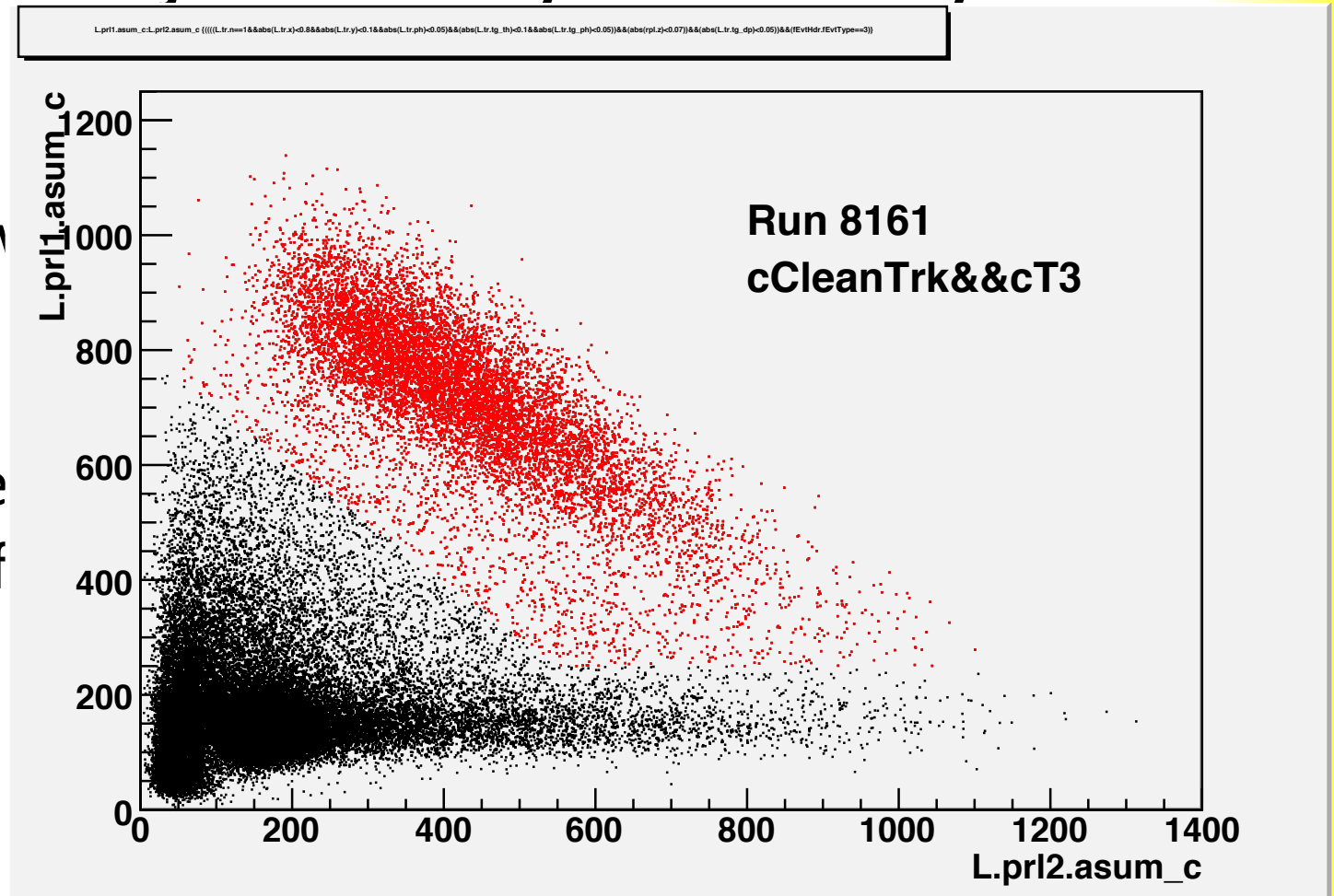
Unbiased Cherenkov Amplitude Spectrum

- Pedestal fit at ch. 17
- Single photo-electron peak at ch. 174
- Mean ≈ 8 p.e.
- Too many events in 1 p.e. peak for poisson statistics
 - δ -rays from pions
- Naïve inefficiency of 14% exaggerated by pion contamination



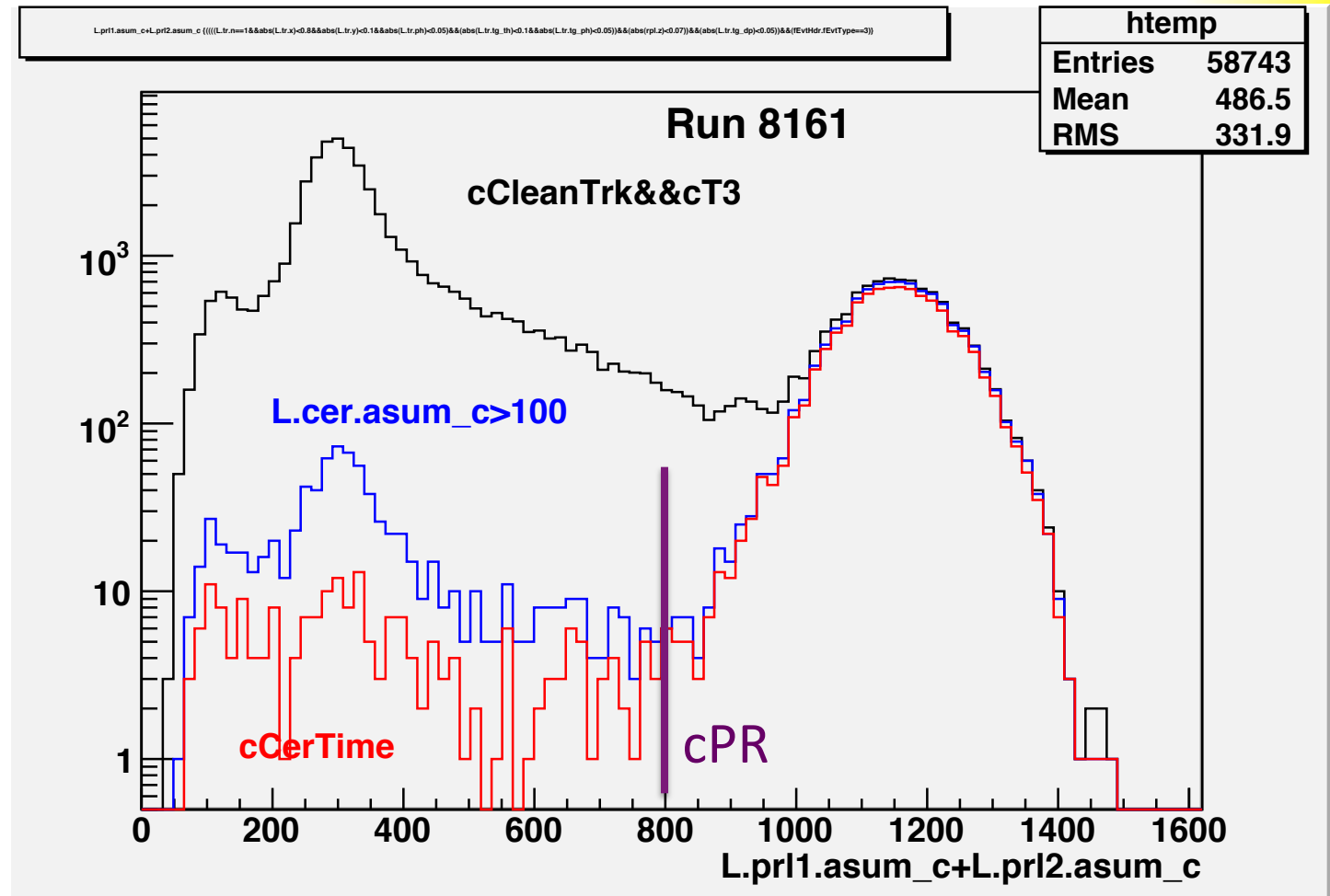
Pion Rejector: Layer 1 vs Layer 2

- Events in red show my cut, with variable value of sum



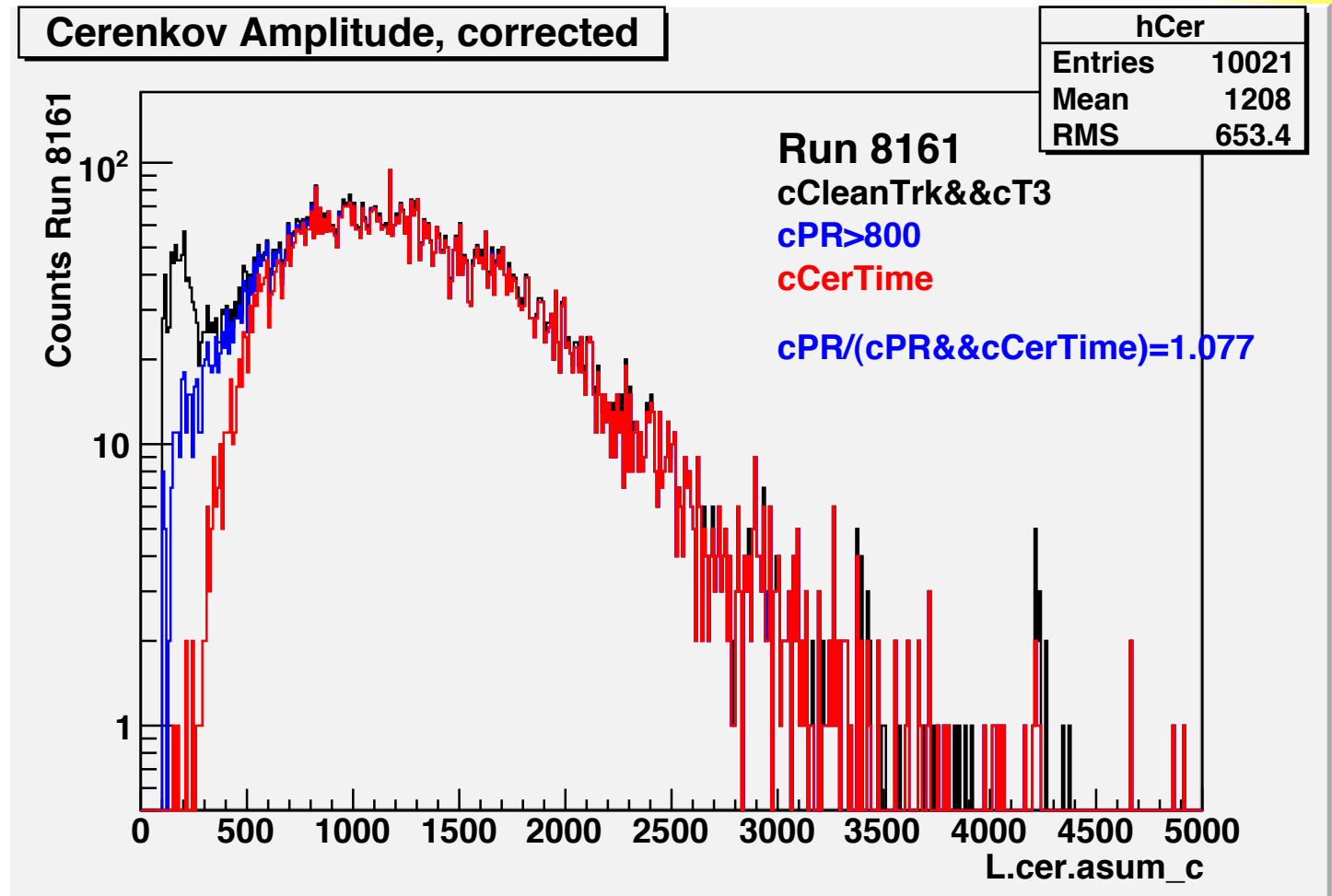
Pion Rejector: Layer1 + Layer2

- Good events
- & not pedestal in Cherenkov
- & Cherenkov TDC in time window



Cherenkov Yield with Pion Rejector Cut (cPR)

- Good Events
- & Pion Rejector Sum > 800
- & Cerenkov Time
- 1/1.077 efficiency
- 7.2% in-efficiency



Cherenkov Efficiency at 50mV threshold

- Run 8213
 - Inefficiency 1.2%
- Run 8509
 - Inefficiency 1.0%
- Are these efficiency values, or measures of the electron/pion purity of the samples defined by PR or Cherenkov?
- Compare to M.Mazouz and M.Defurne analysis