ECAL Resolution and PID Efficiency

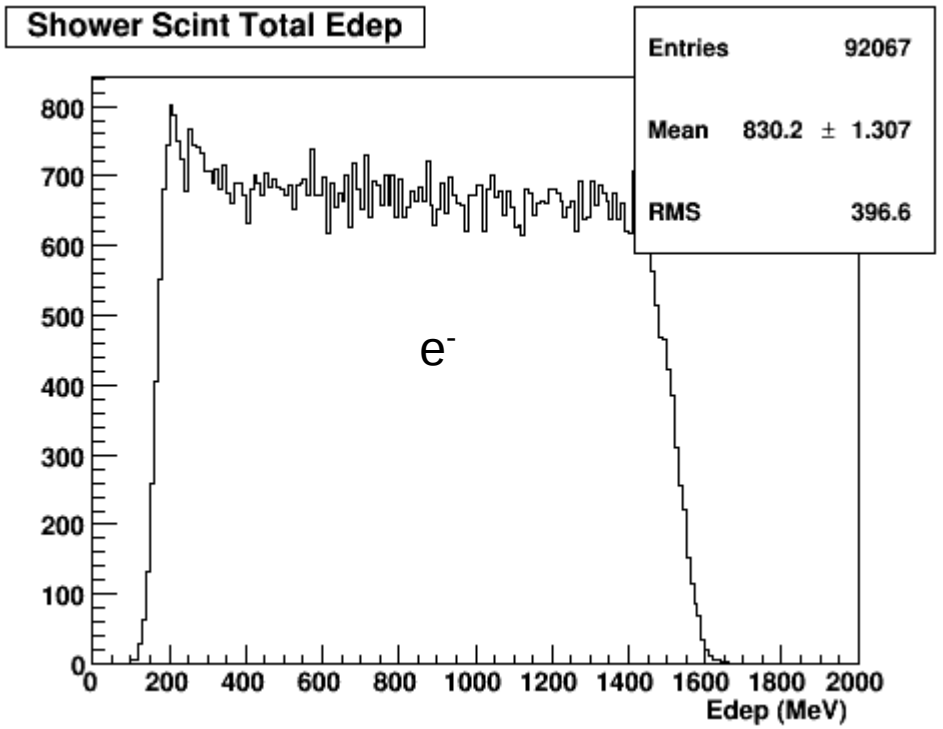
Update 3

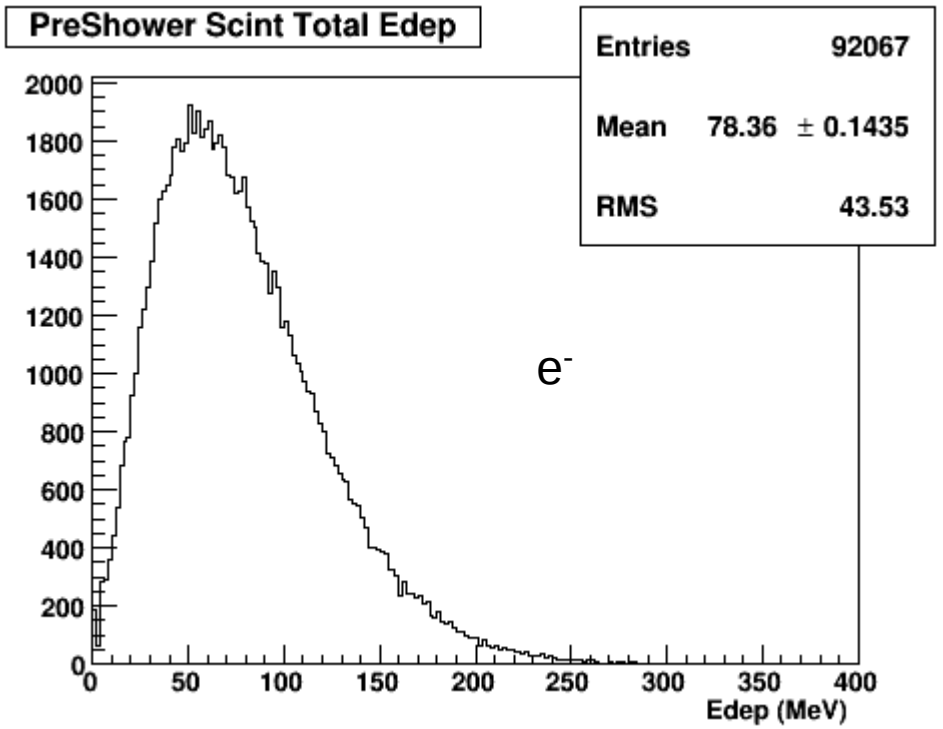
ECAL Simulation Summary

- Input DIS electron for x> 0.35 and negative pions
- Get electron and pion efficiency

MIP Cut on the Pre-Shower

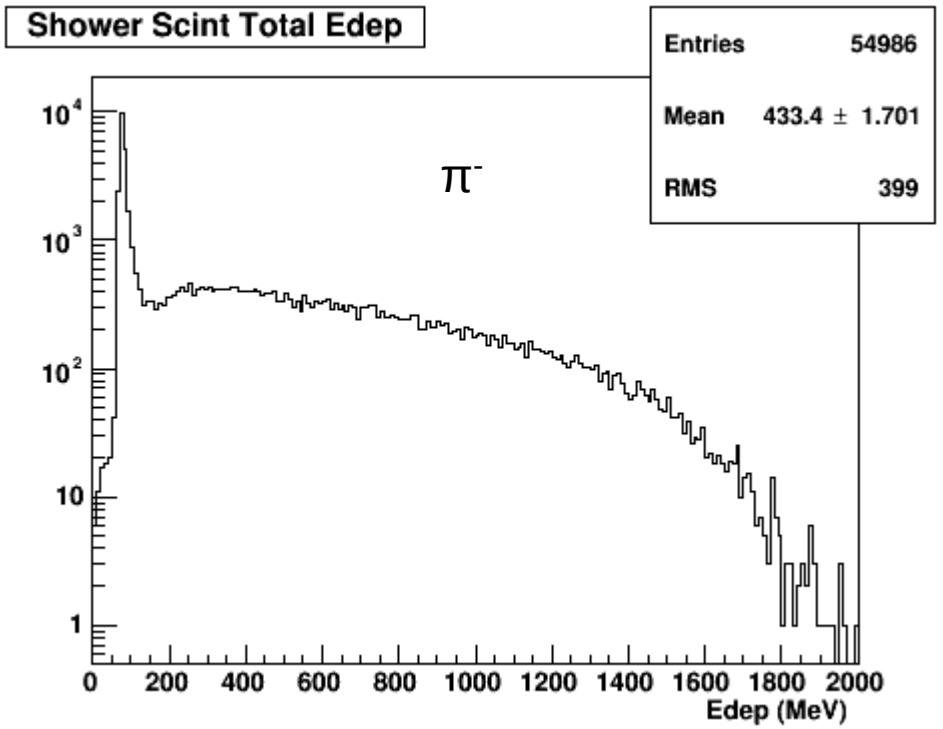
- Electron deposit energy in the PS differently compared to pions
- Due to Pions act like a MIP most of the time PS cut just above a MIP can reject pions

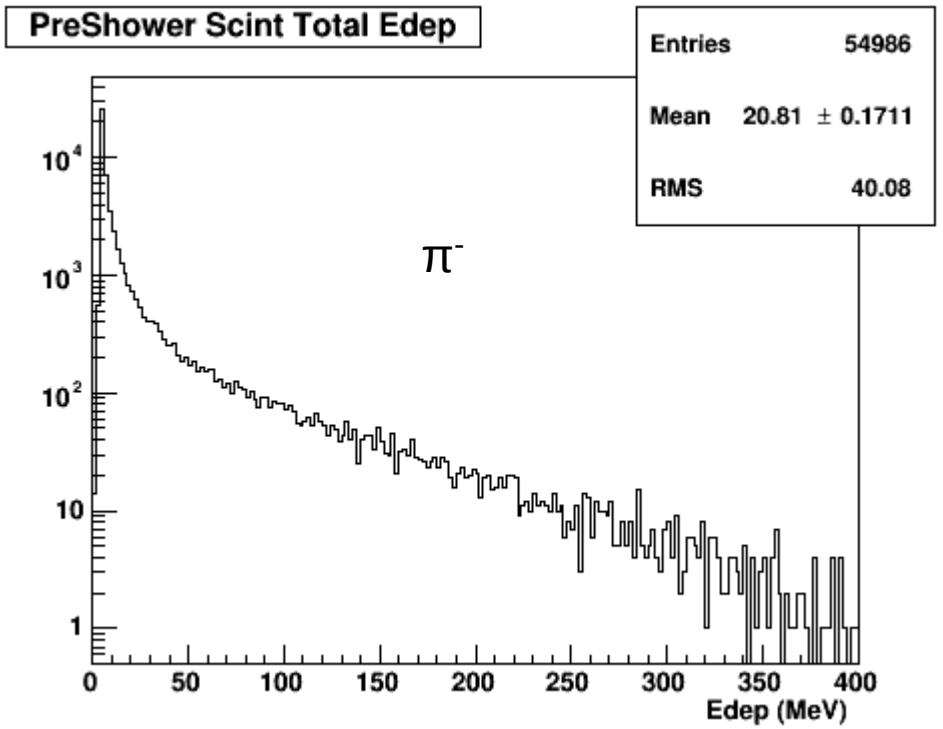




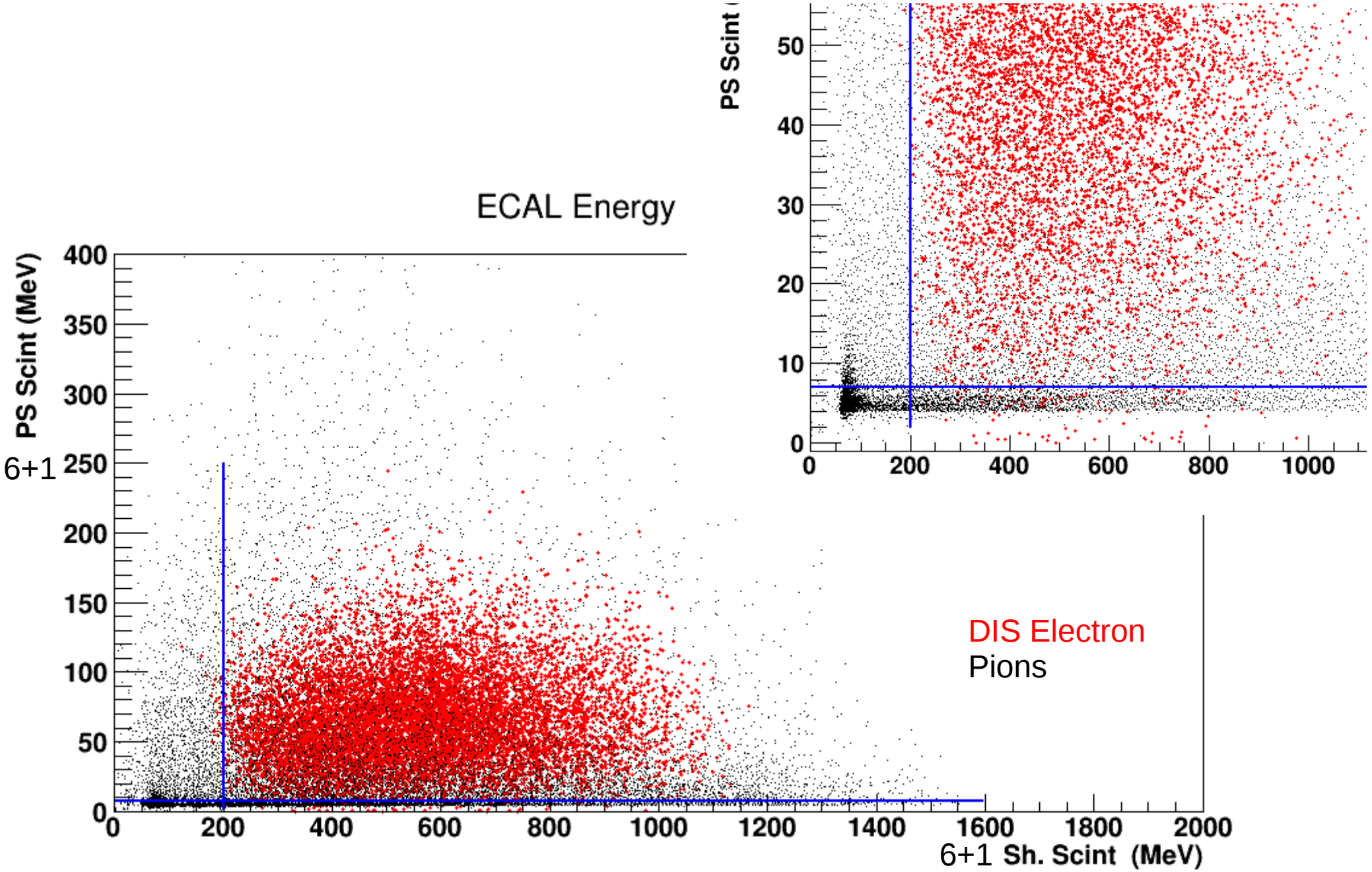
MIP Cut on the Pre-Shower

- Electron deposit energy in the PS differently compared to pions
- Due to Pions act like a MIP most of the time PS cut just above a MIP can reject pions
- Apply a MIP cut to select edep greater than MIP
  - MIP cut is 7 MeV

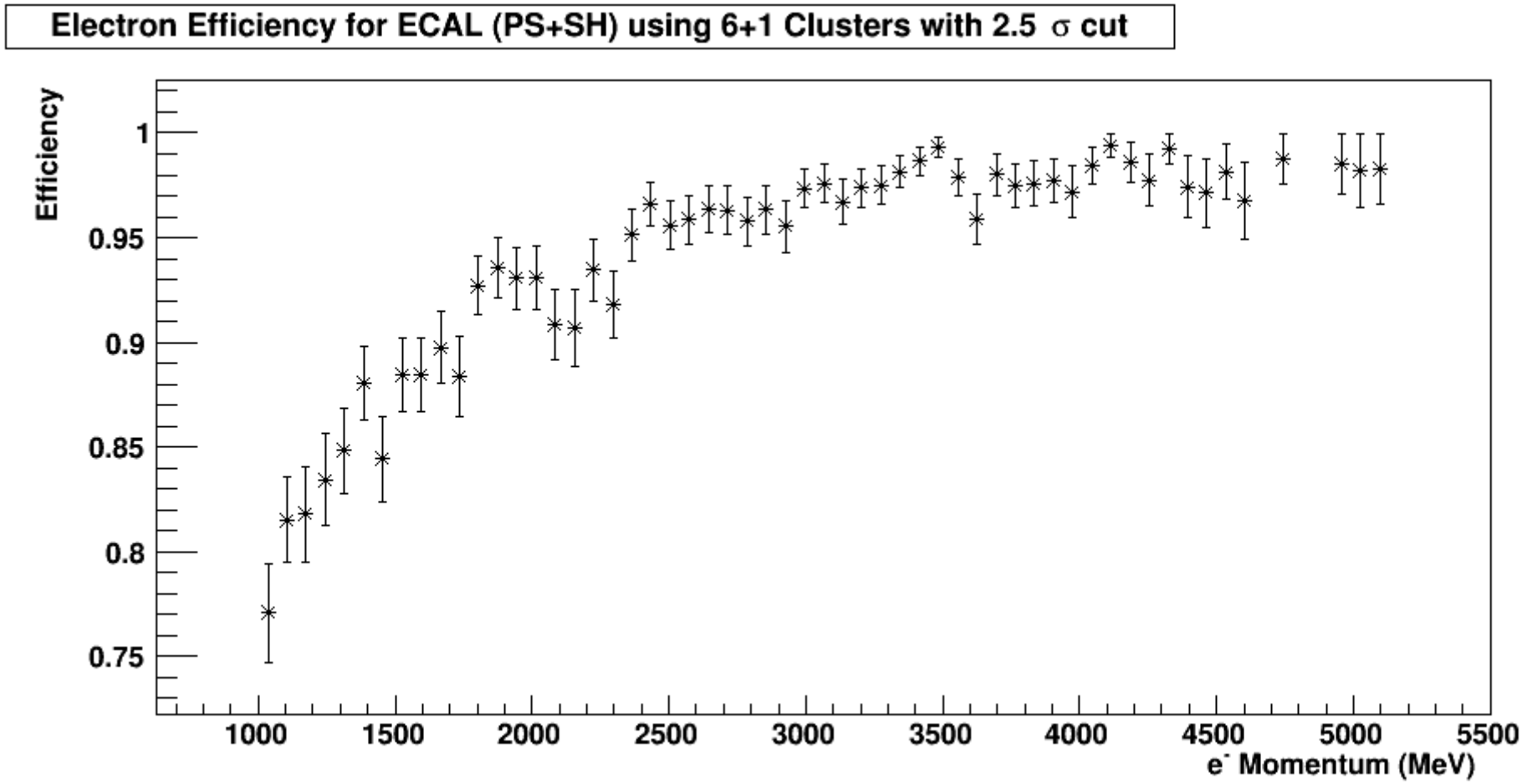




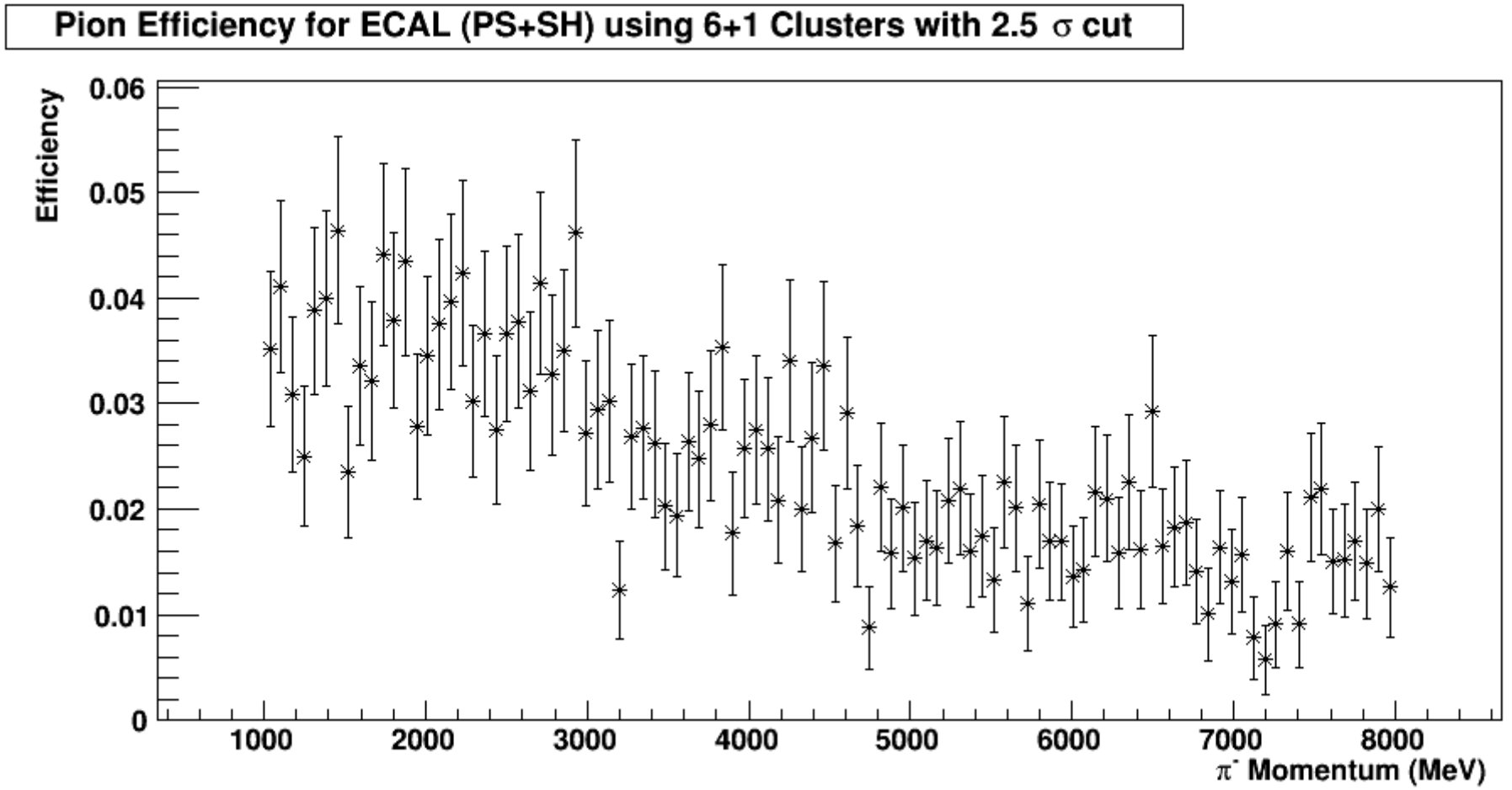
Cuts Applied 6+1 Clusters



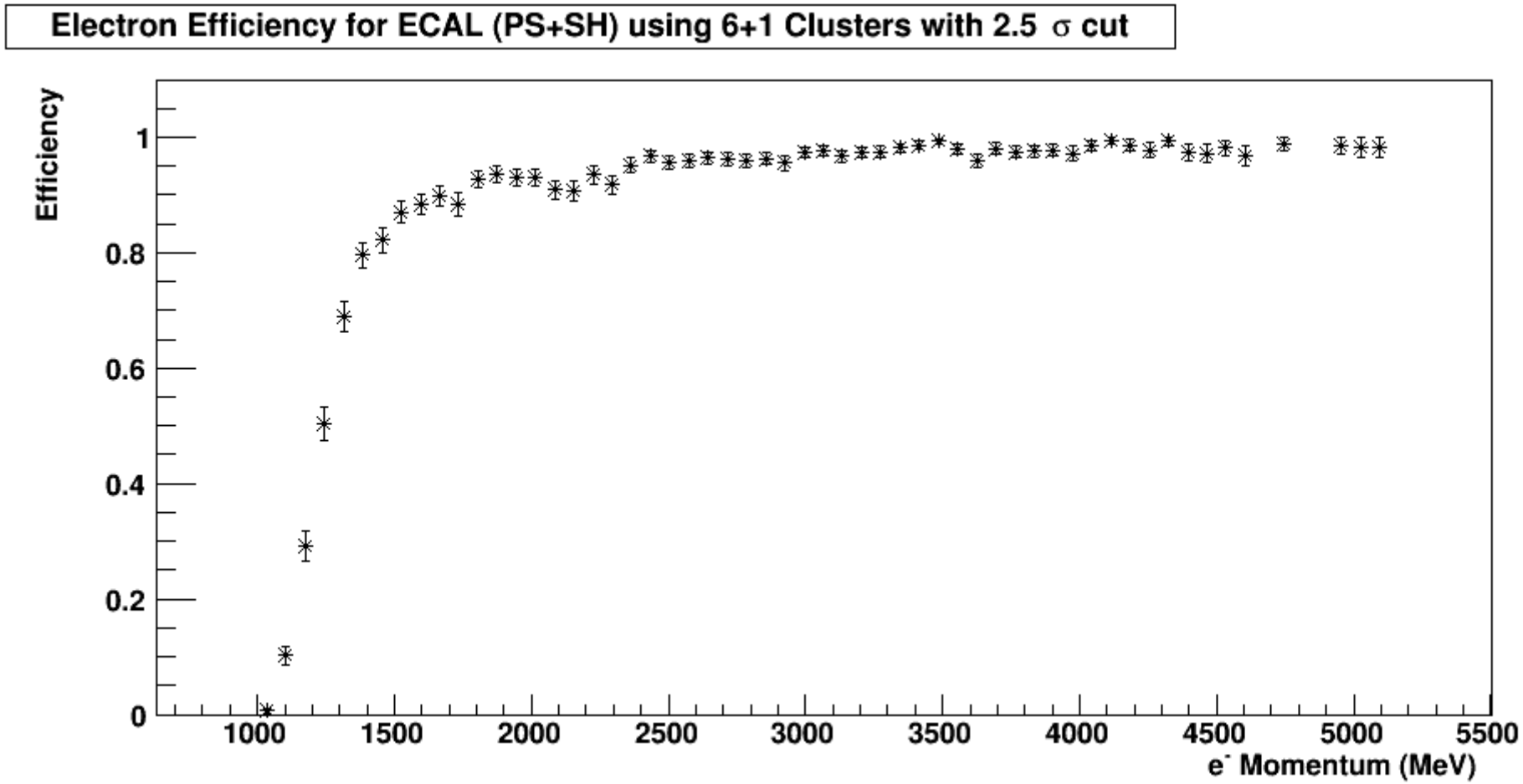
e^- Efficiency with only PS MIP Cut



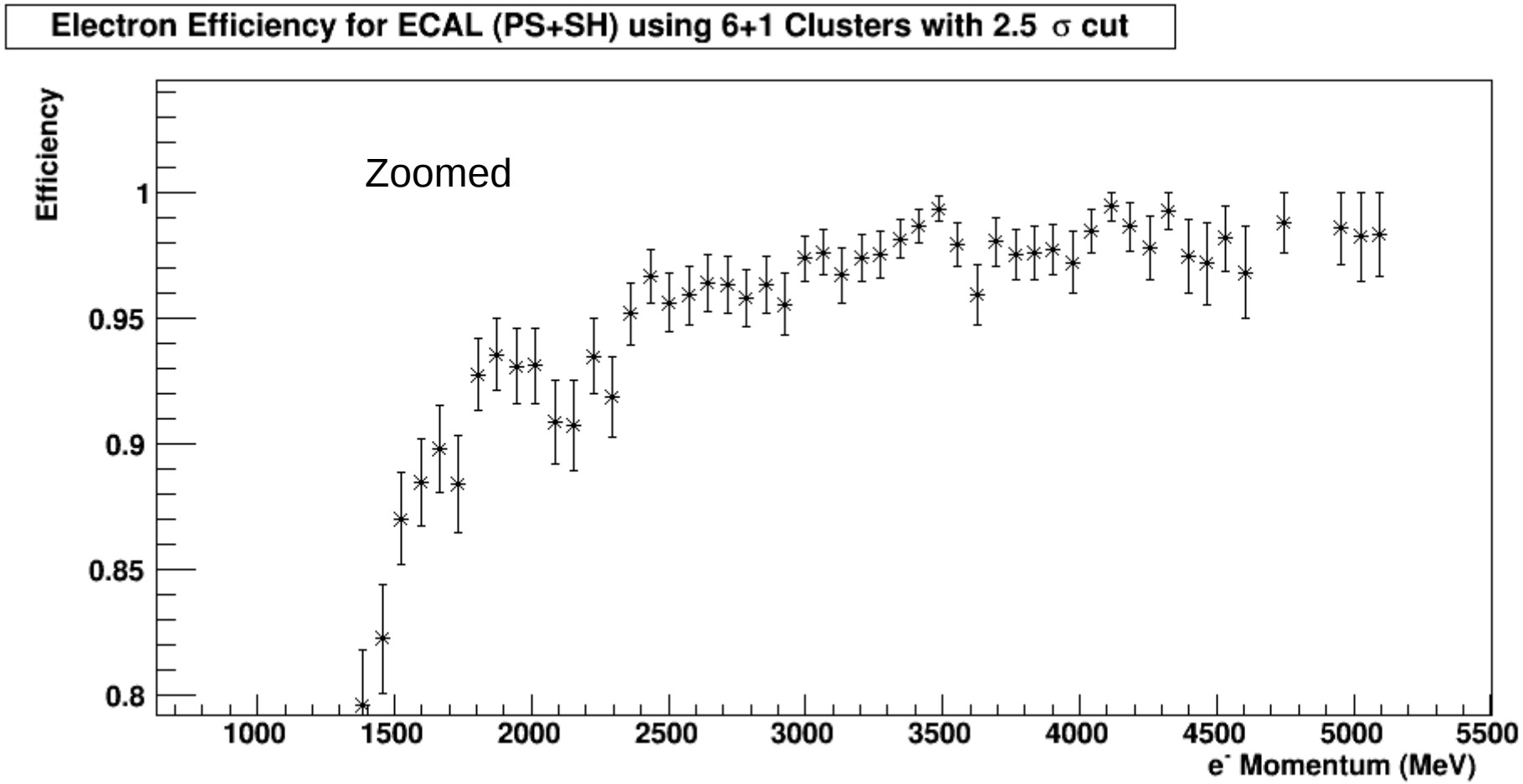
π^- Efficiency with only PS MIP Cut



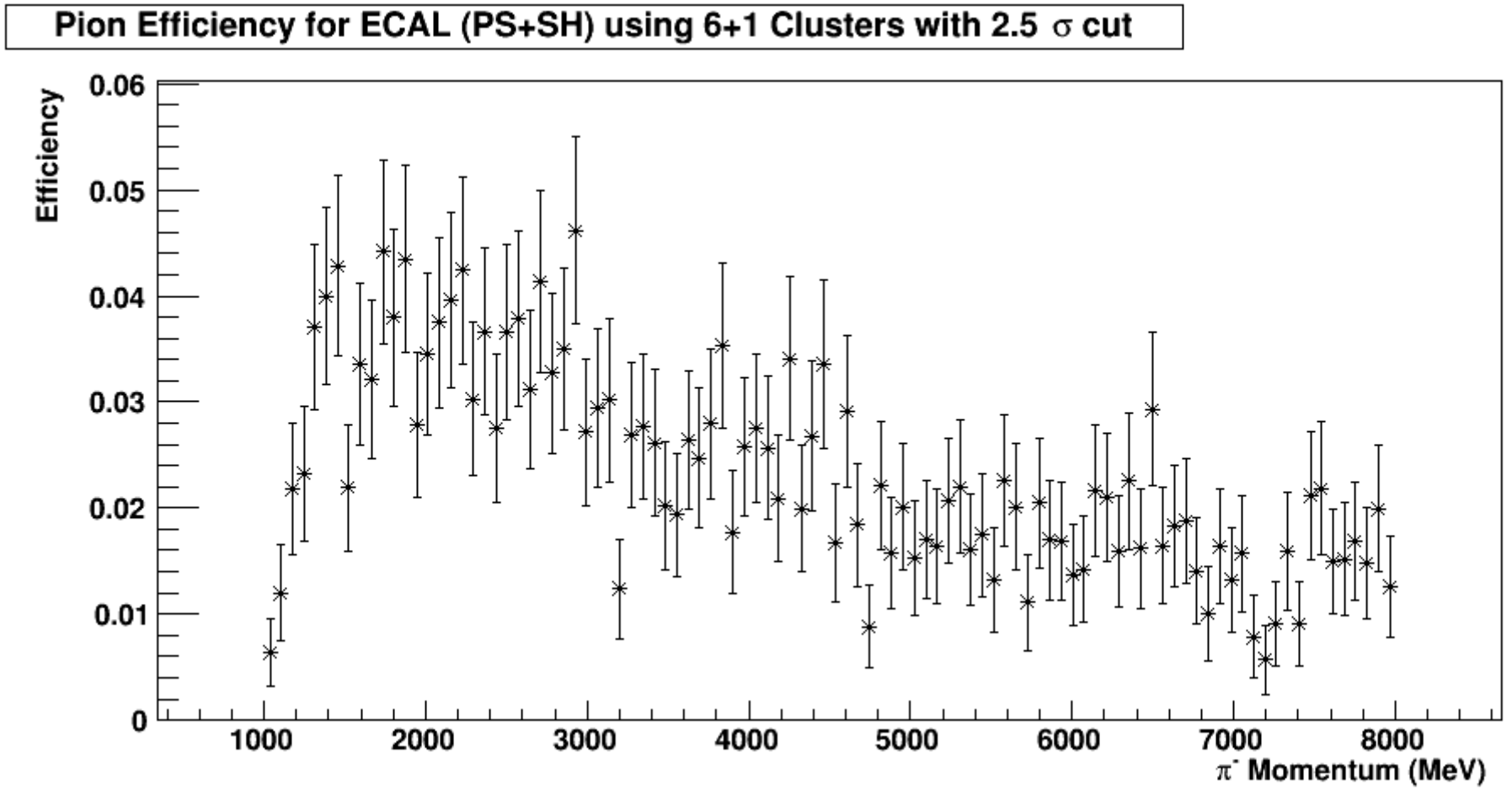
e^- Efficiency with PS MIP + Scint Cut



e^- Efficiency with PS MIP + Scint Cut



π^- Efficiency with PS MIP + Scint Cut



Electrons

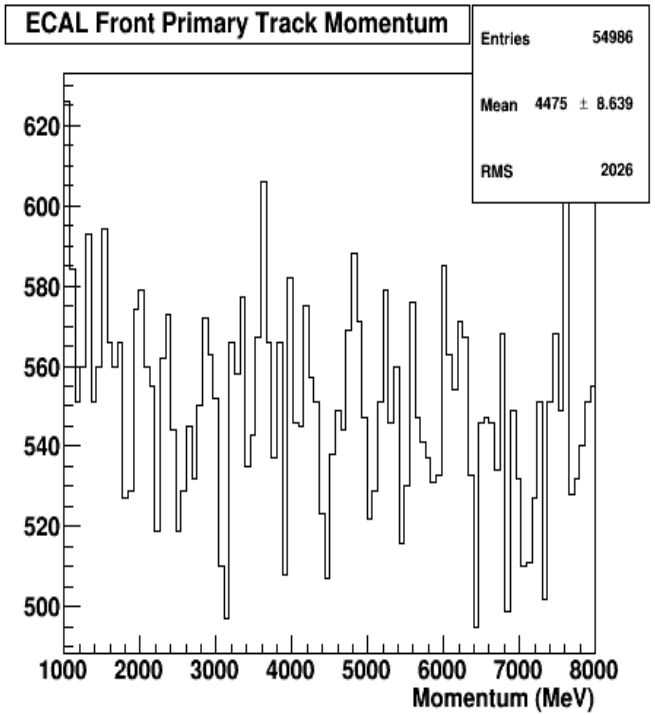
No Shower Cut			With Shower Cut	
Momentum	Efficiency	Error	Efficiency	Error
1.035	0.768	0.023	0.006	0.004
1.105	0.812	0.021	0.102	0.016
1.175	0.808	0.023	0.292	0.027
1.245	0.828	0.022	0.503	0.029
1.315	0.845	0.021	0.690	0.026
1.385	0.875	0.018	0.796	0.022
1.455	0.838	0.021	0.822	0.022
1.525	0.876	0.018	0.870	0.018
1.595	0.882	0.018	0.885	0.017
1.665	0.888	0.018	0.898	0.017
1.735	0.880	0.020	0.884	0.019
1.805	0.921	0.015	0.927	0.014
1.875	0.935	0.014	0.935	0.014
1.945	0.924	0.016	0.931	0.015
2.015	0.920	0.016	0.931	0.015
2.085	0.905	0.017	0.908	0.016
2.155	0.907	0.018	0.907	0.018
2.225	0.931	0.015	0.935	0.015
2.295	0.905	0.017	0.918	0.016
2.365	0.951	0.012	0.951	0.012
2.435	0.963	0.011	0.966	0.010
2.505	0.953	0.012	0.956	0.012
2.575	0.948	0.013	0.959	0.012
2.645	0.964	0.011	0.964	0.011
2.715	0.963	0.011	0.963	0.011
2.785	0.955	0.012	0.958	0.011
2.855	0.963	0.011	0.963	0.011
2.925	0.955	0.013	0.955	0.013
2.995	0.973	0.009	0.973	0.009
3.065	0.976	0.009	0.976	0.009
3.135	0.963	0.011	0.967	0.011
3.205	0.974	0.009	0.974	0.009
3.275	0.975	0.009	0.975	0.009
3.345	0.975	0.009	0.981	0.008
3.415	0.987	0.007	0.987	0.007
3.485	0.993	0.005	0.993	0.005
3.555	0.979	0.009	0.979	0.009
3.625	0.959	0.012	0.959	0.012
3.695	0.980	0.010	0.980	0.010
3.765	0.975	0.010	0.975	0.010
3.835	0.971	0.012	0.976	0.011
3.905	0.977	0.010	0.977	0.010
3.975	0.972	0.012	0.972	0.012
4.045	0.979	0.010	0.984	0.009

Pions

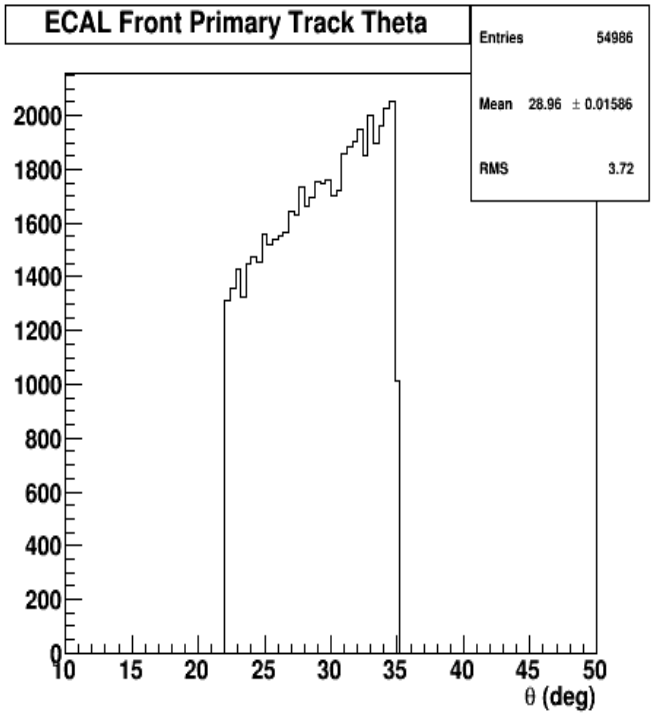
No Shower Cut			With Shower Cut	
Momentum	Efficiency	Error	Efficiency	Error
1.035	0.035	0.007	0.006	0.003
1.105	0.041	0.008	0.012	0.005
1.175	0.031	0.007	0.022	0.006
1.245	0.025	0.007	0.023	0.006
1.315	0.039	0.008	0.037	0.008
1.385	0.040	0.008	0.040	0.008
1.455	0.046	0.009	0.043	0.009
1.525	0.024	0.006	0.022	0.006
1.595	0.034	0.008	0.034	0.008
1.665	0.032	0.007	0.032	0.007
1.735	0.044	0.009	0.044	0.009
1.805	0.038	0.008	0.038	0.008
1.875	0.043	0.009	0.043	0.009
1.945	0.028	0.007	0.028	0.007
2.015	0.035	0.008	0.035	0.008
2.085	0.037	0.008	0.037	0.008
2.155	0.040	0.008	0.040	0.008
2.225	0.042	0.009	0.042	0.009
2.295	0.030	0.007	0.030	0.007
2.365	0.037	0.008	0.037	0.008
2.435	0.028	0.007	0.028	0.007
2.505	0.037	0.008	0.037	0.008
2.575	0.038	0.008	0.038	0.008
2.645	0.031	0.007	0.031	0.007
2.715	0.041	0.009	0.041	0.009
2.785	0.033	0.008	0.033	0.008
2.855	0.035	0.008	0.035	0.008
2.925	0.046	0.009	0.046	0.009
2.995	0.027	0.007	0.027	0.007
3.065	0.029	0.007	0.029	0.007
3.135	0.030	0.008	0.030	0.008
3.205	0.012	0.005	0.012	0.005
3.275	0.027	0.007	0.027	0.007
3.345	0.028	0.007	0.028	0.007
3.415	0.026	0.007	0.026	0.007
3.485	0.020	0.006	0.020	0.006
3.555	0.019	0.006	0.019	0.006
3.625	0.026	0.007	0.026	0.007
3.695	0.025	0.007	0.025	0.007
3.765	0.028	0.007	0.028	0.007
3.835	0.035	0.008	0.035	0.008
3.905	0.018	0.006	0.018	0.006
3.975	0.026	0.007	0.026	0.007
4.045	0.027	0.007	0.027	0.007

End

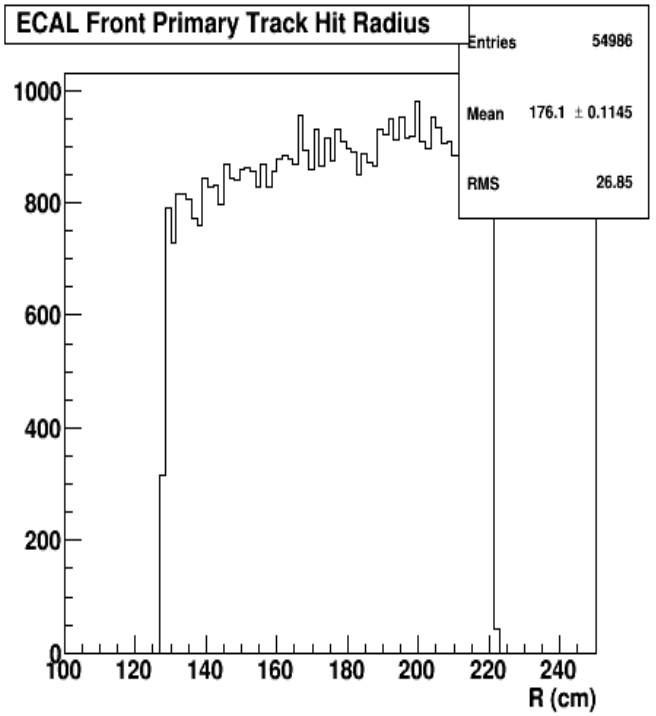
Input Flat Distribution



Input Momentum

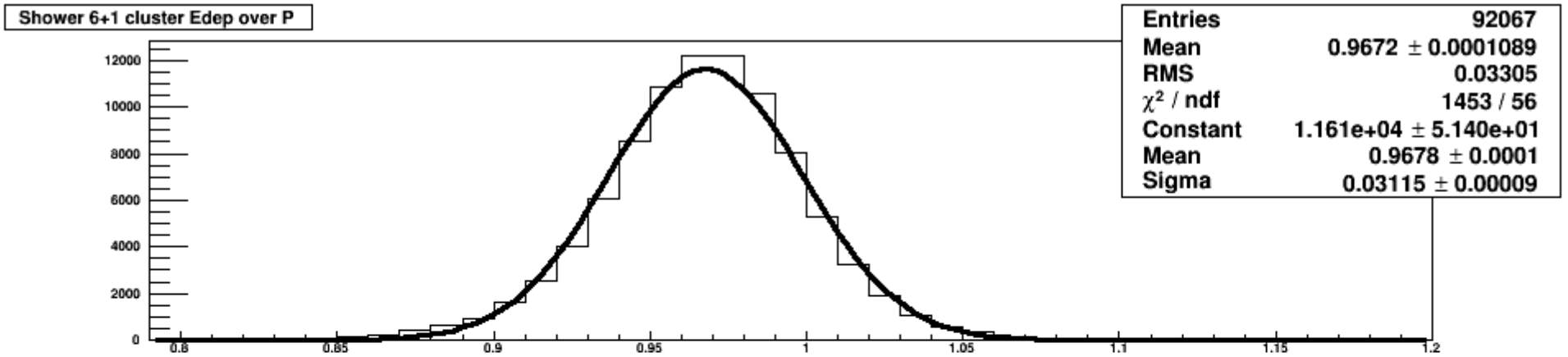


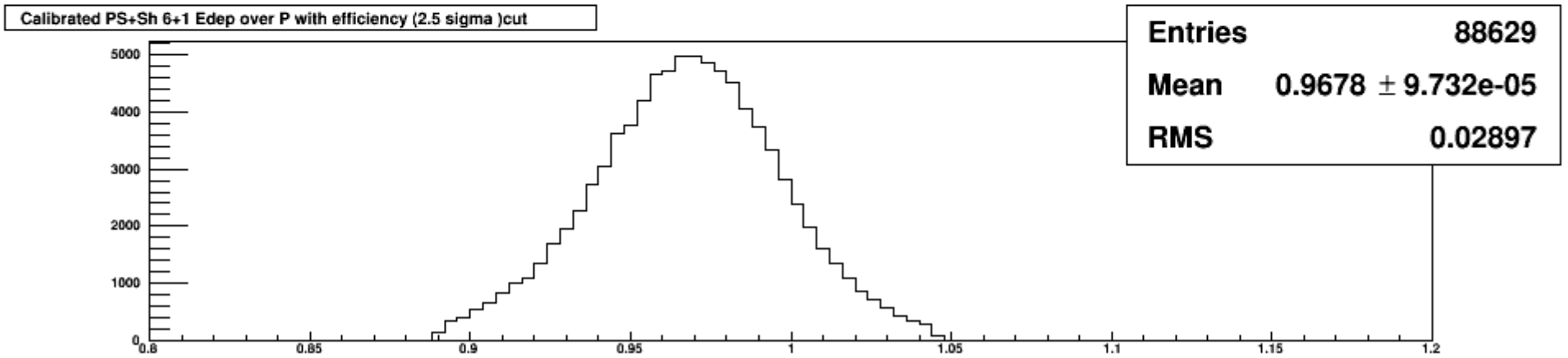
Input Angle



Input Radius

e^- Calibrated Energy over Pf Ratio





- A 2.5 σ cut applied to select e^- events
- Ratio of above cut selected e^- over total e^- events is the ECAL efficiency