BigBite Test for Transversity

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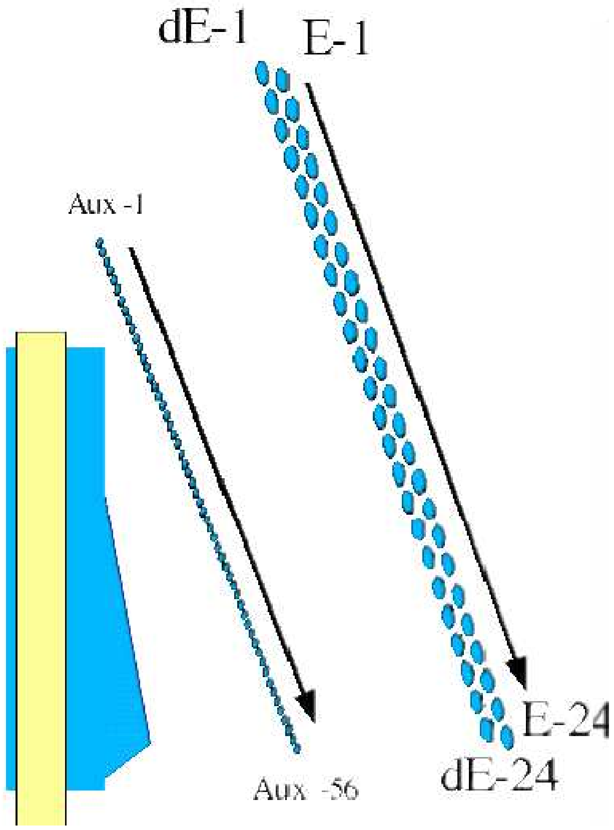
Polarized He3 Collaboration Meeting

(Jul 22, 2005)

Data Taken

Kin	E_e (GeV)	I_e (μA)	Target	θ_B (deg.)	run	Time/Events (min/k)	T3/T6 (kHz)
Cos.	-	-	-	99	3441	7/1	7.3/0.1Hz
Kin1	$I_B = -550$ A						
	4.6	2	4 cm Dummy	99	3435	6/105	1.1/1.6
	4.6	2	4 cm LD2	99	3436	8/238	2.4/1.9
	4.6	1	4 cm LD2	99	3437	9/177	1.2/0.5
	4.6	0.5	4 cm LD2	99	3438	9/133	0.6/0.1
	4.6	2	4 cm LH2	99	3439	7/157	1.1/1.1
	4.6	0.5	15 cm LD2	99	3440	6/150	2.2/1.3
	4.6	2	Empty	99	3442	2/0.4	7.2/0.5Hz
Kin2	$I_B = 0$ A						
	4.6	1	4 cm LD2	99	3443	5/235	1.0/2.0

Trigger Setup



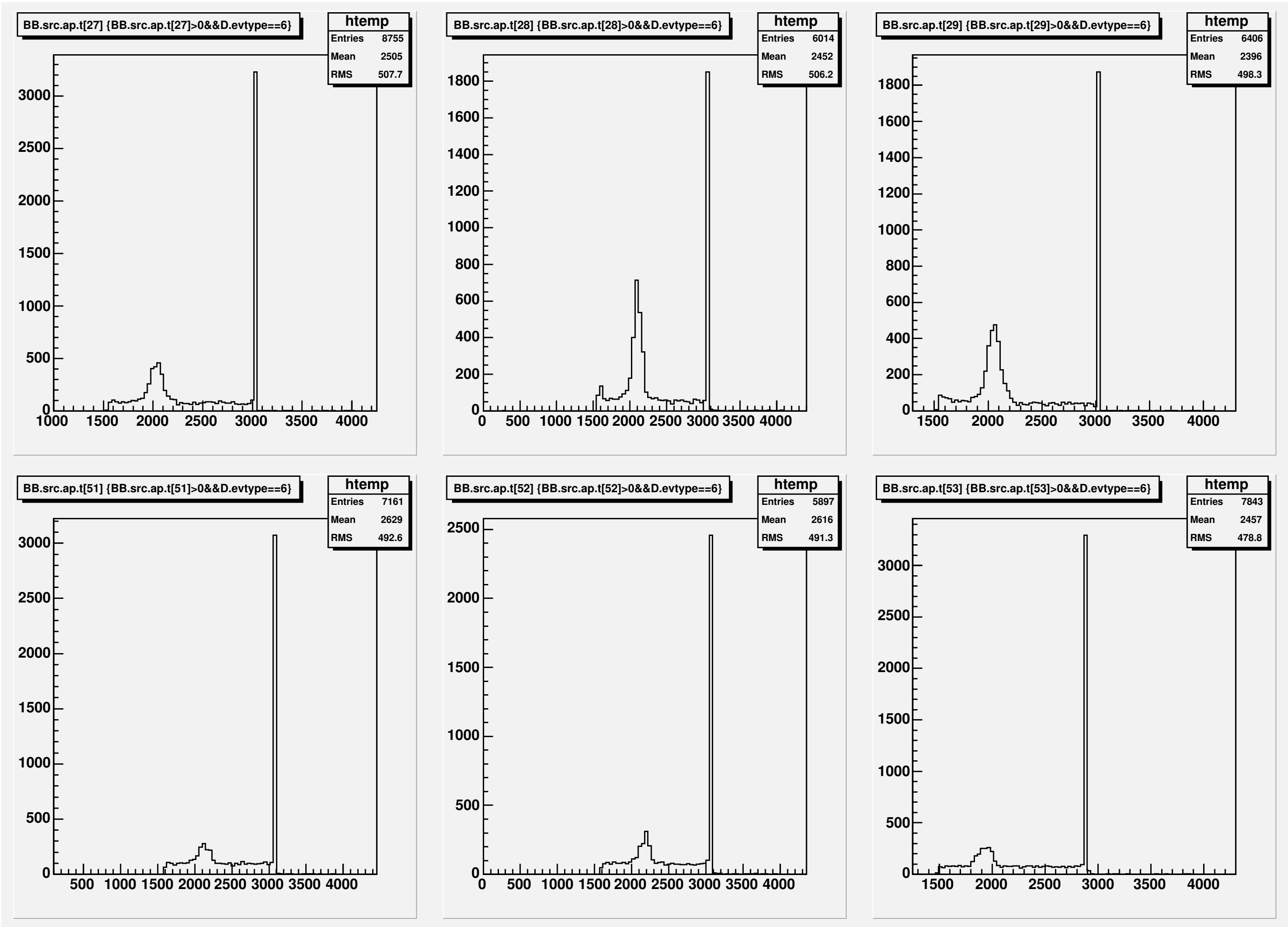
Which paddles are used to form T6 (aux.and.dE.and.E)?

Plan: aux#27-29, aux#53-55; dE#11-12R, dE#22R; E#10-12L, E#21-22L

Fact: aux#28-30,aux#52-54; dE#23R; E#10-12L, E#21-22L

dE#23 overlaps with E#22 and E#23

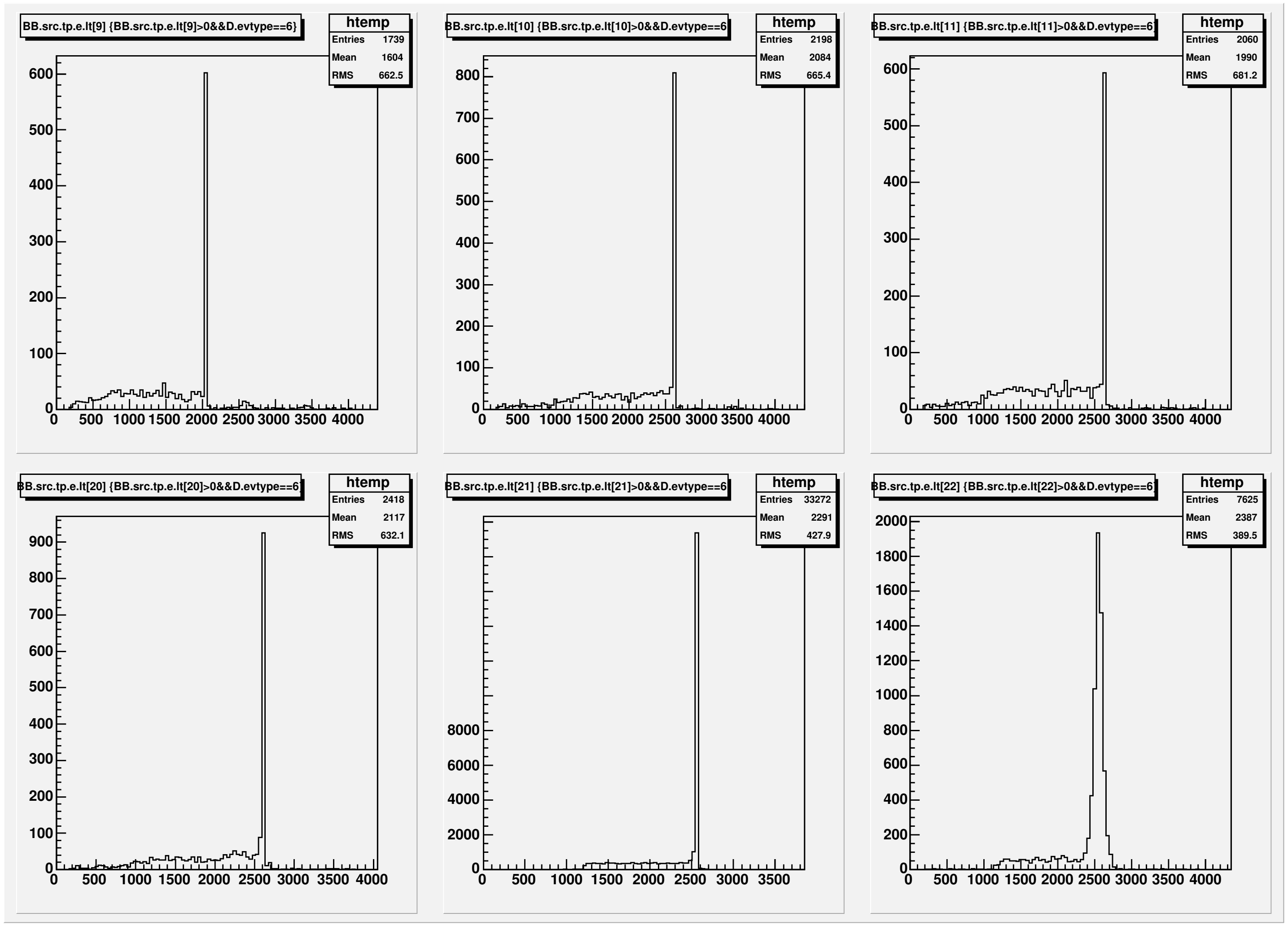
Aux Plane TDC for T6 Events



Aux#28, Aux#29, Aux#30

Aux#52, Aux#53, Aux#54

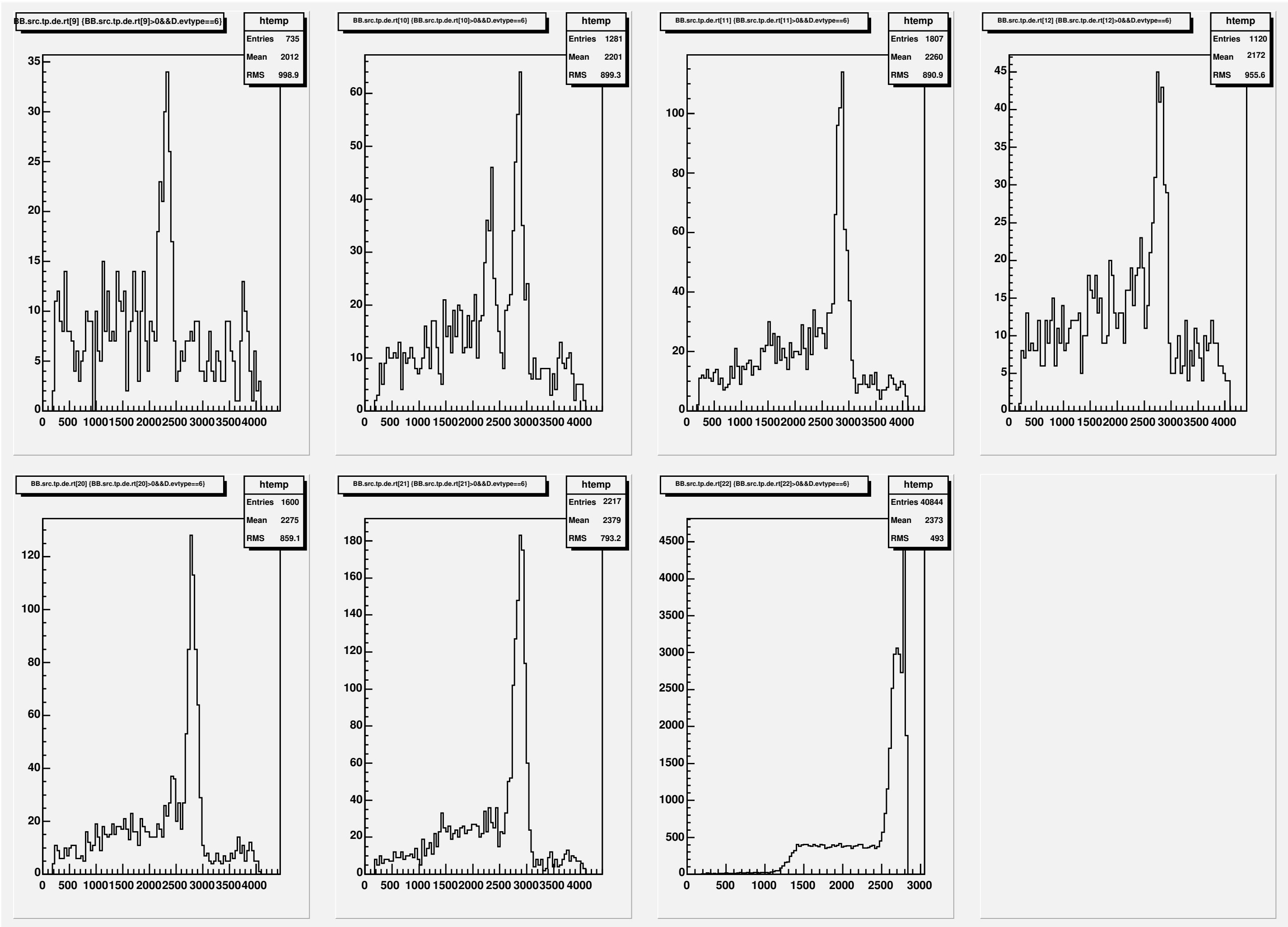
E Plane TDC for T6 Events



E#10L, E#11L, E#12L

E#21L, E#22L as well as E#23L

dE Plane TDC for T6 Events



dE#10R, dE#11R, dE#12R, dE#13R

dE#21R, dE#22R and dE#23R

Random Coincidence

$$n_{acc} = (t_E + t_{dE}) * (t_{E\&dE} + t_{aux}) * n_{aux} * n_E * n_{dE}$$

run	n_{acc}	T6	T6^a	n^a_{acc}	T6^a-n^a_{acc}
3435	1.478	1.635			
3436	2.776	1.940	1.868	0.982	0.886
3437	0.410	0.467	0.459	0.146	0.313
3438	0.045	0.108	0.107	0.016	0.091
3439	1.270	1.076	1.043	0.447	0.596
3440	1.204	1.253			
3441	0.000	0.000			
3442	0.000	0.001			
3443	1.040	1.963	1.927	0.382	1.545

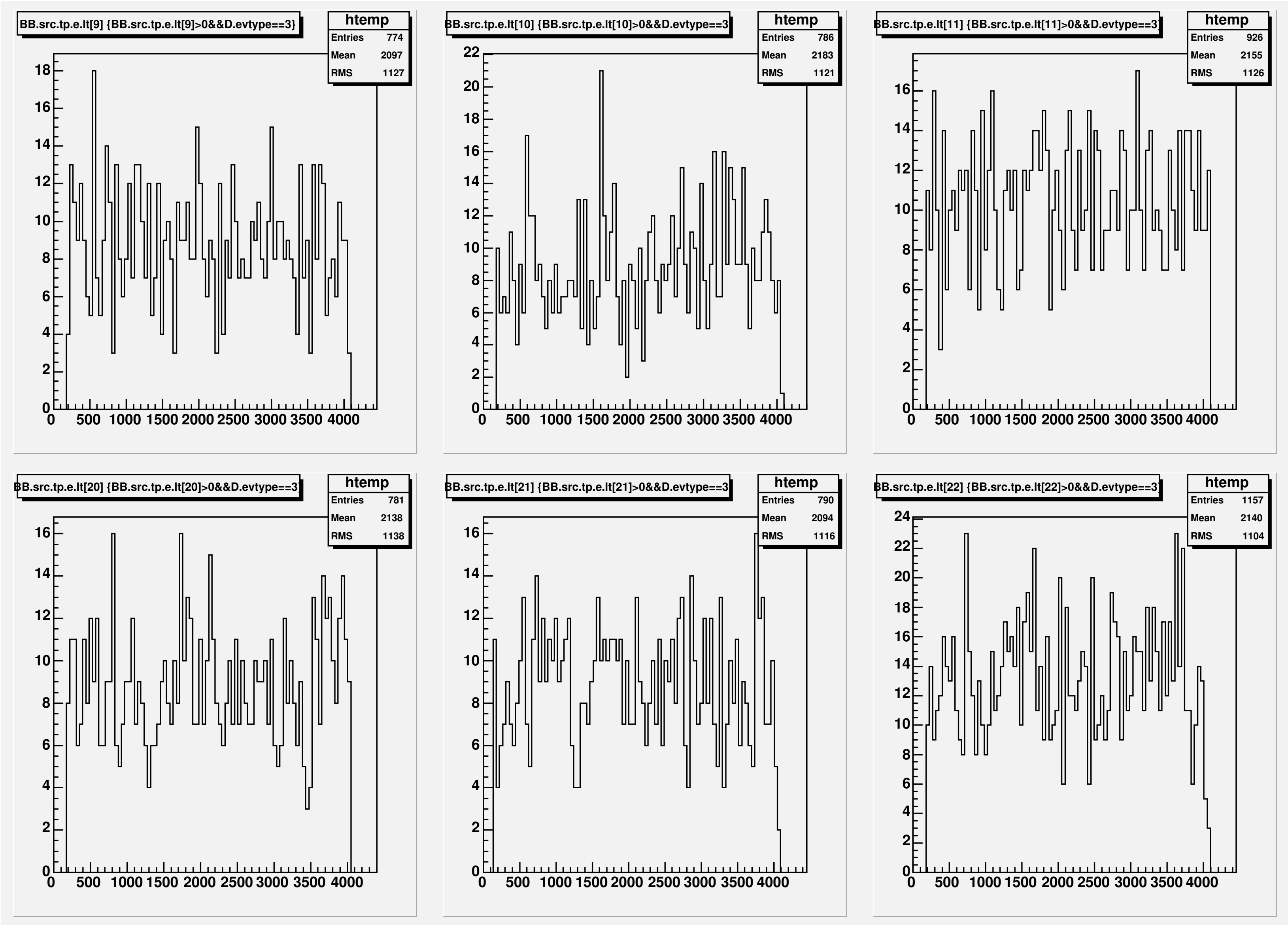
n_{acc} with three dE paddles; n^a_{acc} with a cut on $TDC > 0$ for dE#23R

$\boxed{\text{PMT Rates}}$

- PMT rates from the scalers: total scaler counts average over time.
- PMT rates from the TDCs:

$$n_{TDC} = \tau * n_{T3} * n_{PMT}$$

$$n_{PMT} = n_{TDC}/(\tau * n_{T3}) = N_{TDC}/(\tau * N_{T3}) \; .$$


BB.src.tp.e.lt[9] {BB.src.tp.e.lt[9]>0&&D.evtype==3}
htemp
Entries 774
Mean 2097
RMS 1127
BB.src.tp.e.lt[10] {BB.src.tp.e.lt[10]>0&&D.evtype==3
htemp
Entries 786
Mean 2183
RMS 1121
BB.src.tp.e.lt[11] {BB.src.tp.e.lt[11]>0&&D.evtype==3
htemp
Entries 926
Mean 2155
RMS 1126
BB.src.tp.e.lt[20] {BB.src.tp.e.lt[20]>0&&D.evtype==3
htemp
Entries 781
Mean 2138
RMS 1138
BB.src.tp.e.lt[21] {BB.src.tp.e.lt[21]>0&&D.evtype==3
htemp
Entries 790
Mean 2094
RMS 1116
BB.src.tp.e.lt[22] {BB.src.tp.e.lt[22]>0&&D.evtype==3
htemp
Entries 1157
Mean 2140
RMS 1104

Thank Huan Yao!

Run	N_{T3}		Aux PMT #						dE PMT #			E PMT #				
			28	29	30	52	53	54	11R	12R	23R	10L	11L	12L	21L	22L
3436	100646	N_{TDC}	2562	1407	1484	2344	1946	2749	4607	6396	6014	774	786	926	781	790
		$scaler \rightarrow$	181	102	105	170	141	184	324	444	420	49	52	60	52	50
		$TDC \rightarrow$	186	102	108	170	141	199	334	464	436	56	57	67	57	57
3437	113665	N_{TDC}	1520	807	854	1414	1106	1542	2721	3875	3745	470	484	554	460	454
		$scaler \rightarrow$	95	53	55	89	74	96	173	242	229	25	27	31	27	26
		$TDC \rightarrow$	98	52	55	91	71	99	175	249	240	30	31	36	30	29
3438	91311	N_{TDC}	621	319	323	598	451	644	1114	1521	1516	171	182	243	189	215
		$scaler \rightarrow$	45	25	26	43	35	46	83	117	112	12	13	15	13	12
		$TDC \rightarrow$	50	26	26	48	36	51	89	122	121	14	14	19	15	17
3439	81803	N_{TDC}	1684	885	912	1553	1260	1781	3474	4742	4521	377	413	470	443	452
		$scaler \rightarrow$	142	79	81	133	110	144	300	411	386	30	33	38	34	32
		$TDC \rightarrow$	150	79	81	138	112	159	310	423	403	34	37	42	40	40

PMT Threshold Settings

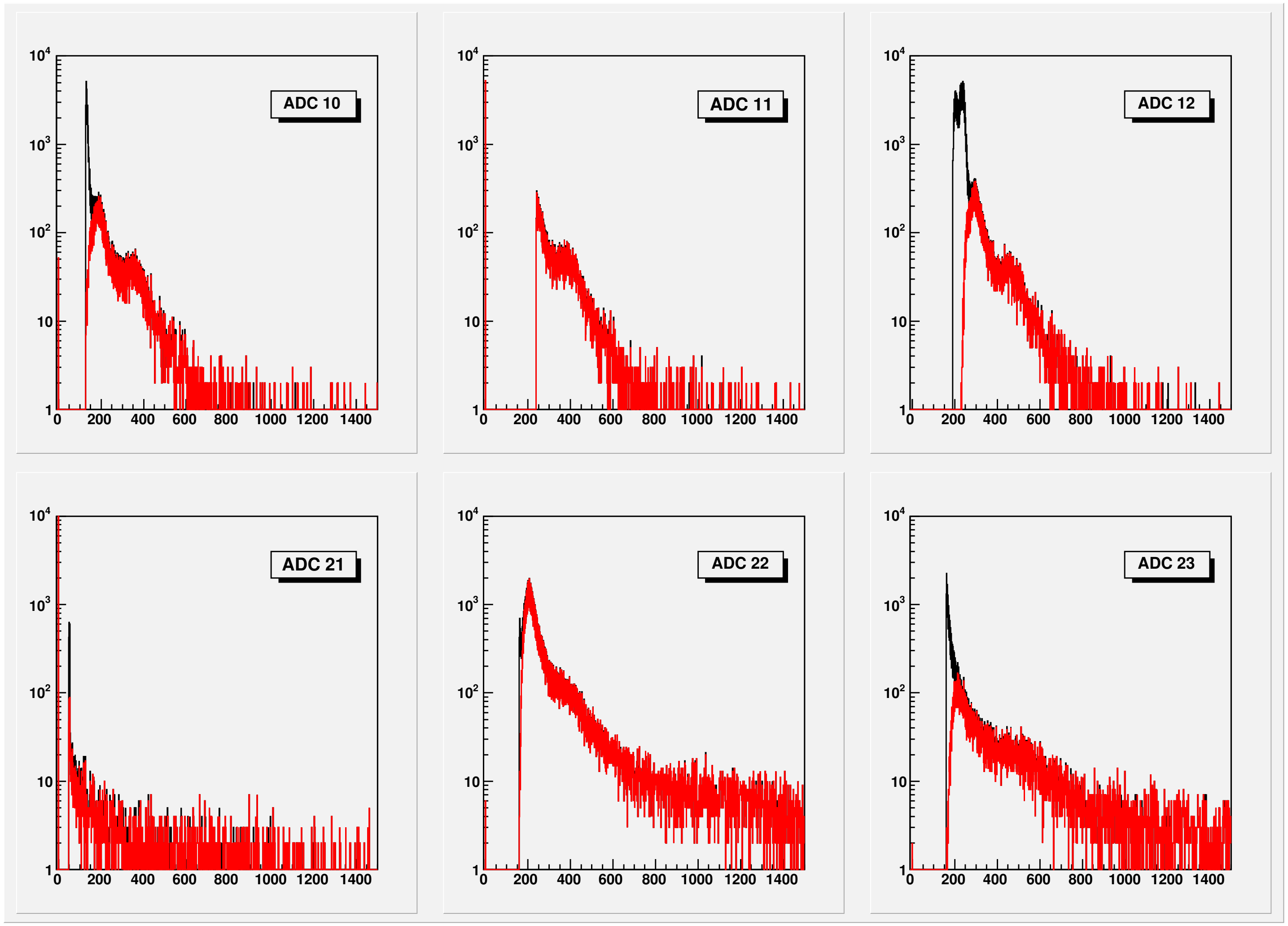
Setting#	Aux Plane (mV)	dE Plane (mV)	E Plane (mV)	T6 (Hz)
I	-80	-120	-60	1
II	-40	-60	-30	4
III	-20	-30	-15	19
IV	-20	-30	-30	6
V	-20	-30	-10	32
VI	-20	-30	-20	14
VII	-20	-40	-20	8

PMT Threshold in terms of Energy Loss

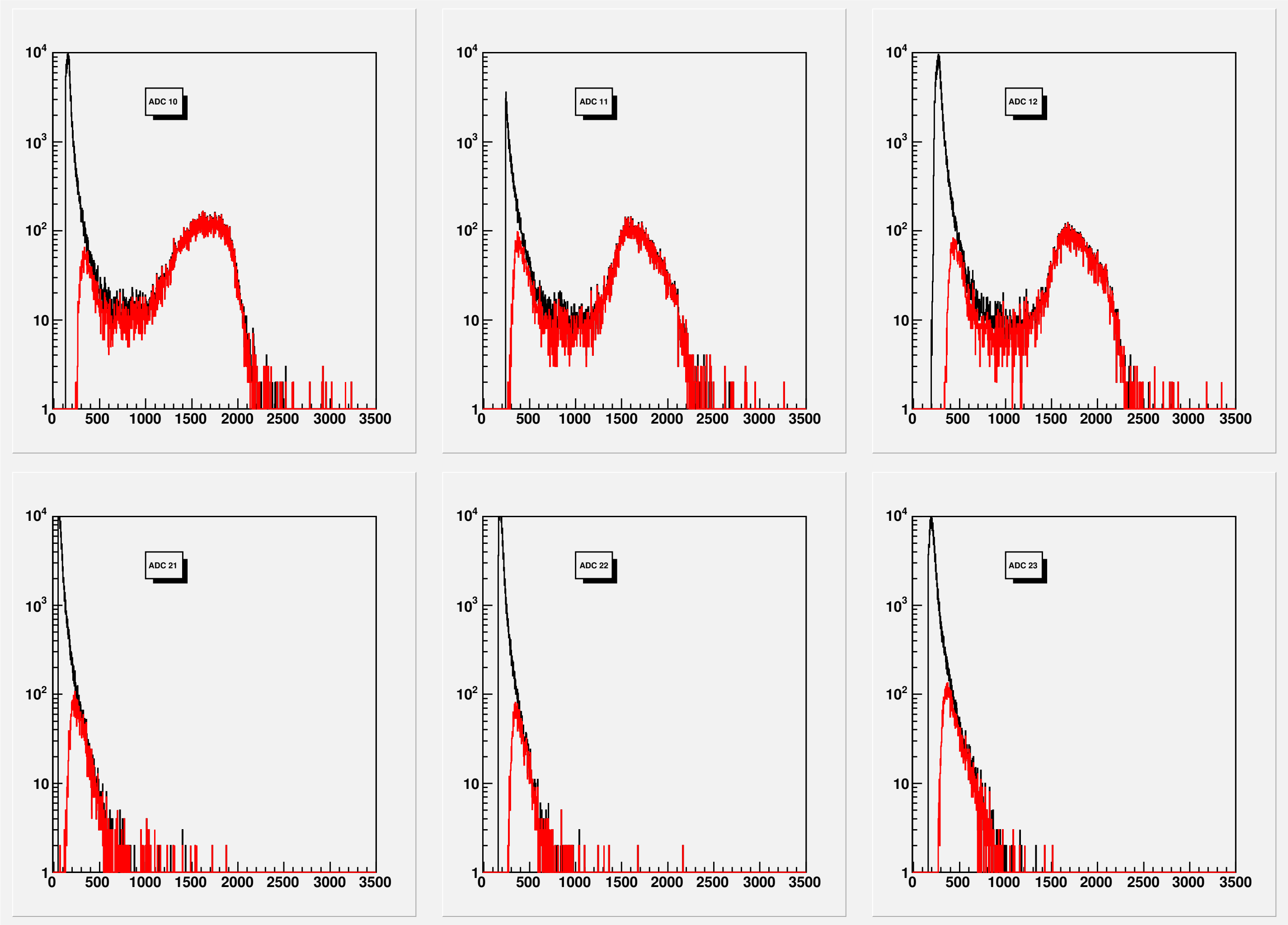
$$Eloss_{\rm th} = Eloss_{ep}\frac{Peak_{ep} - Ped}{ADC_{th} - Ped}$$

PMT	Pedestal	Suppression	ep Peak	TDC threshold		Rate	SRC threshold		Rate
	Run 3289(2202)	(Ch)	(Ch)	(Ch)	(MeV)	(kHz)	(Ch)	(MeV)	(kHz)
E10L	123±16(128)	127	1621	184	1.3	49	383	5.4	126
E11L	173±16(182)	239	1672	$<$239	$<$1.4	52	408	4.9	158
E12L	234±16(231)	191	1755	293	1.2	60	473	4.9	161
aux29	79±0.8(85)	95	1231	119	0.07	102	362	0.5	245
aux30	91±2(98)	111	1262	137	0.08	105	339	0.4	219
dE10R	197±16(199)	207	757	280	0.5	274	529	1.8	245
dE11R	288±16(291)	303	990	382	0.4	324	655	1.6	359

E Plane ADC for T6 Events



E Plane ADC for ep Events



Magnet On and Off

PMT	Manget On (3437)	Magnet Off (3443)	PMT	Manget On (3437)	Magnet Off (3443)	PMT	Manget On (3437)	Magnet Off (3443))
Aux1	17.15	50.9*	dE1L	138.8	77.7*	E1L	27.36	20.7*
Aux2	18.22	62.1*	dE1R	66.90	39.4*	E1R	42.84	32.8*
Aux11	32.18	140.8	dE5L	230.2	153.6	E5L	21.57	30.50
Aux12	34.41	146.5	dE5R	176.4	121.0	E5R	14.86	22.60
Aux21	75.81	207.4	dE9L	210.8	176.3	E9L	19.16	34.65
Aux22	114.3	244.2	dE9R	173.4	145.7	E9R	23.54	36.28
Aux31	52.53	189.5	dE14L	237.6	227.3	E14L	24.01	48.65
Aux32	109.2	241.2	dE46R	138.3	141.2	E14R	16.66	40.25
Aux41	98.61	220.9	dE18L	230.3	228.6	E18L	22.93	46.05
Aux42	53.29	171.7	dE18R	224.5	226.4	E18R	31.30	55.35
Aux51	54.79	153.0	dE22L	242.0	245.6	E22L	26.99	46.22
Aux52	93.20	188.9	dE22R	187.9	189.9	E22R	30.39	50.25
Aux55	101.7	194.2	dE24L	191.7	196.9	E24L	46.33	60.30
Aux56	85.30	165.7	dE24R	209.5	214.8	E24R	86.58	100.9