

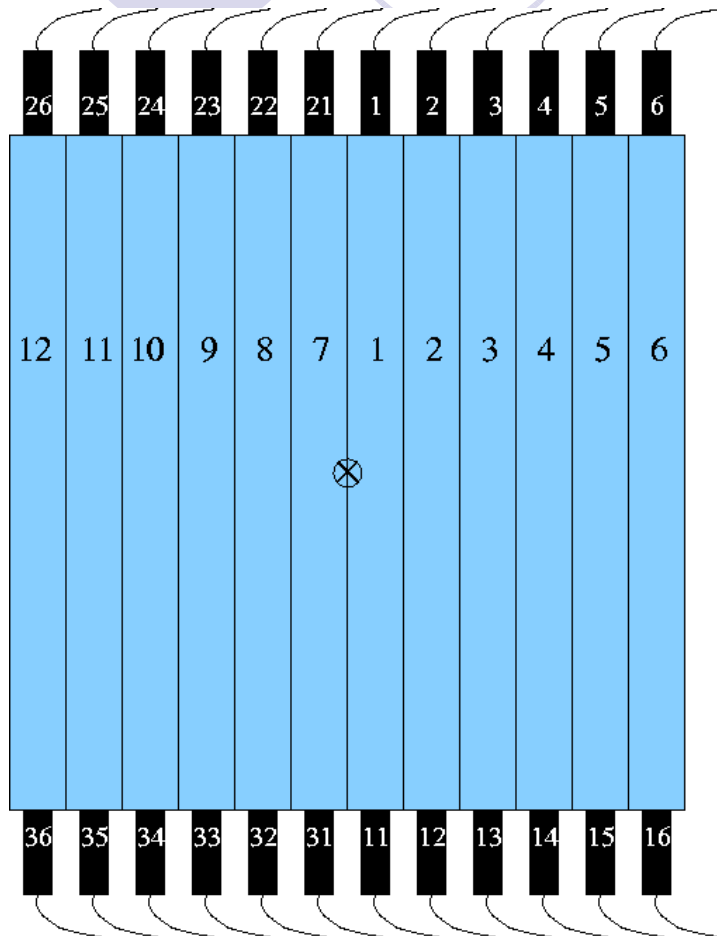


Veto Calibrations and Efficiency

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Veto Detector System



Useful information:

- Charged particle veto
- 12 scintillator paddles covering HYCAL
- Output signals going to ADCs and TDCs
- TDC threshold set at 50mV

Software banks

VETOA – raw ADC bank

VETOT – raw TDC bank

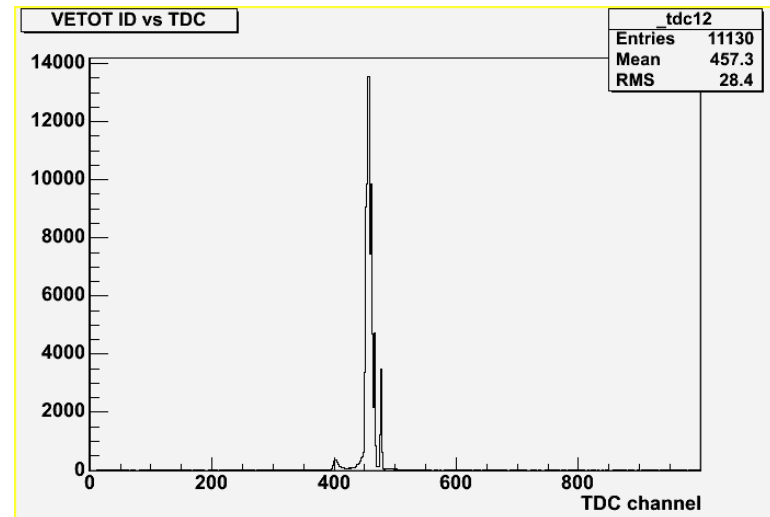
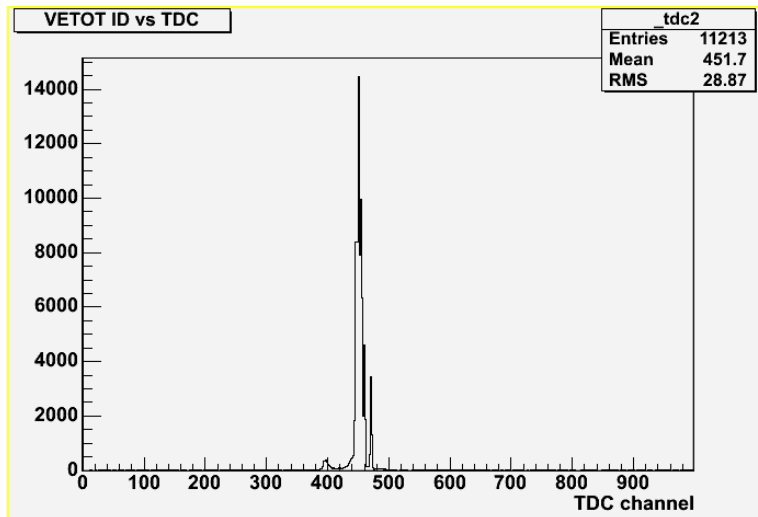
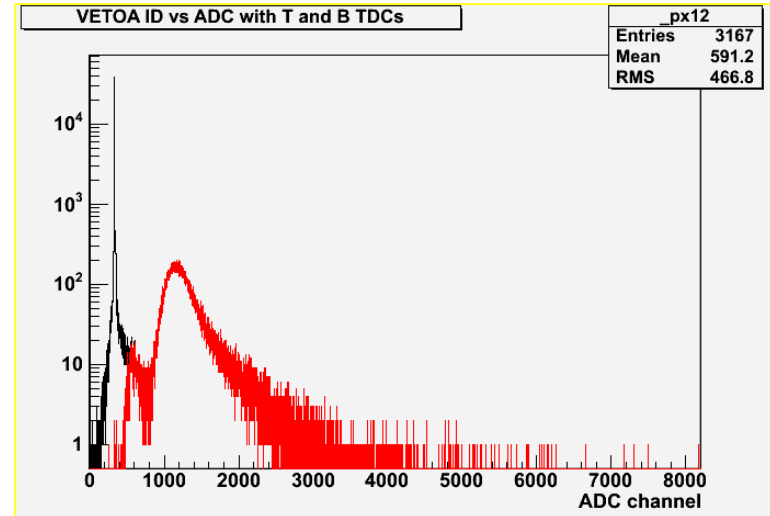
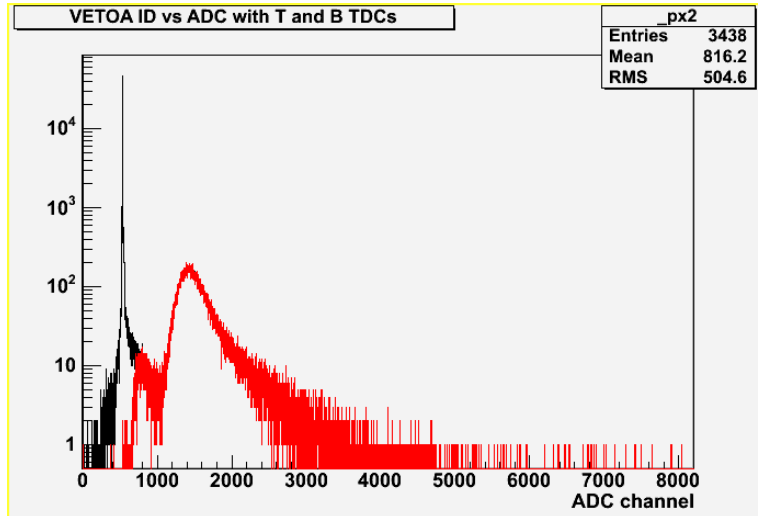
VETOHIT – reconstructed bank

Numbering scheme:

VETOA and VETOT id = numbers on pmts
VETOHIT id = numbers on scintillators

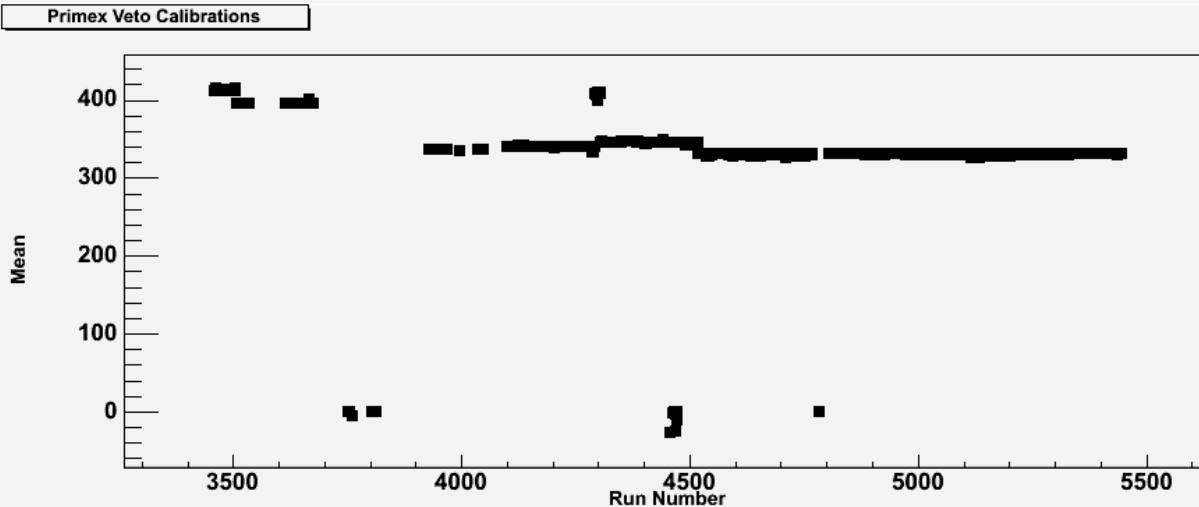
Calibrations from Pair Production

Run 4865 – Target 9Be, low PS B-field

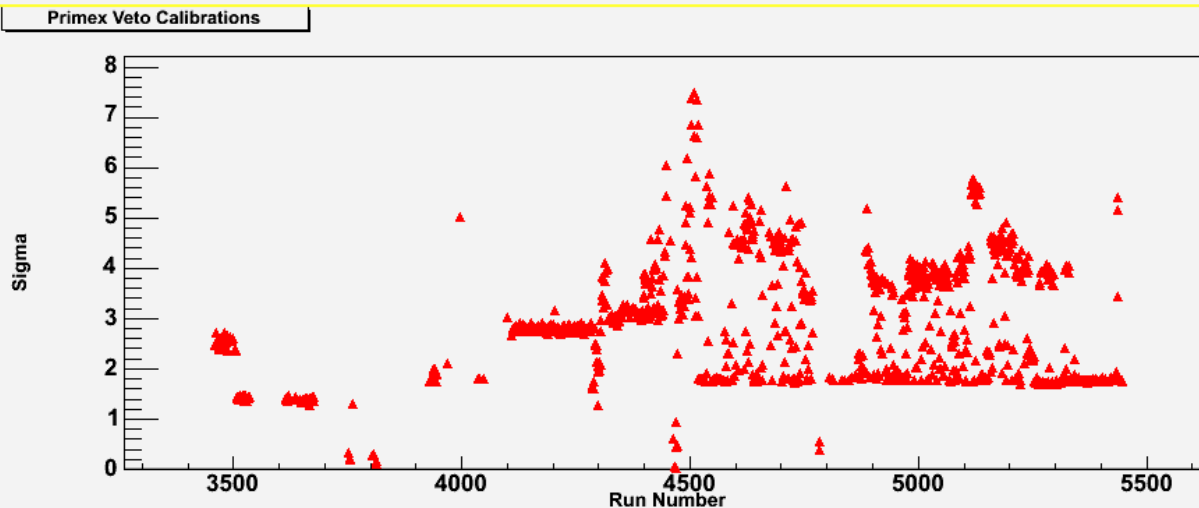


ADC Run History

Mean

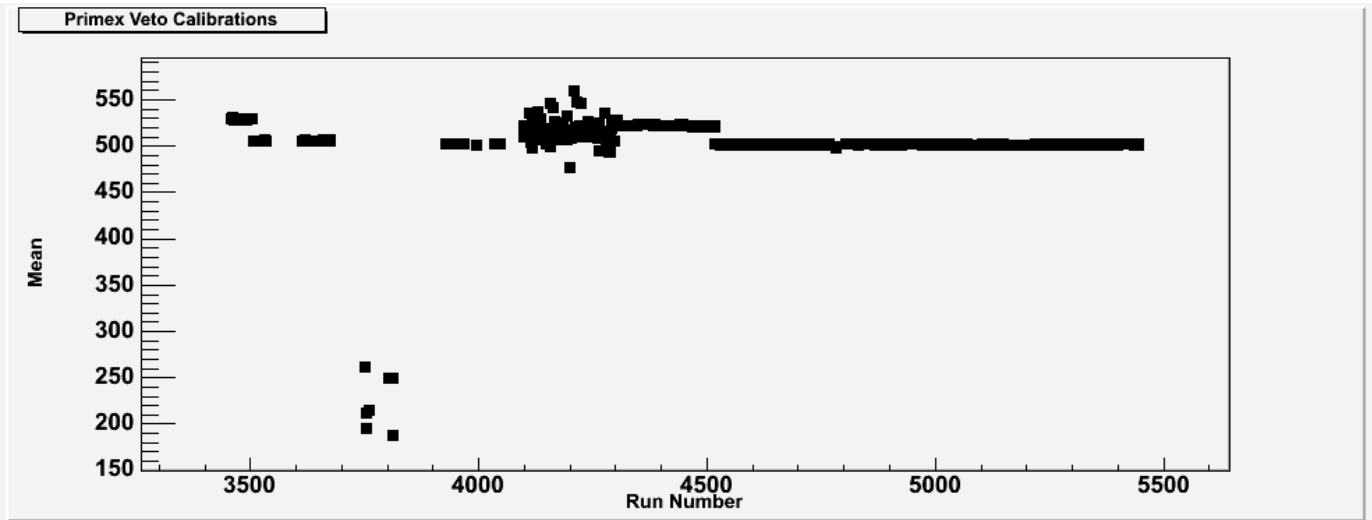


Sigma

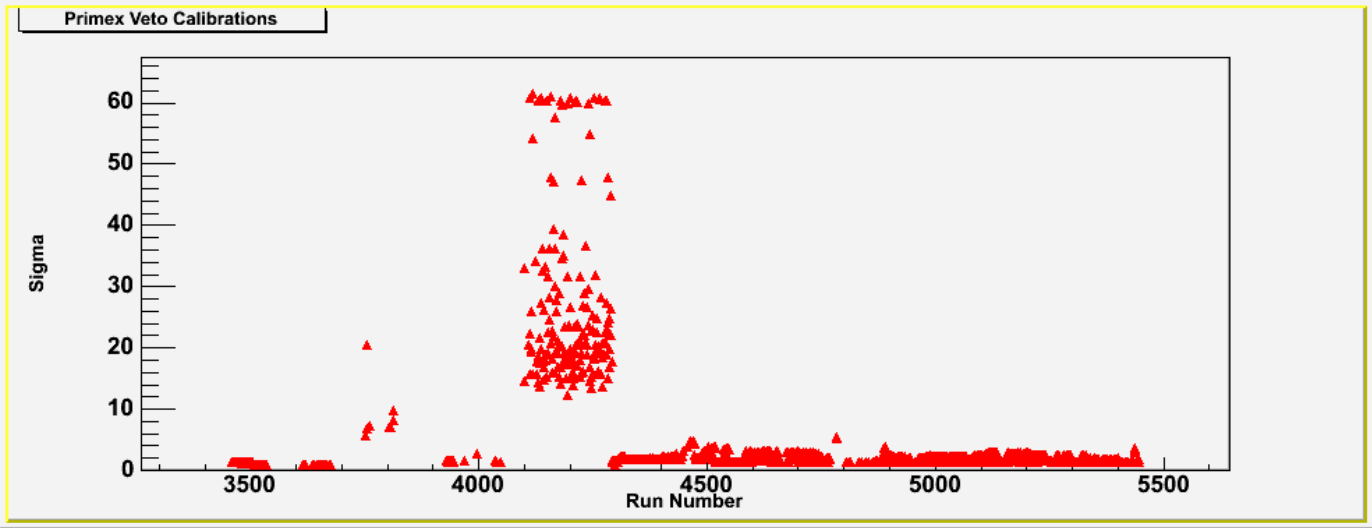


ADC Run History – Problematic Runs

Mean

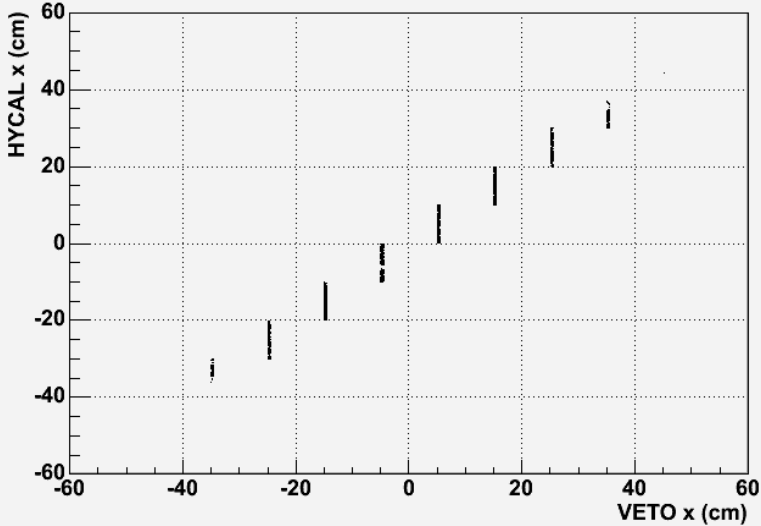


Sigma

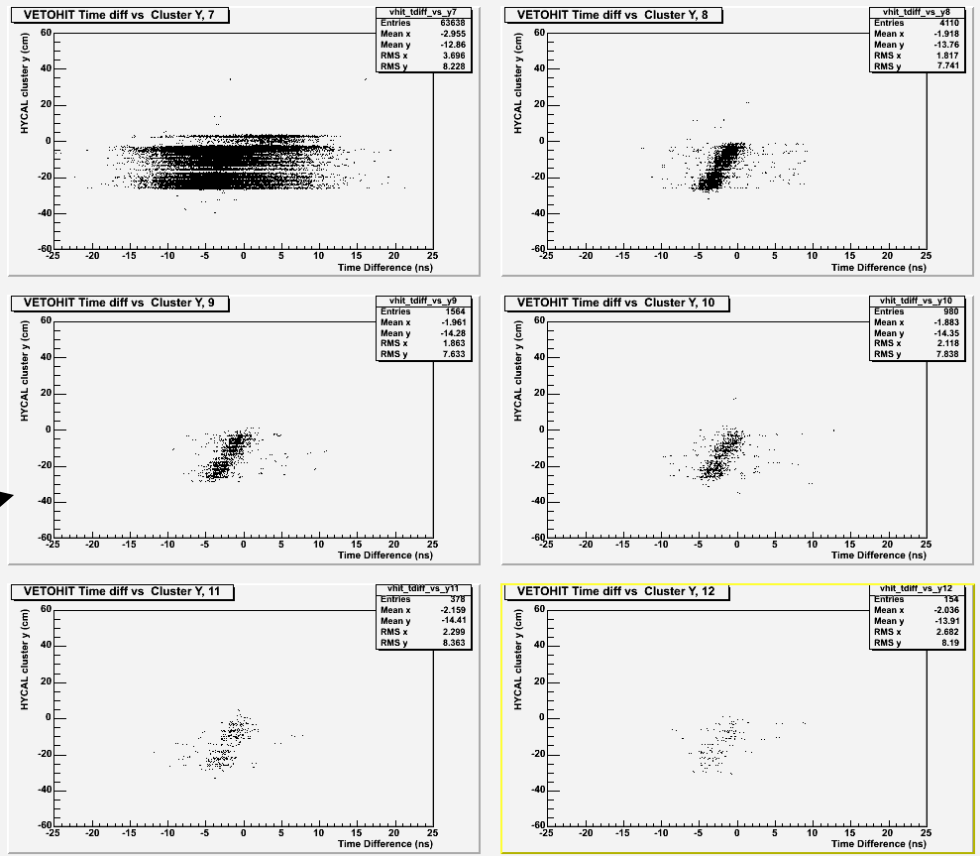


Position Calibrations

Comparison of VETO and HYCALCLUSTER x



X-position : geometrical matching



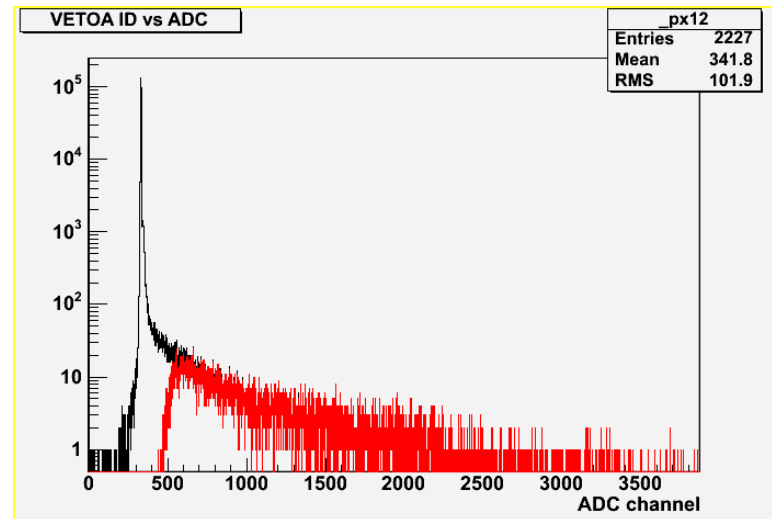
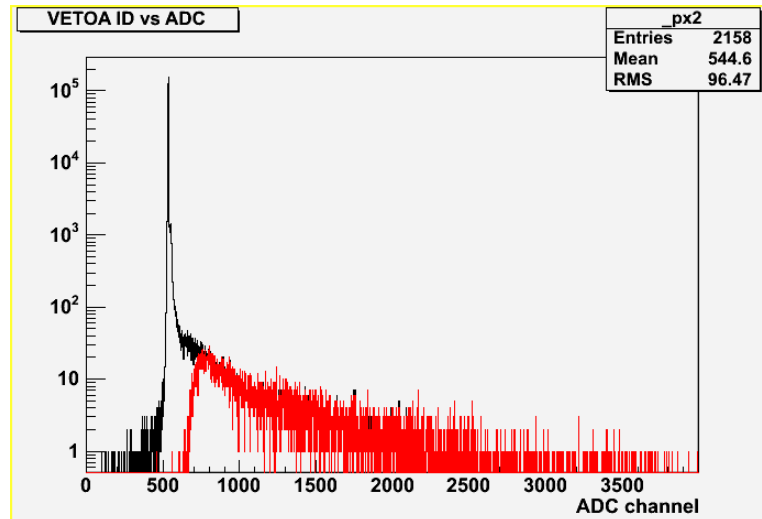
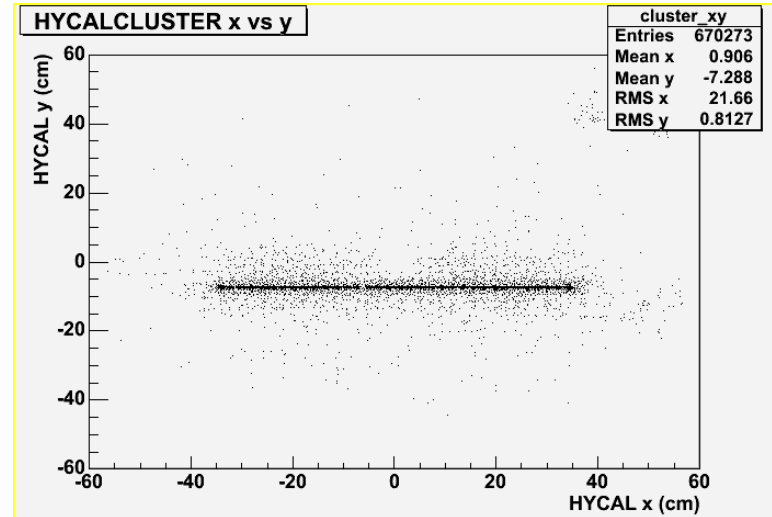
Y-position : time difference between top and bottom pmts

Photon calibrations

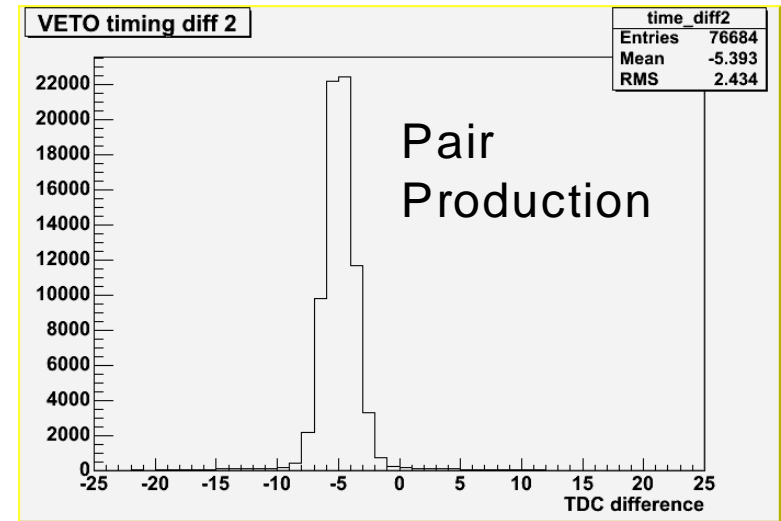
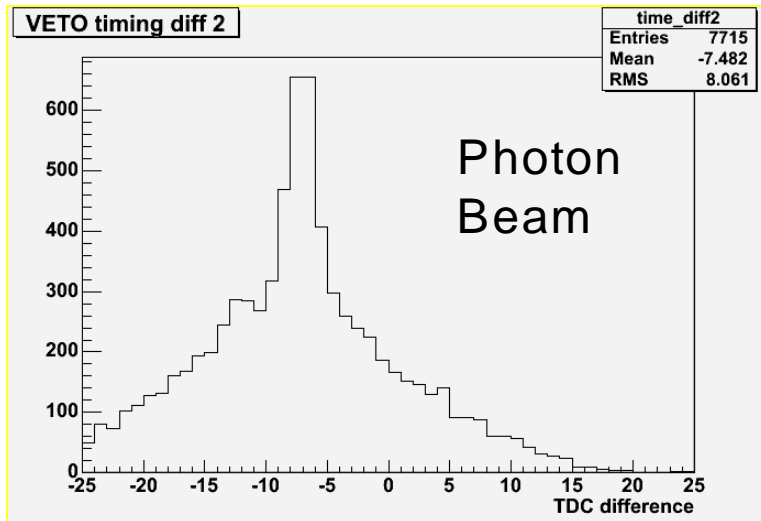
End of experiment calibration run

Run 5353 – one scan with low intensity photon beam directly on Veto counters and PbWO_4

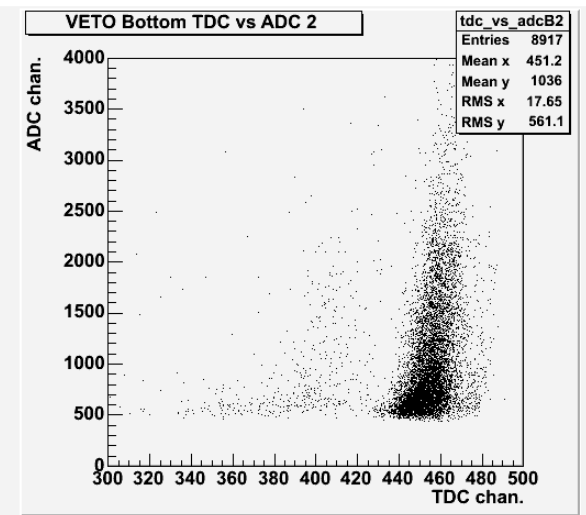
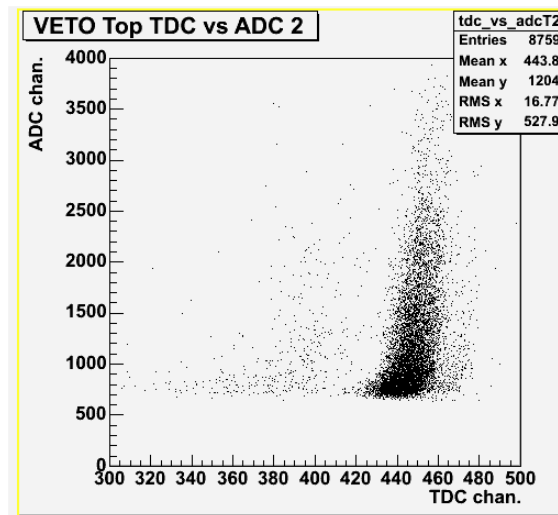
All of these runs taken together can give y-position information.



Veto y-position – TDC Difference



Time-walk correction:
ADC versus TDC from
photon beam run.



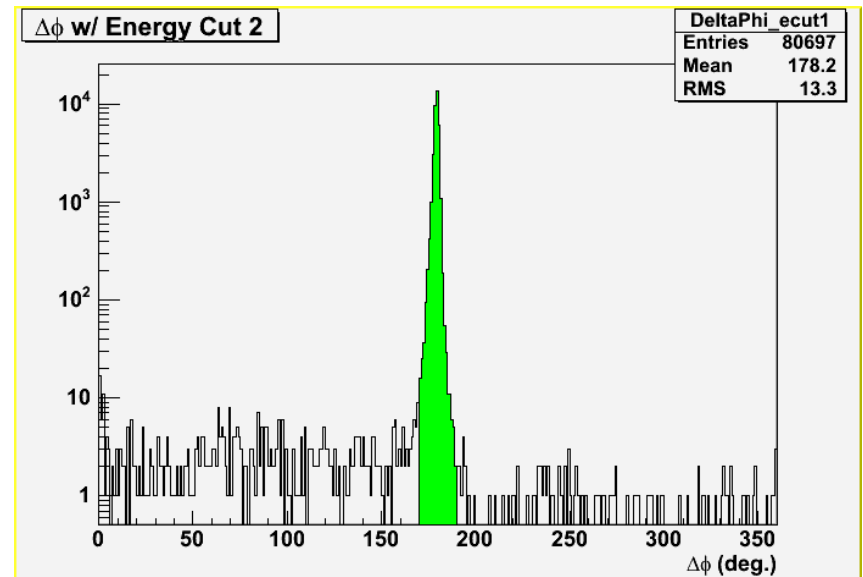
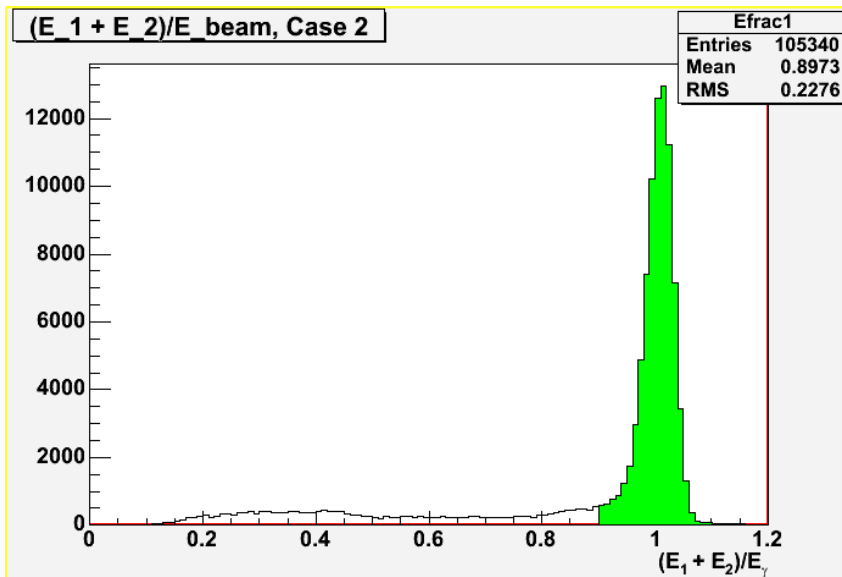
Efficiency Estimate - Cuts

Run 4865 – pair production.

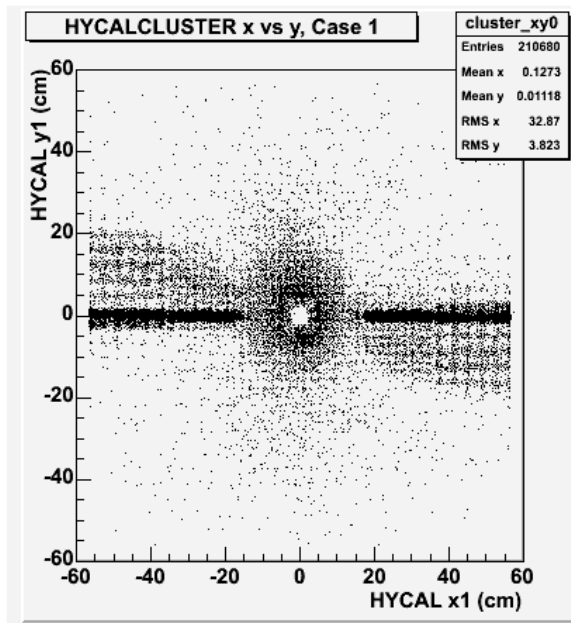
Select events with exactly 2 clusters in HYCALCLUSTER bank.

Cuts applied on

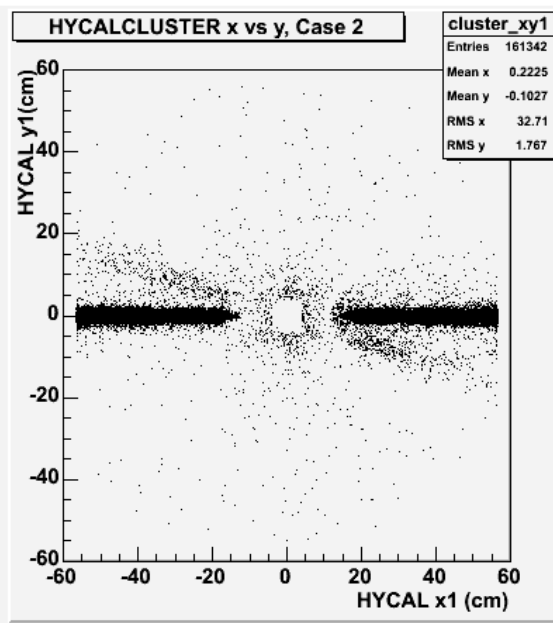
- Energy conservation – $|(E_1 + E_2)/E_\gamma - 1| < 0.1$
- $\Delta\phi$ – 170 to 190 degrees.



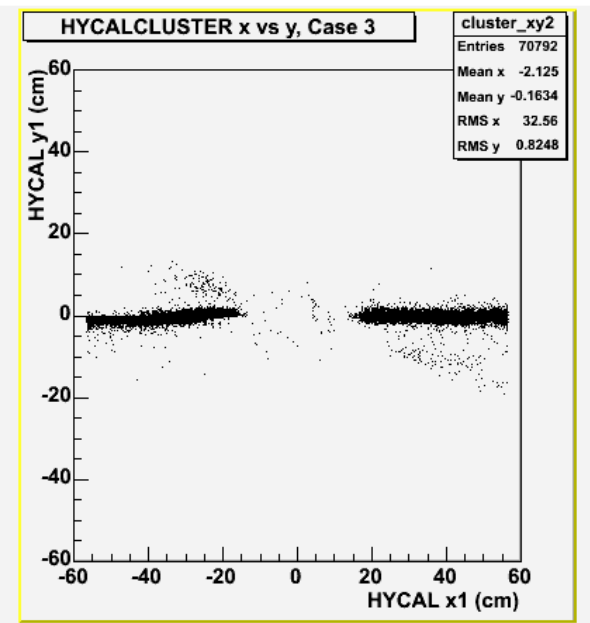
Efficiency Estimate – Clusters



No cuts



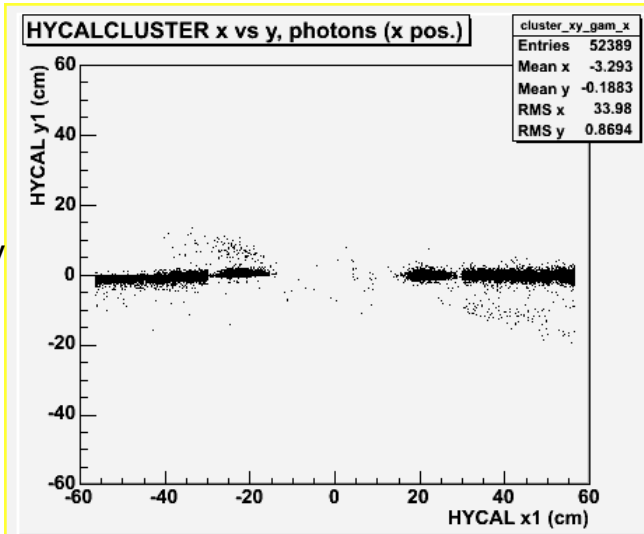
Energy cut



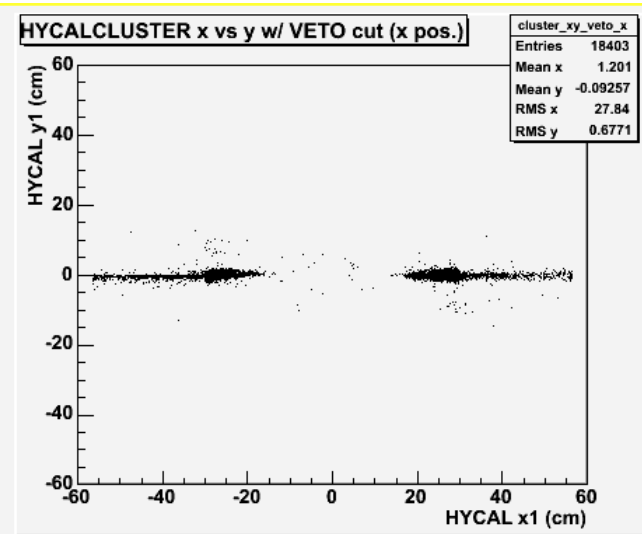
Energy and $\Delta\phi$ cut

Efficiency Estimate – Coincidences

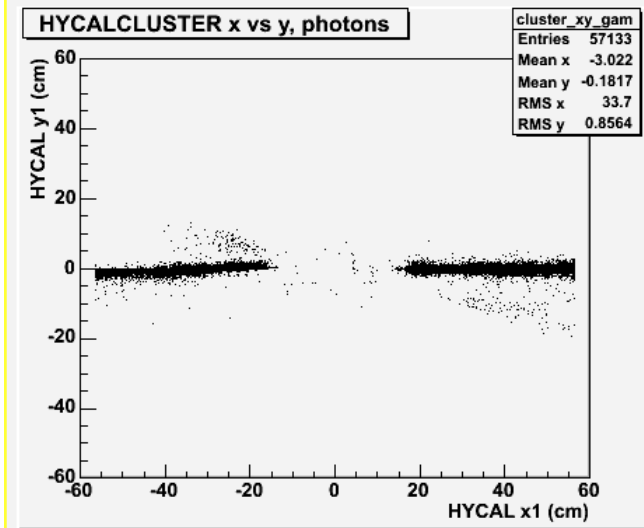
No Veto
Matching
X-pos cut only



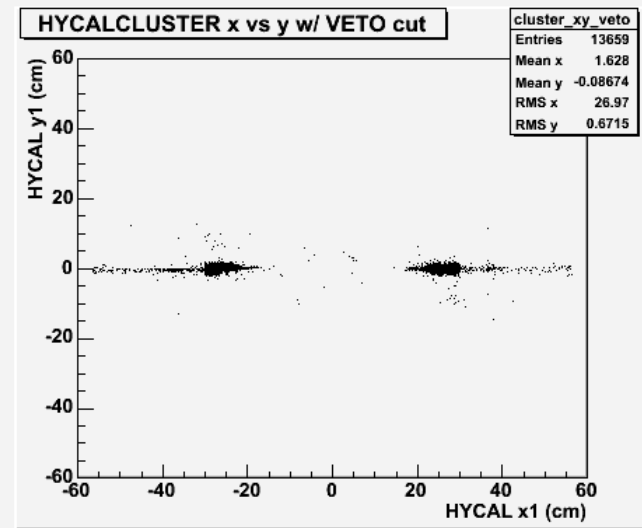
Veto
Matching
X-pos cut only



No Veto
Matching
X-pos and
Timing cuts



Veto
Matching
X-pos and
Timing cuts





Summary

- Finish timing and y-position calibrations
- Pair production has quality data for efficiency calculations
- Analyze Compton run for efficiency estimate
- Analyze photon beam calibration data to understand losses due to e^+e^- conversions and neutral accidentals
- Use pair production data to calibrate ADC