Status Update of SoLID Ecal Beam Test @FTBF

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Outline

- Determine Pedestal
- Redo total ADC integration
- Redo Merged Ecal and MWPC root files
- Preshower and shower gain match with pion data
- Started analyzing simulated data
- TODO:
 - Reduce false MWPC clusters and determine beam position cuts
 - Calibration
 - Extract Ecal resolution



Get Time Window, No Cut.....OLD

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Method 1: Fit Profile

fadc_slot7[2]:Iteration\$



Method 2: Fit Signal Before Main Peak



Method 3: Get Maximum Bin



Cut: time < TimePeak + 10

Method 3: Get Maximum Bin



Get New Pedestal, with Cut.....NEW

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Compare Results: OLD to NEW

OLD													
run	ch0	ch1	ch2	ch3	ch4	ch5	ch6	ch7	ch8	ch9	ch10	ch11	ch12
1009	312	297	248	279	279	270	287	276	0	313	284	273	261
1010	313	297	246	280	282	271	288	276	0	313	284	273	261
1011	313	297	246	282	279	272	288	276	0	313	284	273	262
1012	312	297	246	284	280	272	288	275	0	314	284	273	261
1013	312	296	251	279	280	271	288	275	0	312	284	273	261
1014	312	295	245	278	281	269	287	275	0	311	282	272	260
1015	312	296	246	279	281	270	288	276	0	312	283	273	261
1016	312	296	246	279	282	271	288	276	0	313	283	273	261
1017	312	296	247	279	279	270	288	275	0	312	284	273	261
1018	312	297	246	281	280	271	288	275	0	313	283	273	261
NEW													
run	ch0	ch1	ch2	ch3	ch4	ch5	ch6	ch7	ch8	ch9	ch10	ch11	ch12
1009	312	296	245	279	278	270	287	275	0	312	282	272	260
1010	312	297	245	279	279	270	287	276	0	312	282	272	261
1011	312	297	245	279	279	271	288	276	0	313	283	272	261
1012	312	296	245	279	279	271	288	275	0	312	282	272	261
1013	312	296	246	278	279	270	288	275	0	312	282	272	260
1014	312	295	245	278	279	269	286	274	0	311	281	272	259
1015	312	296	245	278	279	270	287	275	0	312	282	272	260
1016	312	296	245	278	280	270	288	275	0	312	282	272	261
1017	312	296	245	278	279	270	287	275	0	312	282	272	261
1018	312	296	245	279	279	271	288	275	0	312	282	272	261
NEW-O	LD												
run	ch0	ch1	ch2	ch3	ch4	ch5	ch6	ch7	ch8	ch9	ch10	ch11	ch12
1009	0	1	3	0	1	0	0	1	0	1	2	1	1
1010	1	0	1	1	3	1	1	0	0	1	2	1	0
1011	1	0	1	3	0	1	0	0	0	0	1	1	1
1012	0	1	1	5	1	1	0	0	0	2	2	1	0
1013	0	0	5	1	1	1	0	0	0	0	2	1	1
1014	0	0	0	0	2	0	1	1	0	0	1	0	1
1015	0	0	1	1	2	0	1	1	0	0	1	1	1
1016	0	0	1	1	2	1	0	1	0	1	1	1	0
1017	0	0	2	1	0	0	1	0	0	0	2	1	0
1018	0	1	1	2	1	0	0	0	0	1	1	1	0
			1	1		1		1	1	1	1		

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Back up ...

Gain Match for Ecal, 4 GeV, R=1cm

10²









Gain Match for Ecal, 8 GeV, R=1cm



Gain Match for Preshower, R=1cm



Peak Fitting Results

- ch2_main ch3_main ch4_main
 ch5
 ch6
 ch7
 ch2
 ch3
 ch4
- double peak4[] = { **7938**, **8191**, **6990**, 127, 56, 141, 675, 759, 617};
- double peak6[] = { <u>13651, 13803, 11744, 277, 135, 189, 778, 844, 692</u>};
- double peak8[] = { 11860, 12808, 11389, 131, 46, 137, 505, 563, 458};
- double peak10[] = { **15001**, **15782**, **13856**, 130, 57, 132, 485, 542, 436};
- double peak12[] = { <u>19159, 20728, 18062, 210, 125, 175, 549, 636, 521</u>};
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- double peak16[] = { 6884, 7522, 8712, 127, 51, 117, 117, 135, 139};

Note:

- 1 GeV calibration data do not have MWPC chamber0
- NO 2 GeV calibration data
- Preshower HV almost not changed at all beam energies, except 16 GeV
- 6GeV and 12 GeV has serious pile up issue

Signal for 8 Gev Calibration Runs, 1016







fadc_slot7[12]:Iteration\$ {Entry\$<10000}



















fadc slot7[9]:Iteration\$ {Entry\$<10000}



fadc_slot7[6]:Iteration\$ {Entry\$<10000}

fadc_slot7[5]:Iteration\$ {Entry\$<10000}









Signal for 8 Gev Calibration Runs, 1017







fadc_slot7[12]:Iteration\$ {Entry\$<10000}





















fadc_slot7[4]:Iteration\$ {Entry\$<10000}



fadc slot7[9]:Iteration\$ {Entry\$<10000}



Signal for 8 Gev Calibration Runs, 1018









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100

















fadc slot7[0]:Iteration\$ {Entry\$<10000}







fadc slot7[9]:Iteration\$ {Entry\$<10000}



Pile up ... 8 GeV Ecal spectra



 8 GeV, beam on top block, ~30k particles per spill, 6k triggers per spill

Pile up ... 10 GeV Ecal spectra



 10 GeV, beam on top block, ~80k particles per spill, 9k triggers per spill

Simulated Result: Ecal only

Edep_ec_module1: blue(r<=6cm), red(r<=1cm)



Simulated Result: Ecal and Preshower



Summary

- MWPC cluster finding algorithm is developed. But we still need to reduce false cluster and determine a tracking cut
- Merged Ecal and MWPC root files, adding MWPC cluster information
- Ecal gain match is on going
- Preshower gain match is on going
- Started analyzing simulated data
- Building work environment in ifarm, prepare to transfer some tasks to Zhenyu's group
- TODO:
 - Reduce false MWPC clusters and determine beam position cuts
 - Finish gain matching, then start chi2 fitting to determine matching between preshower and shower
 - Compare to simulation to determine TDC to MeV coefficient
 - Extract Ecal resolution

Signal Width



























500

fadc_slot7[0]:Iteration\$ {Entry\$<10000}



100



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