

BB Efficiency

Electron Elastic cut:

1. T3 no edm
2. theta and phi acceptance
3. single track
4. has track to S2
5. $W = \text{proton mass } (938.27) \pm 4.49 \text{ MeV}/c^2$

The MWDC Efficiency

Making Event selection as follow:

1. Energy deposit in E- plane > 500 channel. (rough cut)
2. proton PID for E-plane: (see nhit_PID in CT and in E)
 - 2.1 BB-L time
 - 2.2 Graphic cut E vs q
3. select one hit data per event passing proton PID for E-plane. And store other hits that also pass this cut (not yet to determine the better one)
4. Analyze only the data with one hit pass cut
5. proton PID for MWDC:
 - 5.1 $|\text{track}_x - 0.65 * E_{\text{bar}} + 0.6570| \leq 0.1042 \text{ (m)}$
 - 5.2 $|\text{track}_y - 0.1 * E_{\text{tdiff}}| \leq 0.0355 \text{ (m)}$
 - 5.3 $|q - \text{BB_momentum}| \leq 24.1653 \text{ MeV}/c$
6. select one track (or more) data per event passing proton PID for MWDC.

Run	q GeV/c	Event pass CT	Event pass CT and E_q graph: PID in E
2033	(0.38-0.44)	pass CT 154796 nhit 0 9717 nhit 1 152520 nhit 2 2248 nhit 3 27 nhit 4 1	pass E 102672 nhit 0 61841 nhit 1 102409 nhit 2 263 nhit 3 0 nhit 4 0
PID from E single hit		Event pass track to E-plane matching	Event pass track to E-plane matching and q-p : PID in MWDC
102409		pass trackMatching 85458 ntrack 0 17214 ntrack 1 84916 ntrack 2 540 ntrack 3 2 ntrack 4 0	pass MWDC 79843 ntrack 0 22829 ntrack 1 79825 ntrack 2 18 ntrack 3 0 ntrack 4 0
Efficiency	PID in E single hit	PID in MWDC (single and double track)	
77.96	102409	79843	

Run	q GeV/c	Event pass CT	Event pass CT and E_q graph: PID in E
2009	(0.32 to 0.38)	pass CT 86396 nhit 0 29974 nhit 1 84868 nhit 2 1511 nhit 3 16 nhit 4 1	pass E 66817 nhit 0 49553 nhit 1 66732 nhit 2 85 nhit 3 0 nhit 4 0
PID from E single hit		Event pass track to E-plane matching	Event pass track to E-plane matching and q-p : PID in MWDC
66732		pass trackMatching 59977 ntrack 0 6840 ntrack 1 59897 ntrack 2 79 ntrack 3 1 ntrack 4 0	pass MWDC 58973 ntrack 0 7844 ntrack 1 58969 ntrack 2 4 ntrack 3 0 ntrack 4 0
Efficiency	PID in E single hit	PID in MWDC (single and double track)	
88.372	66732	58973	

Run	q GeV/c	Event pass CT	Event pass CT and E_q graph: PID in E
2037	(0.42 to 0.48)	pass CT 130530 nhit 0 34667 nhit 1 129377 nhit 2 1132 nhit 3 20 nhit 4 1	pass E 84562 nhit 0 80635 nhit 1 84472 nhit 2 90 nhit 3 0 nhit 4 0
PID from E single hit		Event pass track to E-plane matching	Event pass track to E-plane matching and q-p : PID in MWDC
84472		pass trackMatching 70617 ntrack 0 13945 ntrack 1 70250 ntrack 2 366 ntrack 3 1 ntrack 4 0	pass MWDC 65652 ntrack 0 18910 ntrack 1 65646 ntrack 2 6 ntrack 3 0 ntrack 4 0
Efficiency	PID in E single hit	PID in MWDC (single and double track)	
77.72	84472	65652	

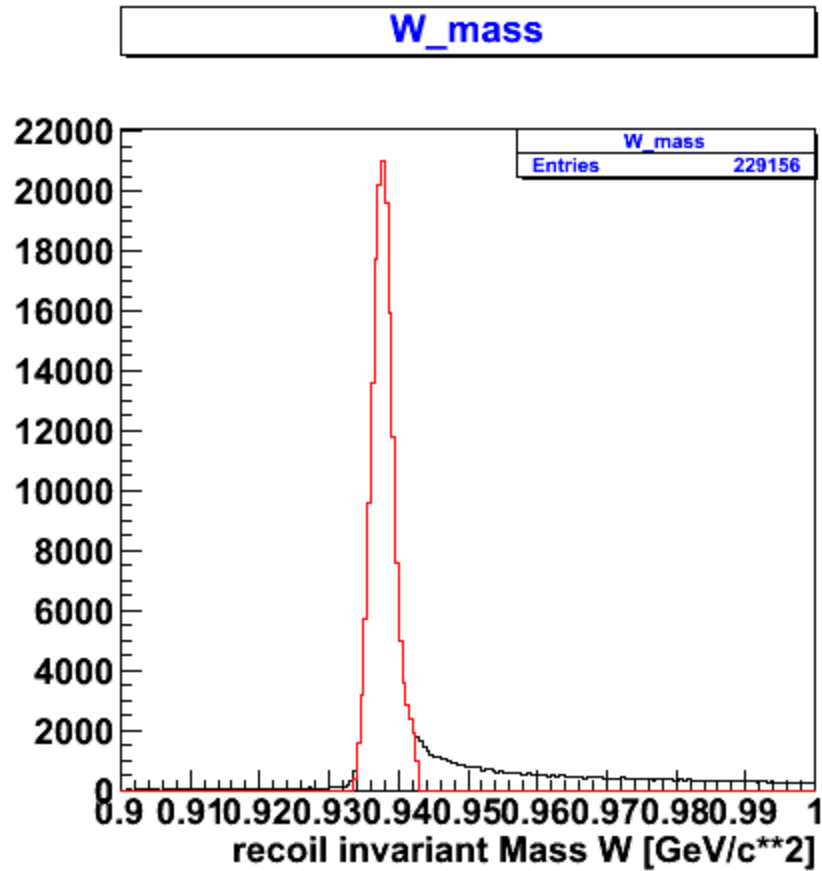


Figure 1.1: W mass

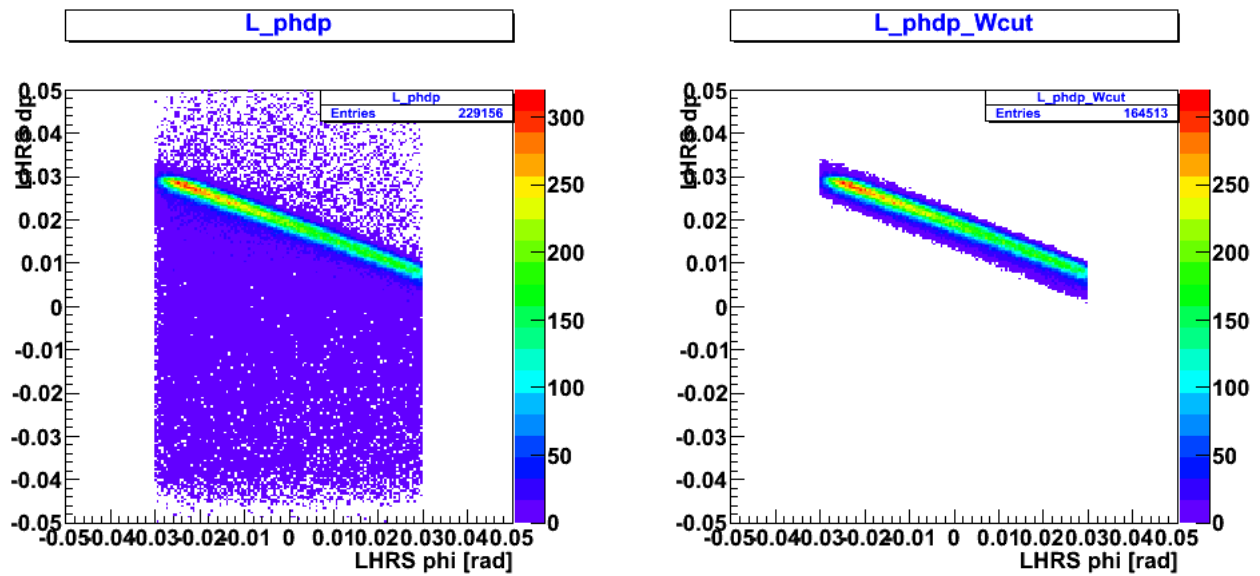


Figure 1.2: Strip cut in L_{HRS} dp vs L_{HRS} phi from making $|W - M_p|$ cut

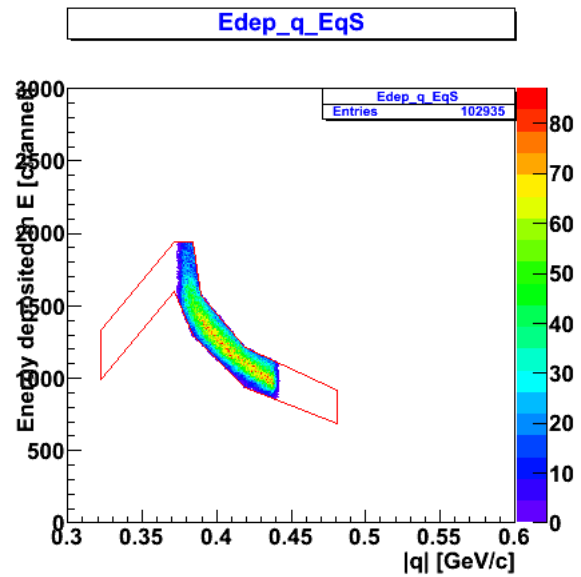
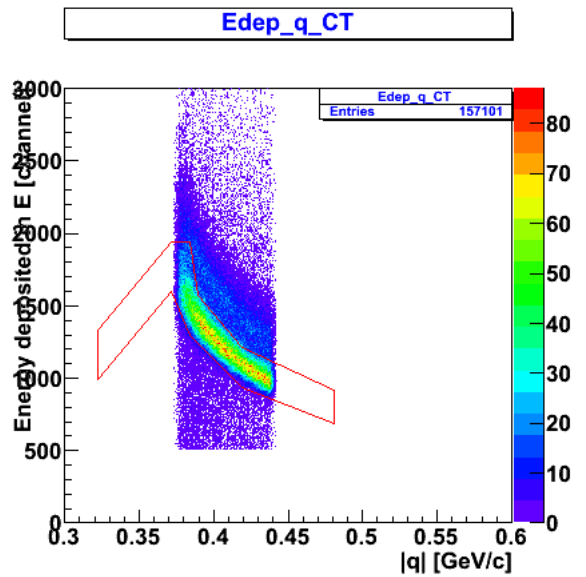
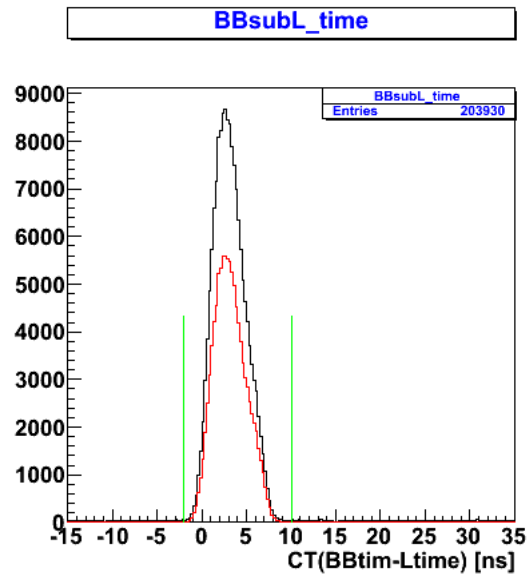
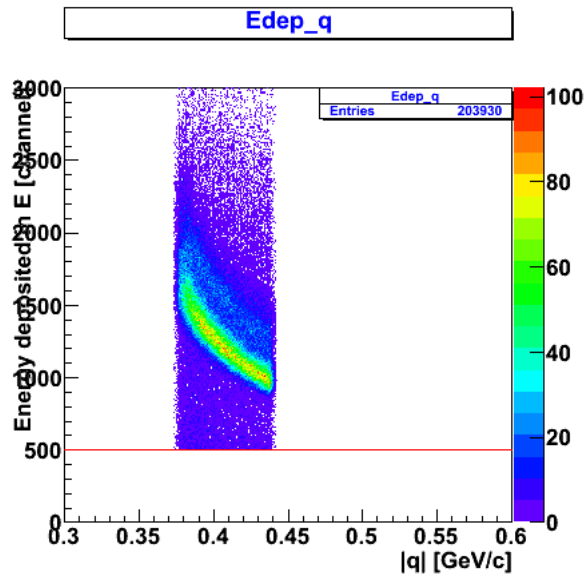


Figure 1.3 Proton PID in E plane

- 1.3.1 $E > 500$ channel (all hit)
- 1.3.2 $CT(BB-L \text{ time})$ cut in green
- 1.3.3 E vs q after $|CT|$ cut
- 1.3.4 E vs q after E_q graphic cut

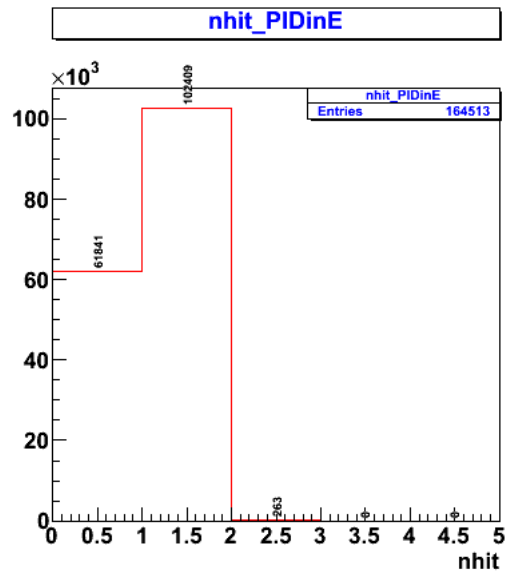
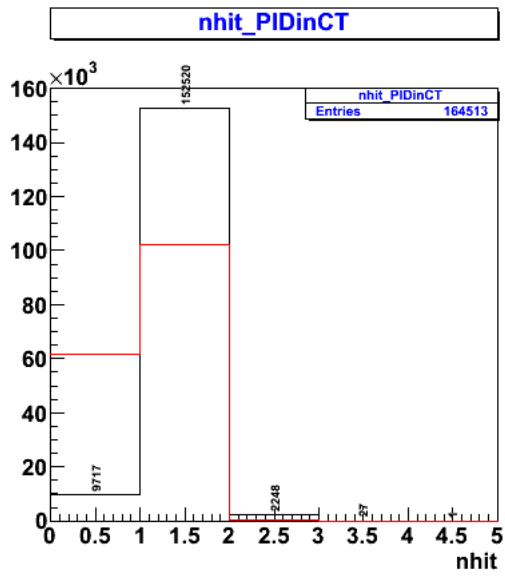


Figure 1.4

1.4.1 *nhit per event pass |CT|*

1.4.2 *nhit per event pass |CT| and E_q graph*

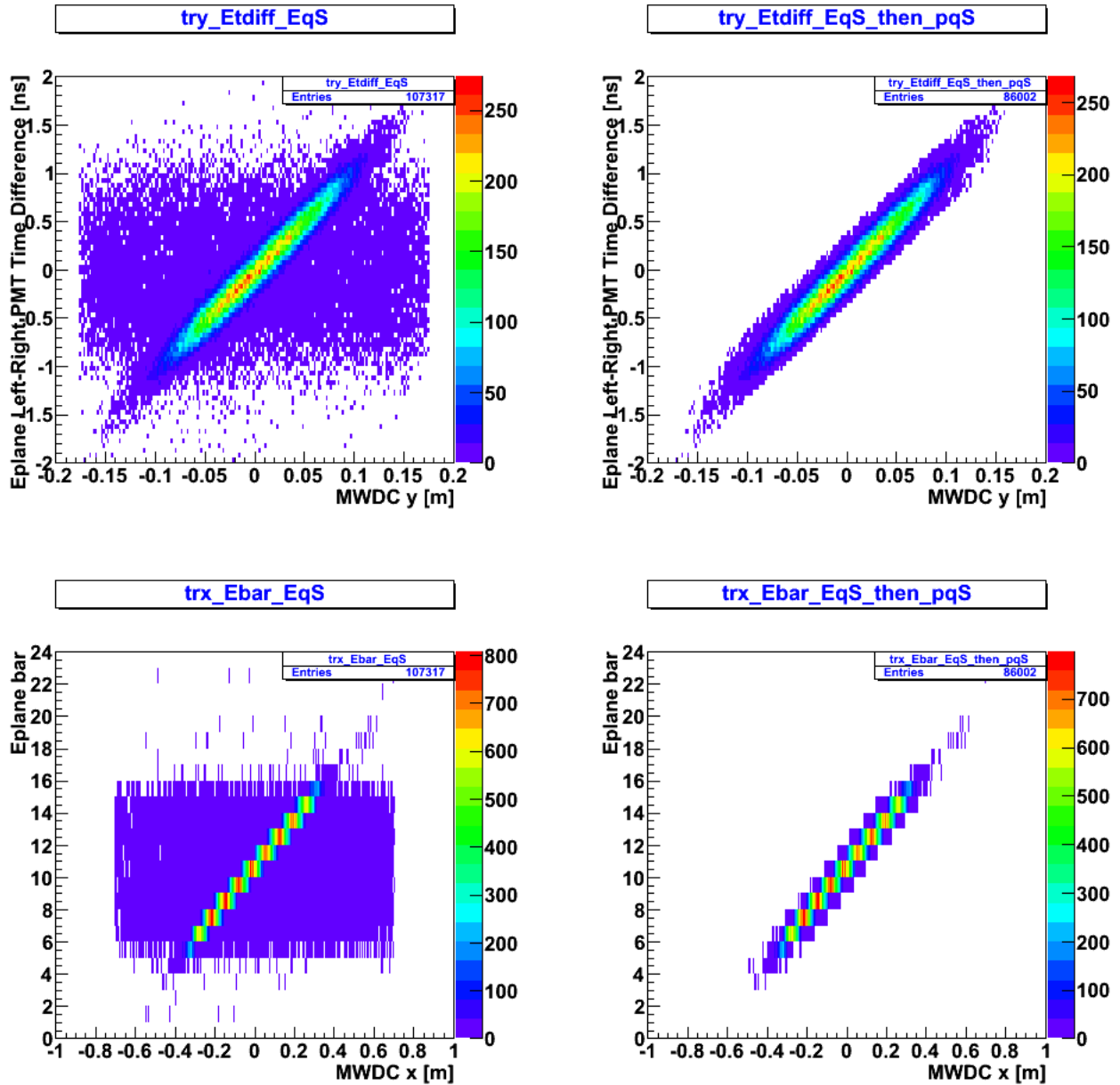


Figure 1.5 focusing on Event with single hit pass Proton PID in E

- 1.5.1 E bar L/R time difference vs track y
- 1.5.2 E bar L/R time difference vs track y with track matching E location cut
- 1.5.3 E bar vs track x
- 1.5.4 E bar vs track x with track matching E location cut

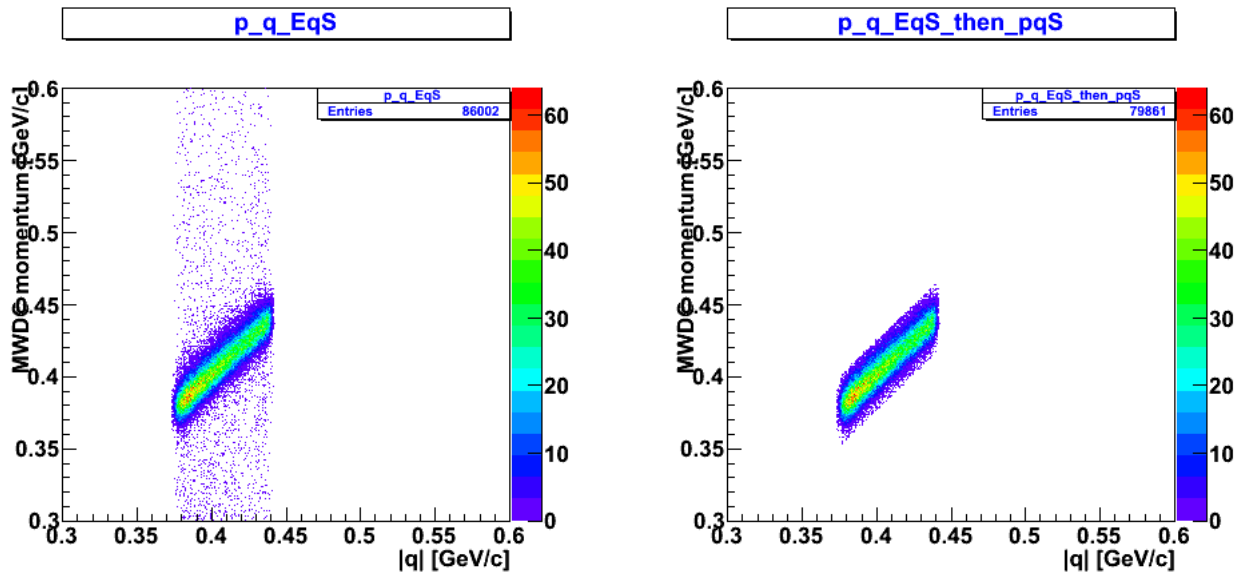


Figure 1.6 Proton PID in MWDC after PID in E

1.6.1 MWDC momentum vs $|q|$ after track matching

1.6.2 MWDC momentum vs $|q|$ after track matching and $|q - p|$ cut

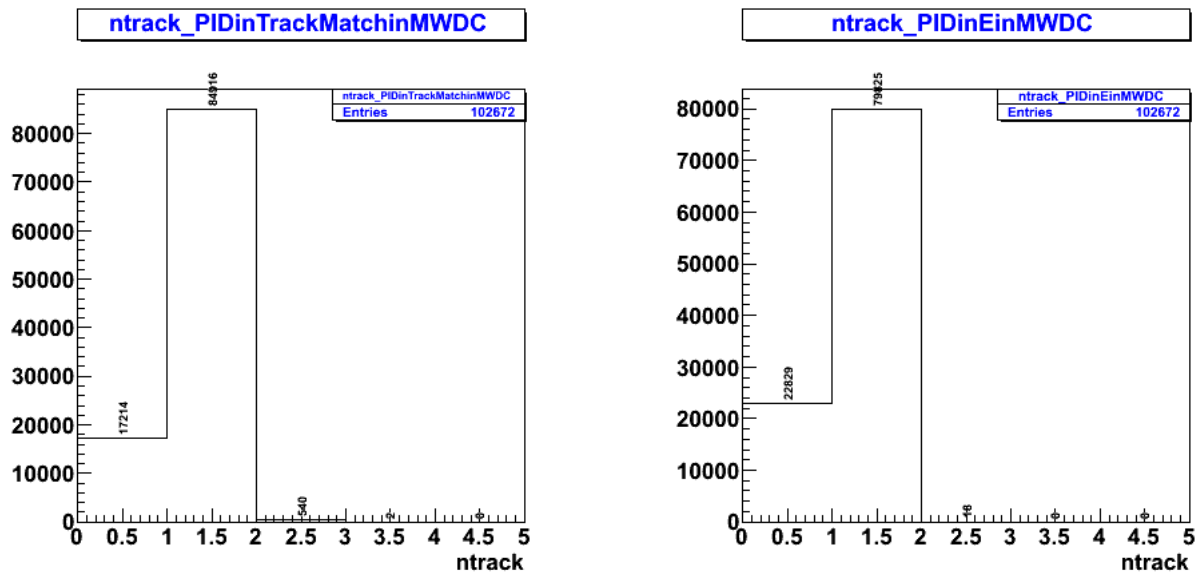


Figure 1.7

1.7.1 $ntrack$ per event pass track matching cut

1.7.2 $ntrack$ per event pass track matching cut and $|q-p|$

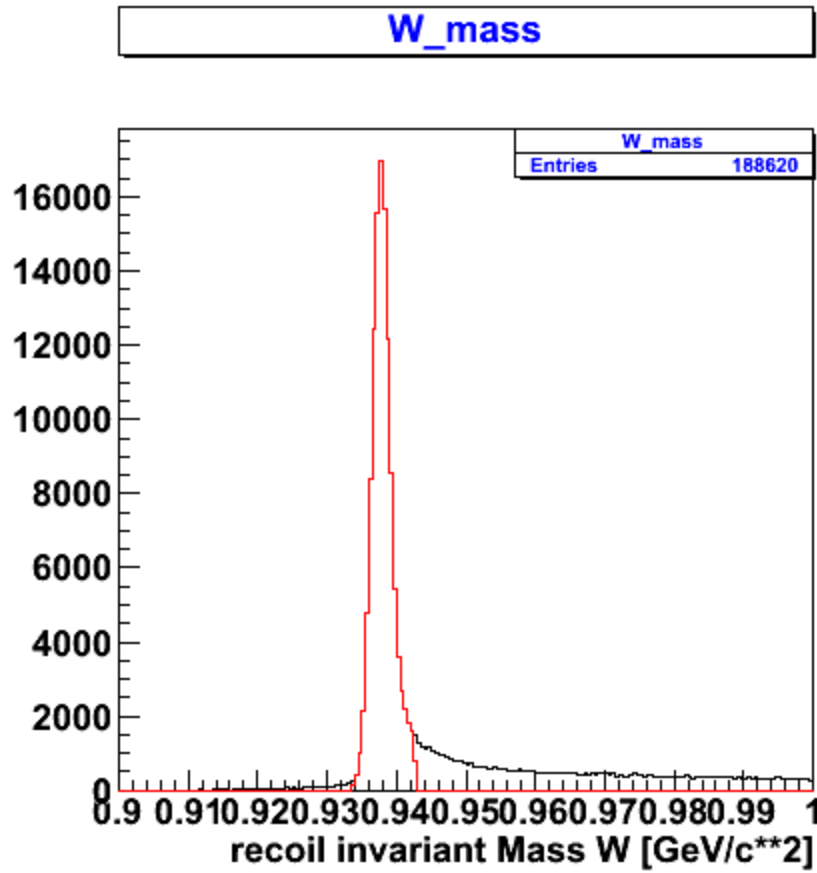


Figure 2.1: W mass

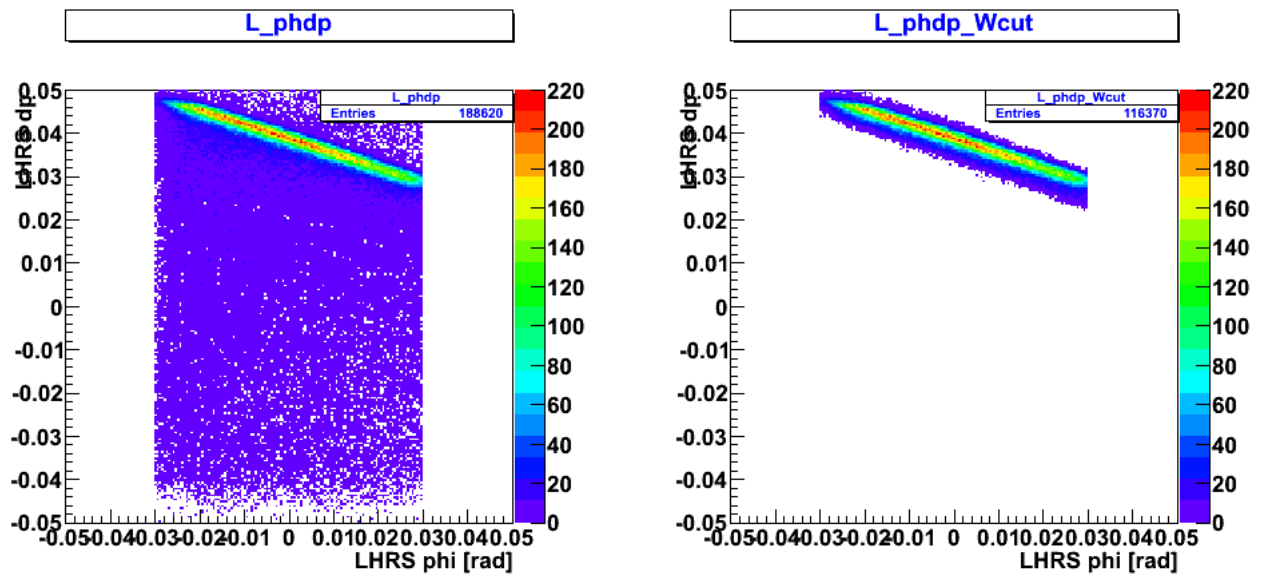


Figure 2.2: Strip cut in L_pdp vs L_pdp phi from making $|W - M_p|$ cut

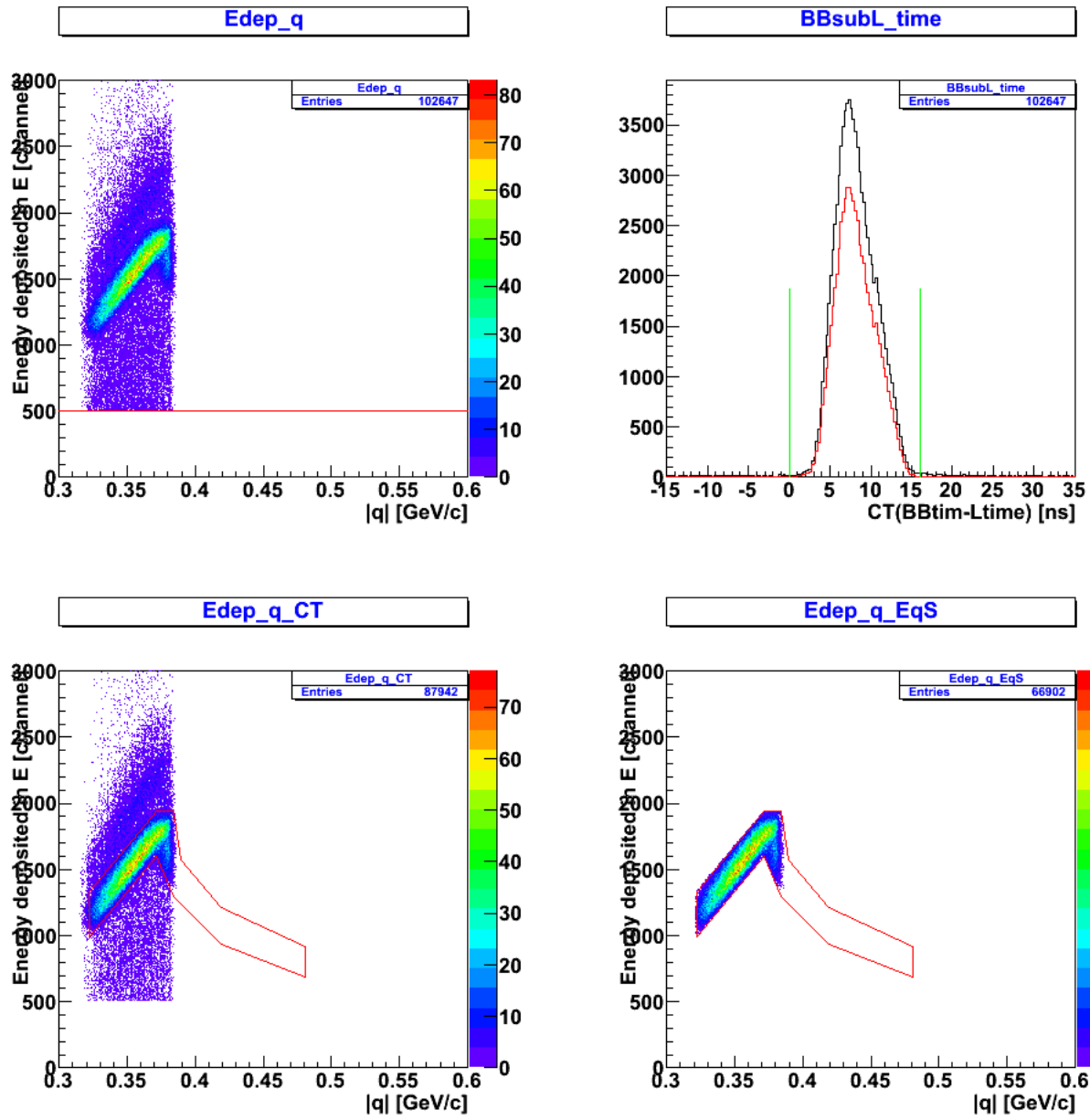


Figure 2.3 Proton PID in E plan

- 2.3.1 $E > 500$ channel (all hit)
- 2.3.2 CT(BB-L time) cut in green
- 2.3.3 E vs q after |CT| cut
- 2.3.4 E vs q after E_q graphic cut

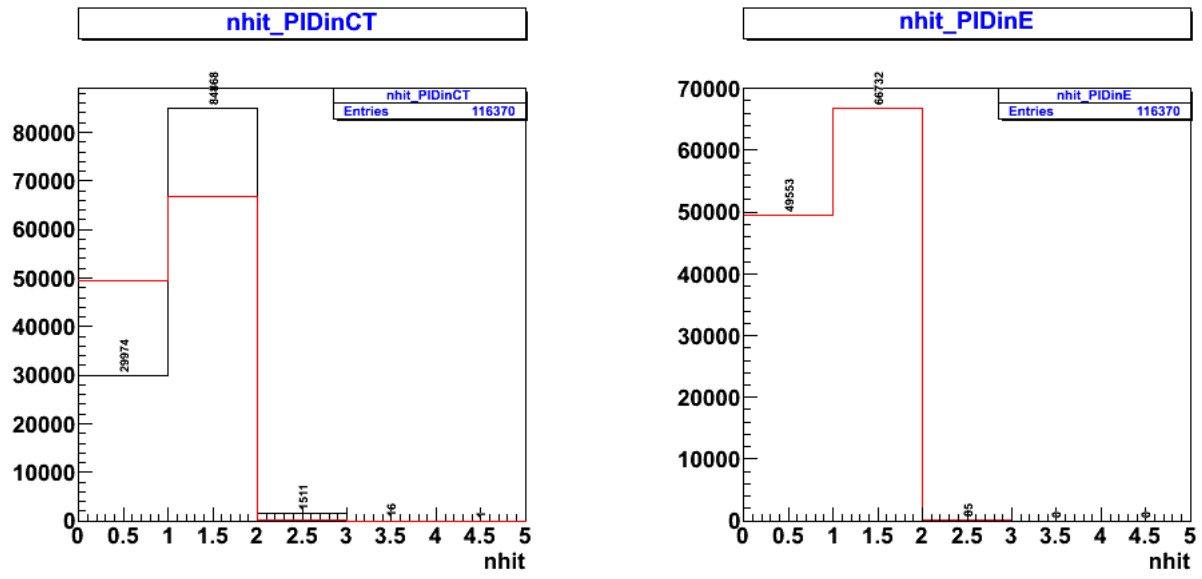


Figure 2.4

2.4.1 *nhit per event pass |CT|*

2.4.2 *nhit per event pass |CT| and E_q graph*

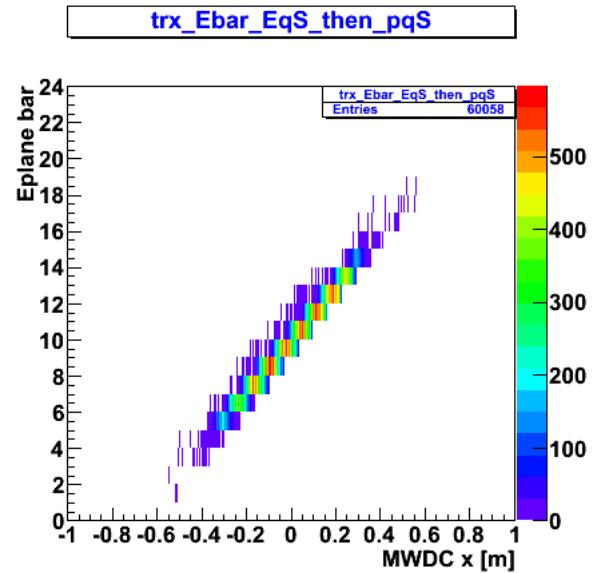
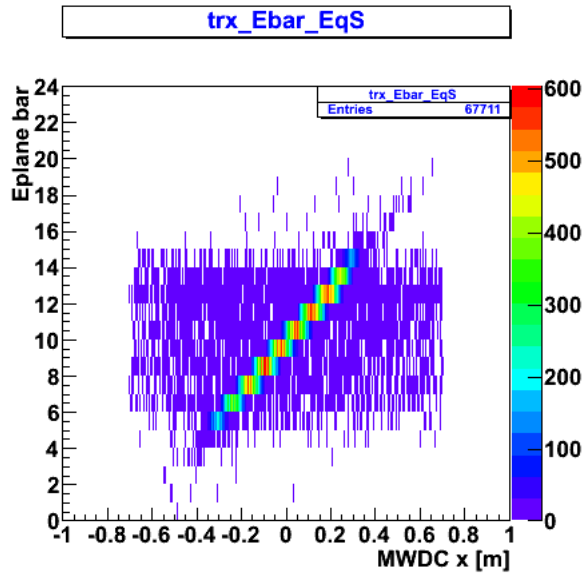
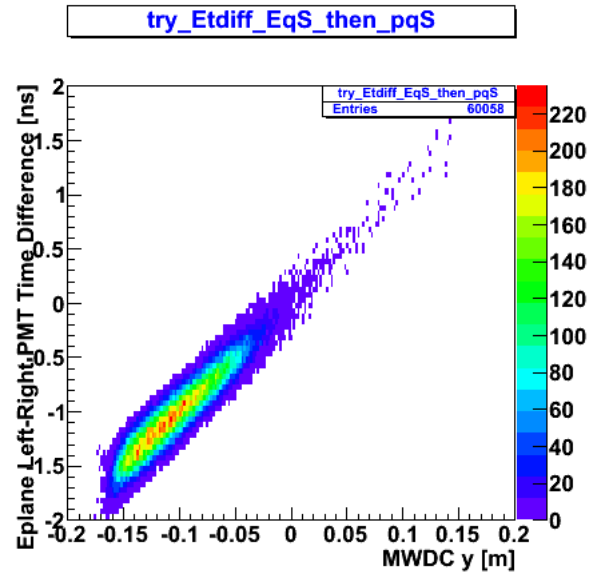
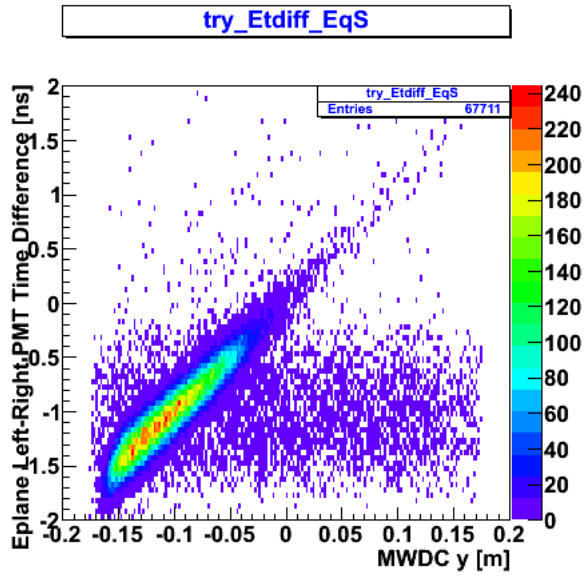


Figure 2.5 focusing on Event with single hit pass Proton PID in E

- 2.5.1 *E bar L/R time difference vs track y*
- 2.5.2 *E bar L/R time difference vs track y with track matching E location cut*
- 2.5.3 *E bar vs track x*
- 2.5.4 *E bar vs track x with track matching E location cut*

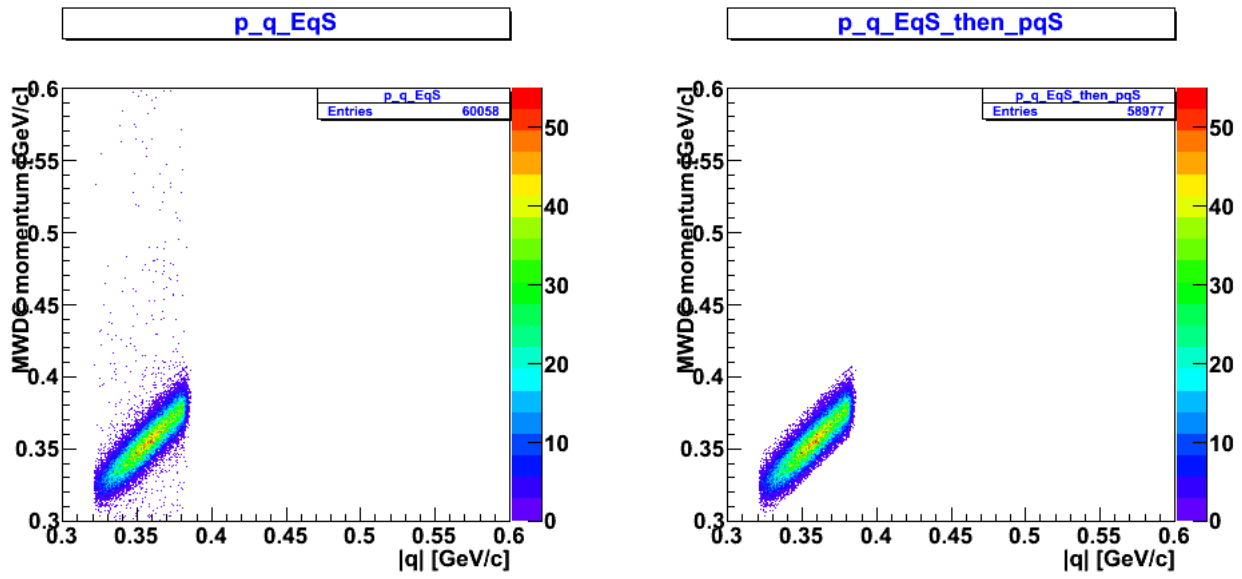


Figure 2.6 Proton PID in MWDC after PID in E

2.6.1 MWDC momentum vs $|q|$ after track matching

2.6.2 MWDC momentum vs $|q|$ after track matching and $|q - p|$ cut

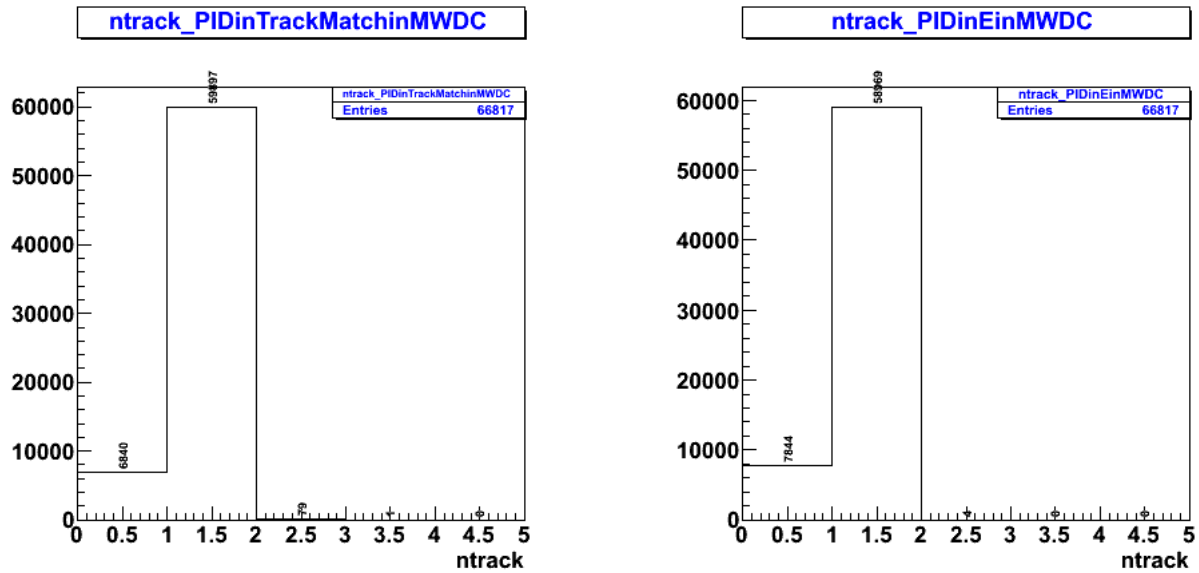


Figure 2.7

2.7.1 $ntrack$ per event pass track matching cut

2.7.2 $ntrack$ per event pass track matching cut and $|q-p|$

Data for run 2037

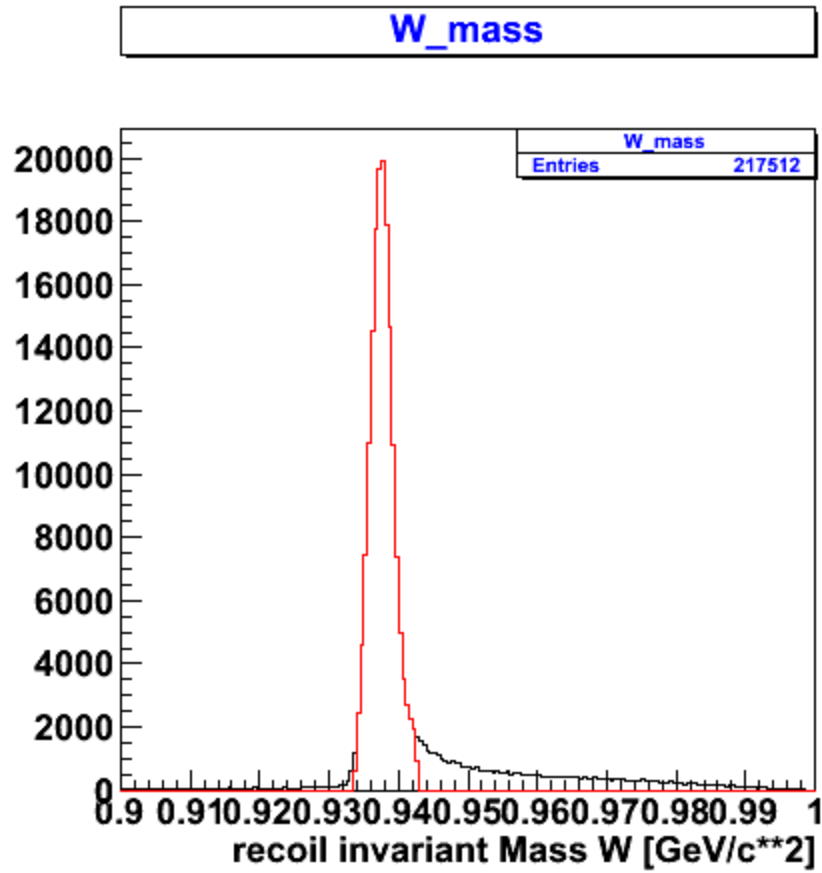


Figure 3.1: W mass

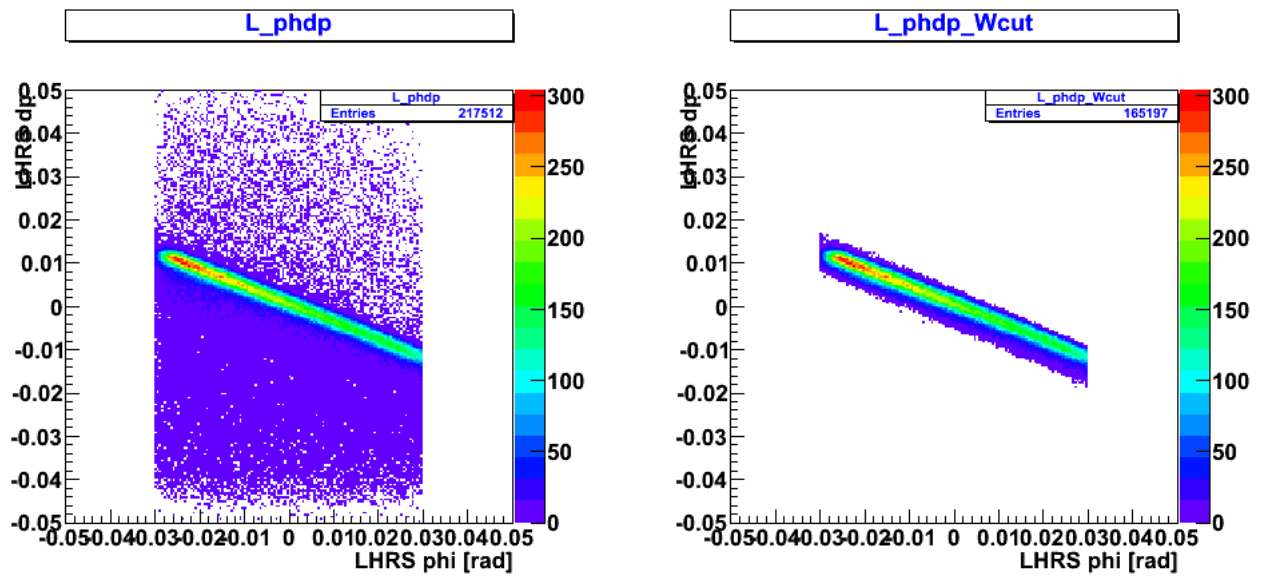


Figure 3.2: Strip cut in LPHS dp vs LPHS phi from making $|W - M_p|$ cut

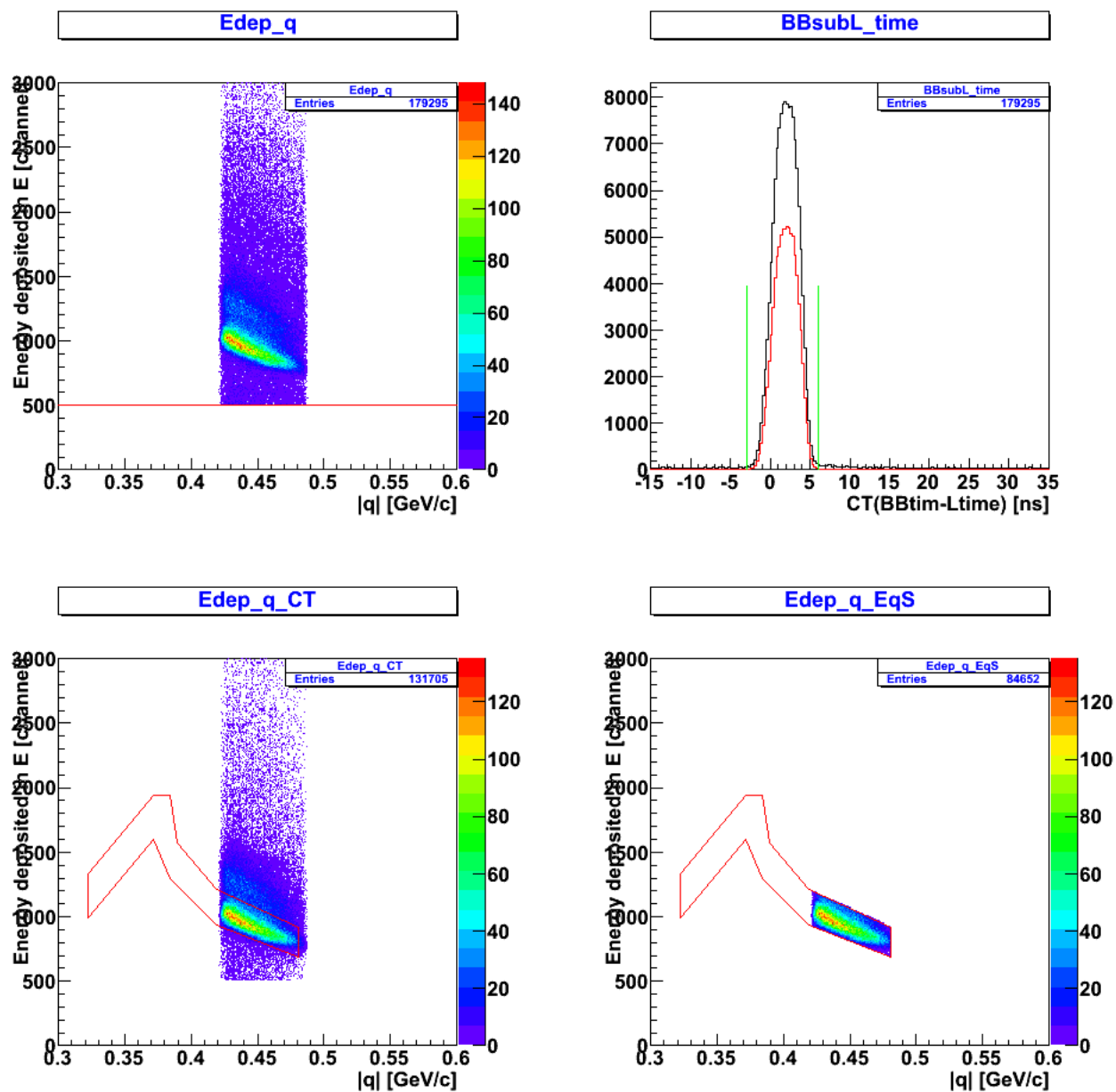


Figure 3.3 Proton PID in E plane

- 3.3.1 $E > 500$ channel (all hit)
- 3.3.2 CT(BB-L time) cut in green
- 3.3.3 E vs q after $|CT|$ cut
- 3.3.4 E vs q after E_q graphic cut

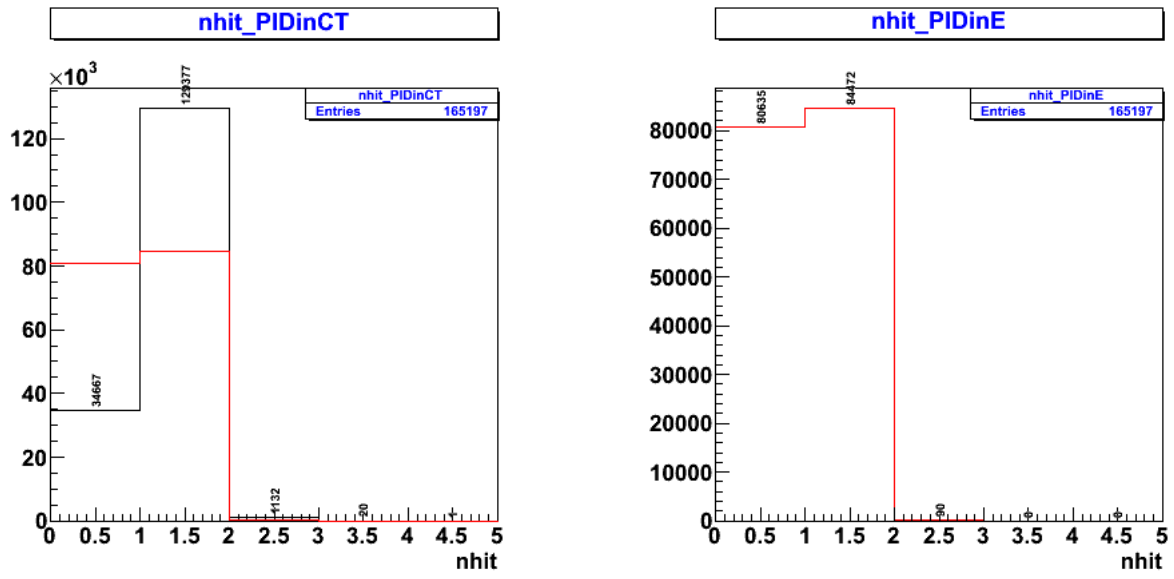


Figure 3.4

3.4.1 *nhit per event pass |CT|*

3.4.2 *nhit per event pass |CT| and E_q graph*

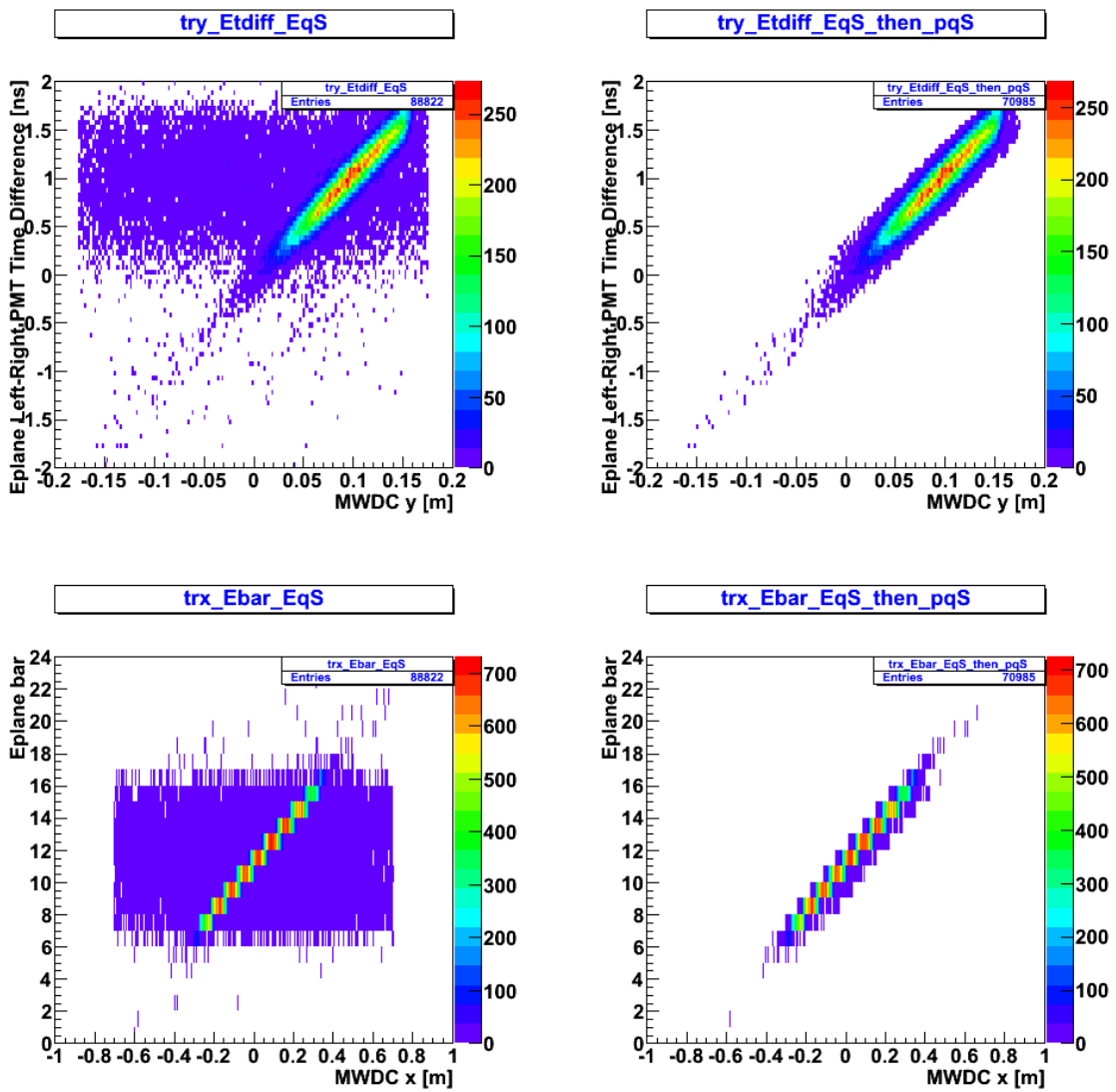


Figure 3.5 focusing on Event with single hit pass Proton PID in E

- 3.5.1 E bar L/R time difference vs track y
- 3.5.2 E bar L/R time difference vs track y with track matching E location cut
- 3.5.3 E bar vs track x
- 3.5.4 E bar vs track x with track matching E location cut

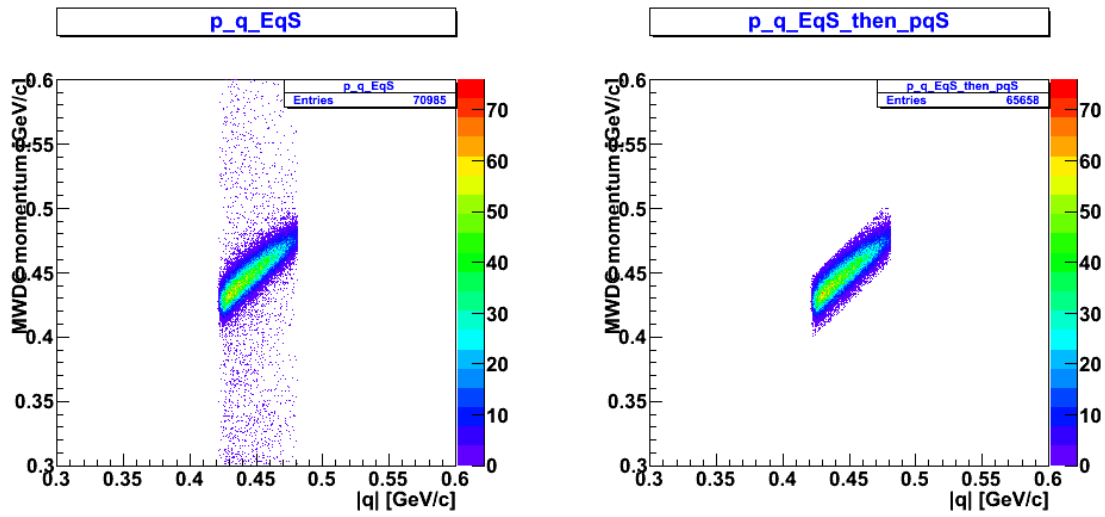


Figure 3.6 Proton PID in MWDC after PID in E

3.6.1 MWDC momentum vs $|q|$ after track matching

3.6.2 MWDC momentum vs $|q|$ after track matching and $|q - p|$ cut

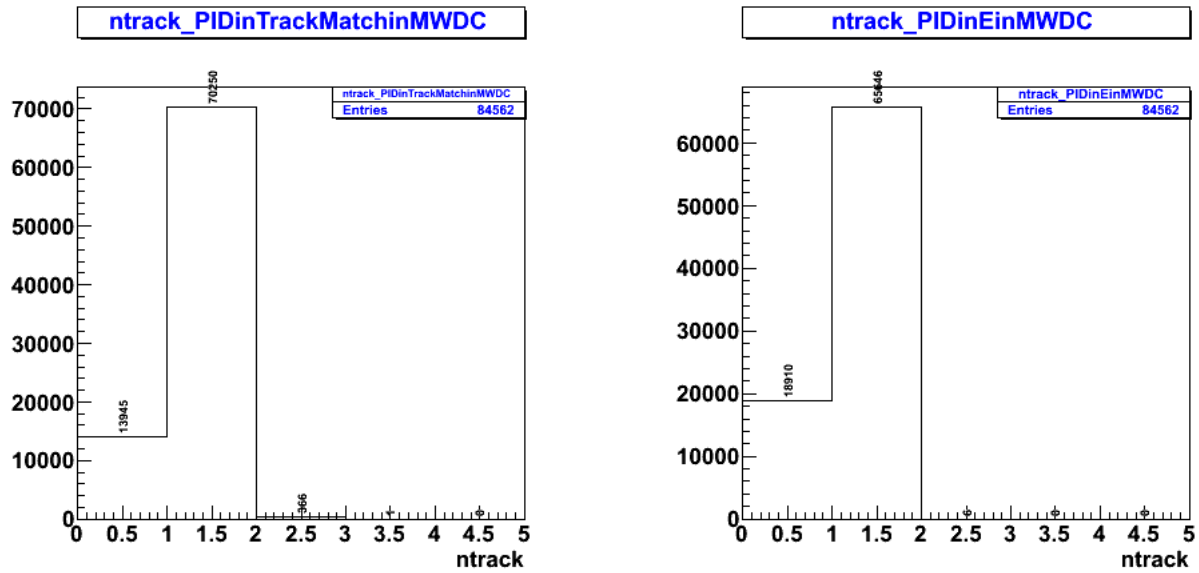


Figure 3.7

3.7.1 $ntrack$ per event pass track matching cut

3.7.2 $ntrack$ per event pass track matching cut and $|q-p|$