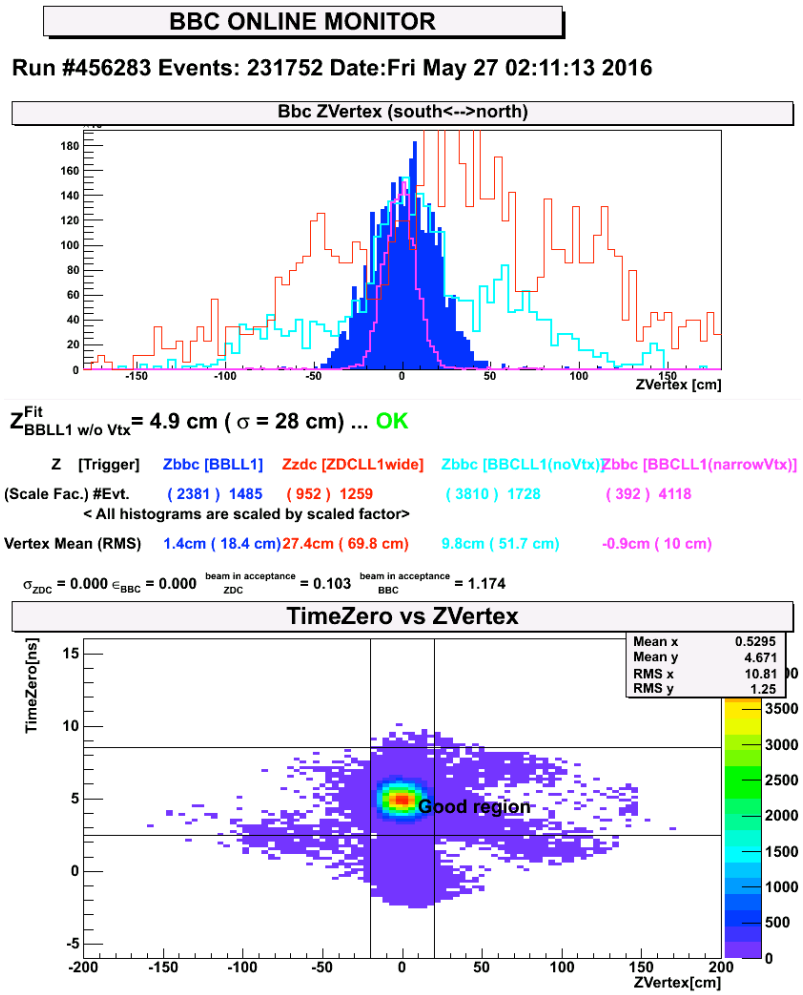
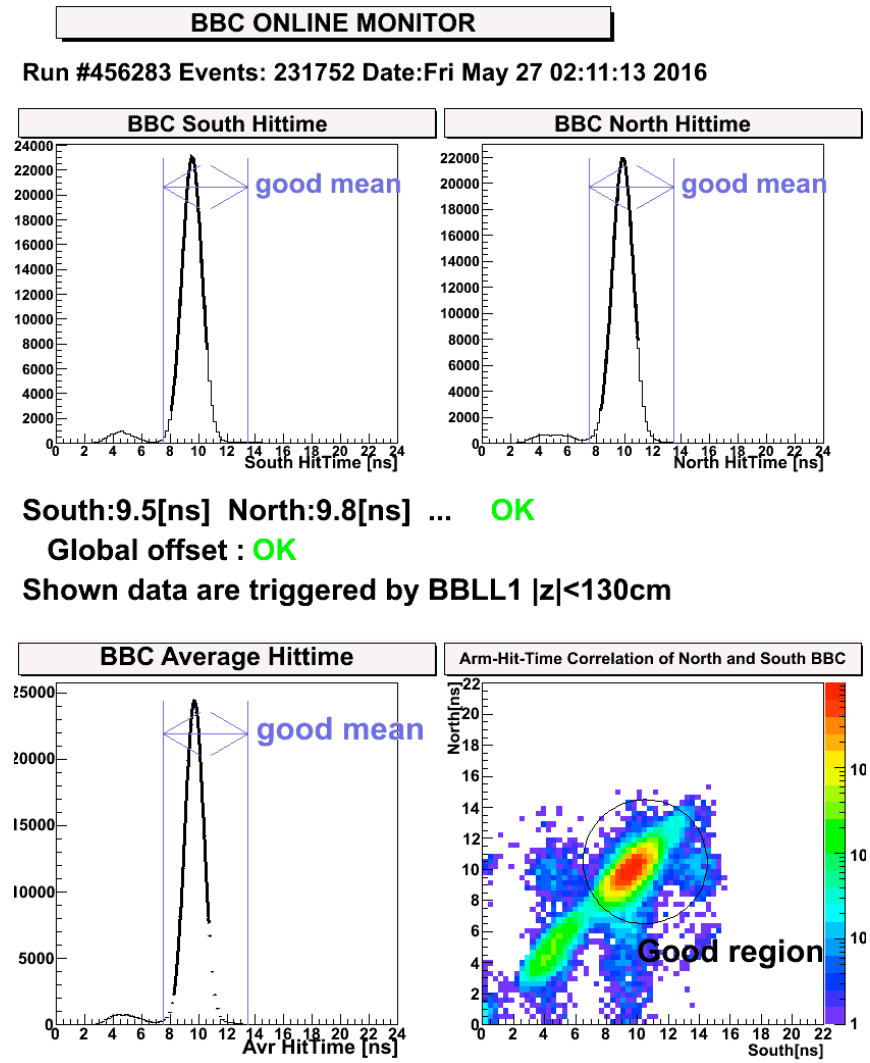
FVTX MB Trigger Status @ 20GeV

5-17-2016 01:24:12

D+AU 62GEV RUN456384

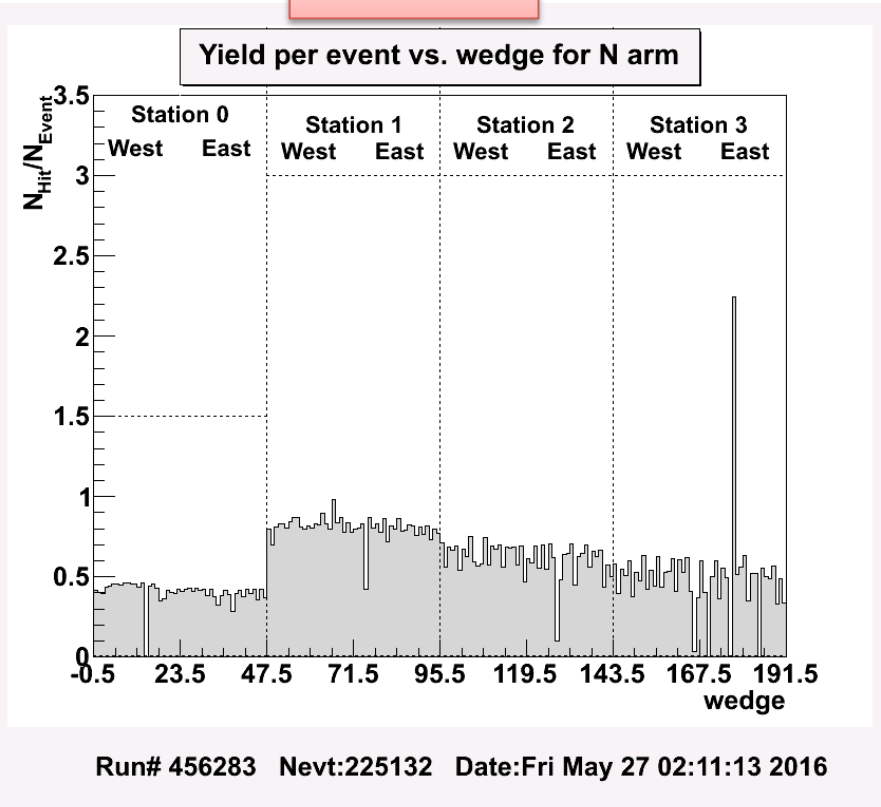
BBC z-Distribution at Run#456283



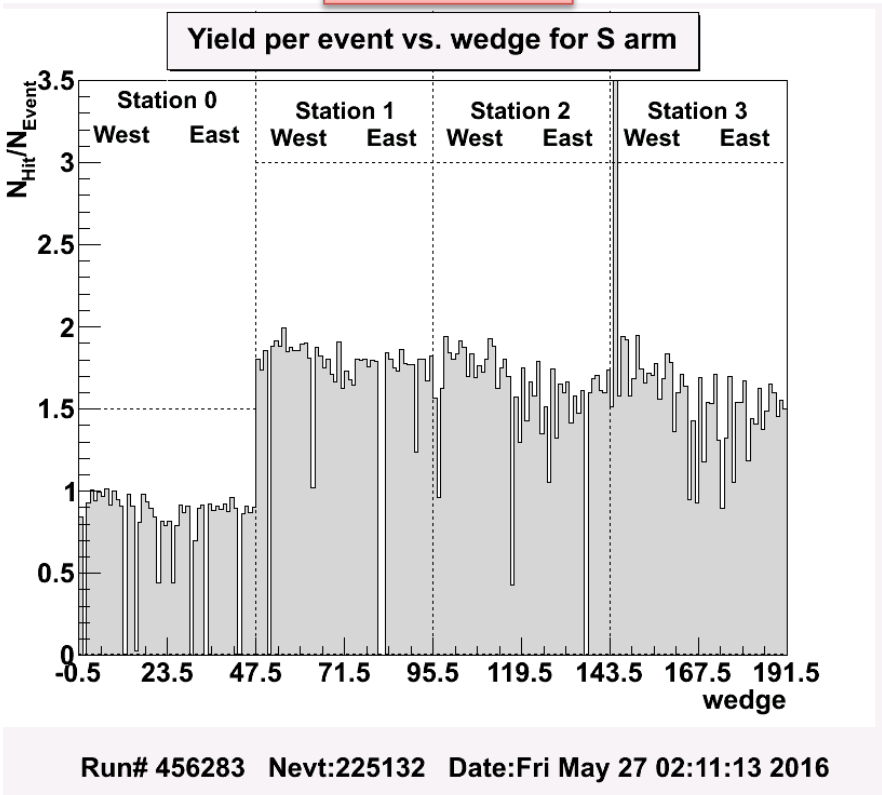


FVTX Wedge Hit per Event

North Arm



South Arm



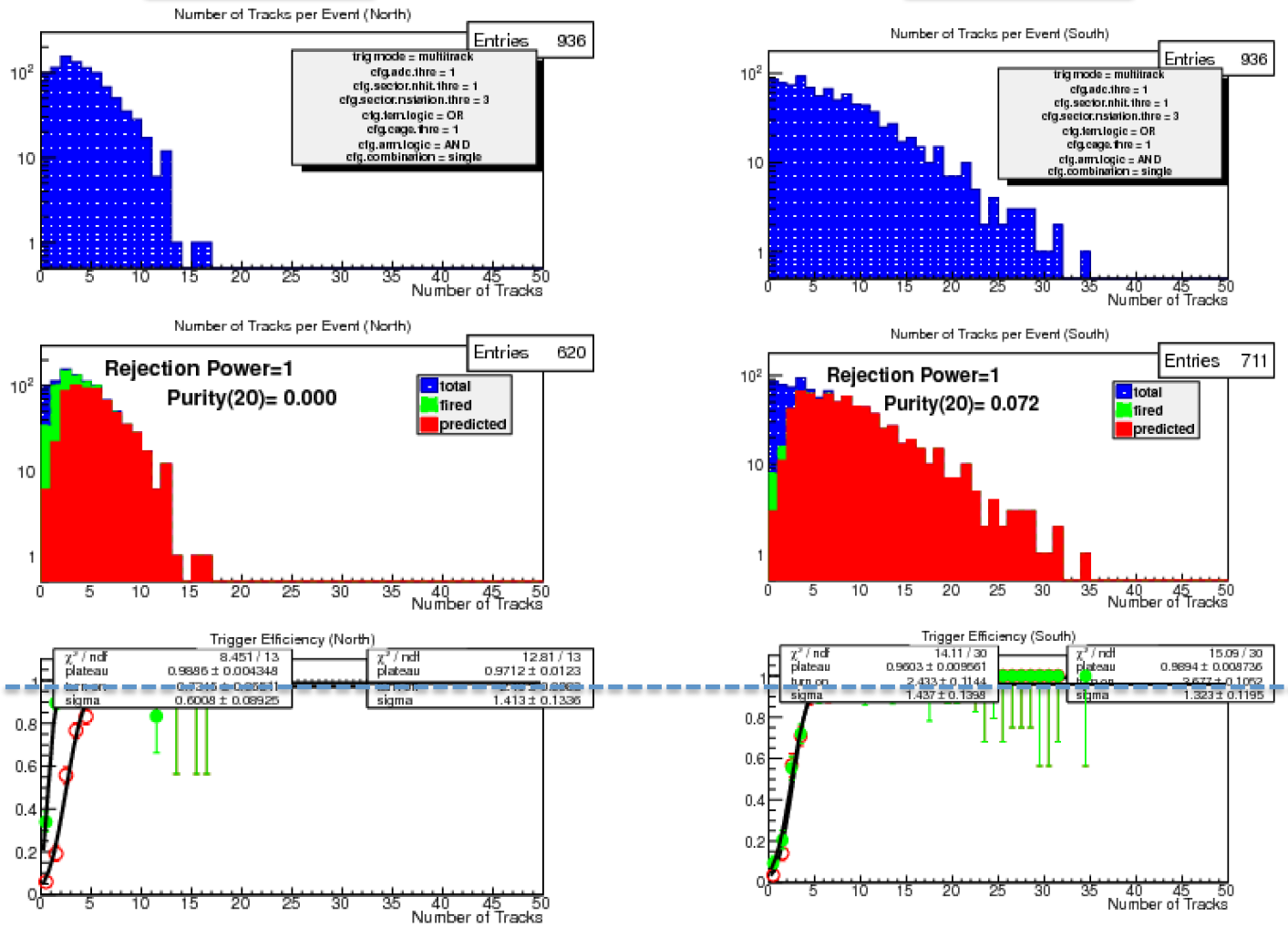
0.5 ~ 1 hit/wedge/event

1 ~ 2 hit/wedge/event

Run456283 (d+Au@64GeV) Performance

North Arm

South Arm



Efficiency turn on reaches 1 at # of track>5

Both North and South arm shows > 90% matching efficiency between “predicted” and “actuary fired” events. FVTX trigger seems to be functioning correctly.

Analyzed Data

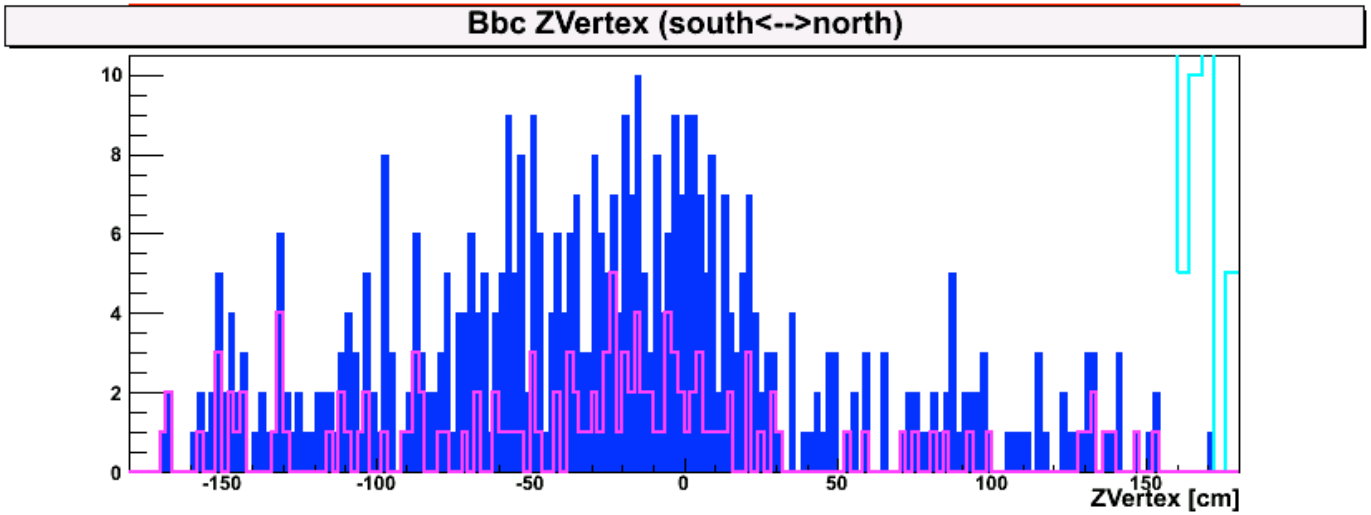
Run #	BBC z-VTX	FVTX average hits	FVTX trigger
456451	bad	reasonable	suspicious
456540	reasonable	Too high	suspicious

D+AU 20GEV

Run#456523 20 GeV bad beam quality

BBC ONLINE MONITOR

Run #456523 Events: 150543 Date:Sun May 29 17:05:29 2016



$Z^{Fit}_{BBLL1\ w/o\ Vtx}$ = -378.3 cm (σ = 299 cm) ... See Z_{ZDC} or Ask SL

Z [Trigger]	Zbbc [BBLL1]	Zzdc [ZDCLL1wide]	Zbbc [BBCLL1(noVtx)]	Zbbc [BBCLL1(narrowVtx)]
(Scale Fac.) #Evt.	(1) 109456	(100) 1	(10) 51884	(1e+07) 34525

< All histograms are scaled by scaled factor>

Vertex Mean (RMS)	-22.8cm (70.6 cm)	-2.14748e+08cm (-2.14748e+08 cm)	-2.14748e+08cm (2.14748e+08 cm)	-30.1cm (73.8 cm)

σ_{ZDC} = 0.000 ϵ_{BBC} = 0.000 $^{\text{beam in acceptance}}_{\text{ZDC}}$ = 0.000 $^{\text{beam in acceptance}}_{\text{BBC}}$ = 0.072

Run#456523 Trigger Rates

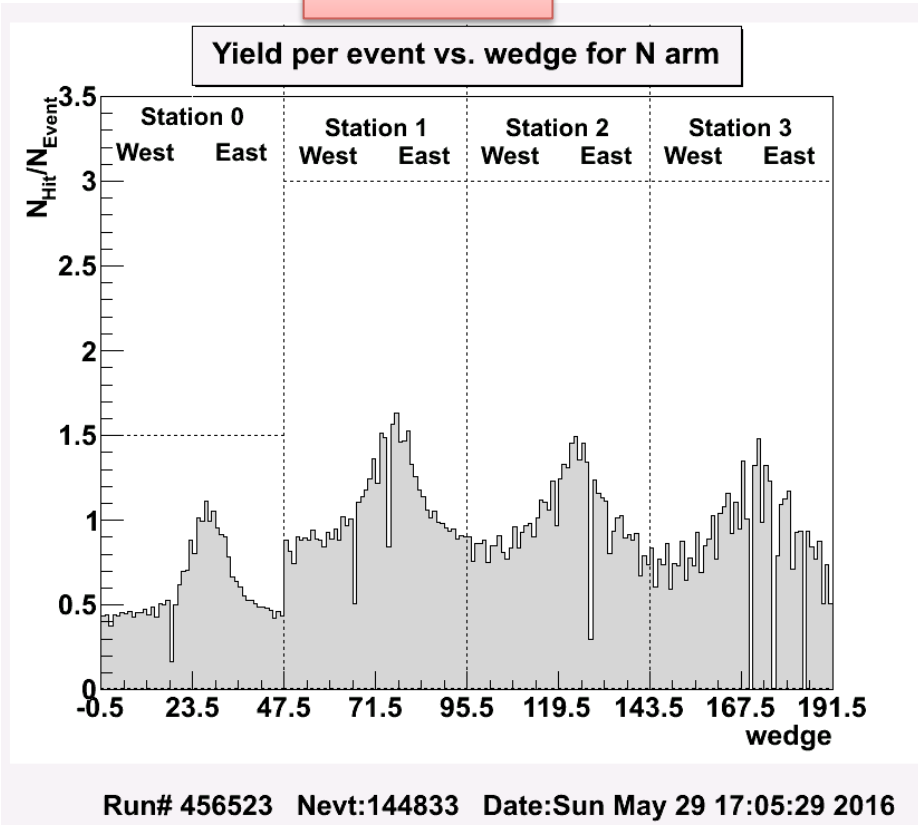
Note: L1 Trigger Scaler Entries in pink indicate an approximate count due to the fact that Run Control may have crashed and the run was not ended properly.
select * from trigger where runnumber = 456523 order by bitnb

Name	Bit Mask	Scale Down	State	Raw Trigger Count	Raw Trigger Rate	Live Trigger Count	Live Trigger Rate	Scaled Trigger Count	Scaled Trigger Rate	Livetime
BBCLL1(>0 tubes)	0x00000001	0	Enabled	1527470	1493.13	1117930	1092.80	1117930	1092.80	0.73
BBCLL1(>0 tubes) novertex	0x00000002	9	Enabled	7077306	6918.19	5247664	5129.68	524766	512.97	0.74
ZDCLL1wide	0x00000004	99	Enabled	1973	1.93	247	0.24	2	0.00	0.13
BBCLL1(>0 tubes)_central_narrowvtx	0x00000008	9999999	Enabled	36820	35.99	29606	28.94	0	0.00	0.80
BBCLL1(>0 tubes) narrowvtx	0x00000010	9999999	Enabled	481500	470.67	355172	347.19	0	0.00	0.74
ZDCNS	0x00000020	99	Enabled	19812	19.37	141				
ERT_4x4b	0x00000040	9999999	Enabled	2822	2.76	236				
ERT_4x4a&BBCLL1	0x00000080	9999999	Enabled	610	0.60					
ERT_4x4a	0x00000100	9999999	Enabled	6311	6.17	339				
ERTLL1_E&BBCLL1(narrow)	0x00000200	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
FVTX_N	0x00000400	9999999	Enabled	34979013	34192.58	3315377	32407.99	3	0.00	0.95
FVTX_S	0x00000800	40	Enabled	14936775	14600.95	14074046	13757.62	343269	335.55	0.94
MPC_N_A	0x00001000	20	Enabled	131750	128.79	73282	71.63	3489	3.41	0.56
MUIDLL1_N1D&BBCLL1 narrowvtx	0x00002000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_S1D&BBCLL1 narrowvtx	0x00004000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
ZDCN_BL	0x00008000	999	Enabled	124597	121.80	107781	105.36	107	0.10	0.87
CLOCK	0x00010000	90908	Enabled	9509326477	9295529.30	8998219316	8795913.31	98980	96.75	0.95
MPC_N_B	0x00020000	0	Enabled	78526	76.76	44026	43.04	44026	43.04	0.56
FVTX_NS	0x00040000	27	Enabled	11278483	11024.91	10618490	10379.76	379231	370.70	0.94
ZDCS	0x00080000	999	Enabled	491442	480.39	370308	361.98	370	0.36	0.75
FVTX_NS&BBCS_central	0x00100000	0	Enabled	319105	311.93	247361	241.80	247361	241.80	0.78
FVTX_NS&BBC_S(>3)	0x00200000	9999999	Enabled	829425	810.78	701655	685.88	0	0.00	0.85
FVTX_NS&BBC_S(>0)	0x00400000	0	Enabled	1009482	986.79	858634	839.33	858634	839.33	0.85
UNUSED_1	0x00800000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_N2D&BBCLL1	0x01000000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00

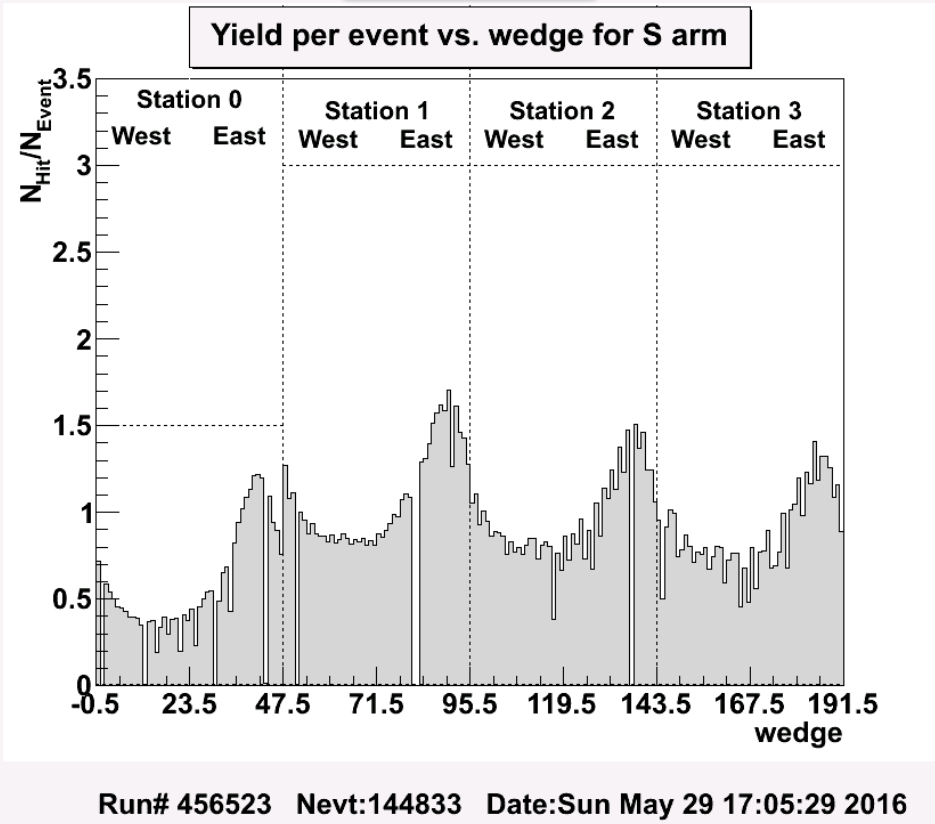
FVTX_NS/BBCnoVTX ~ 2 BBC fired too much?

Run#456523 FVTX Wedge Hit per Event

North Arm



South Arm



0.5 ~ 1.5 hit/wedge/event

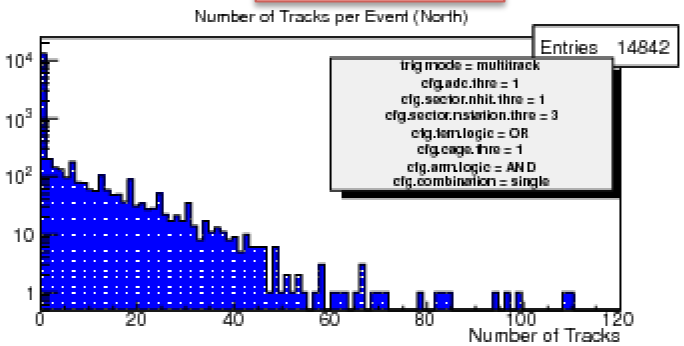
0.5 ~ 1.5 hit/wedge/event

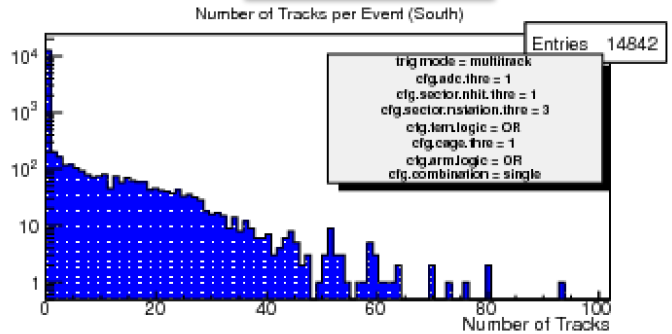
Although somehow unfamiliar peaking structure appears, rates are reasonably similar to these of 62 GeV.

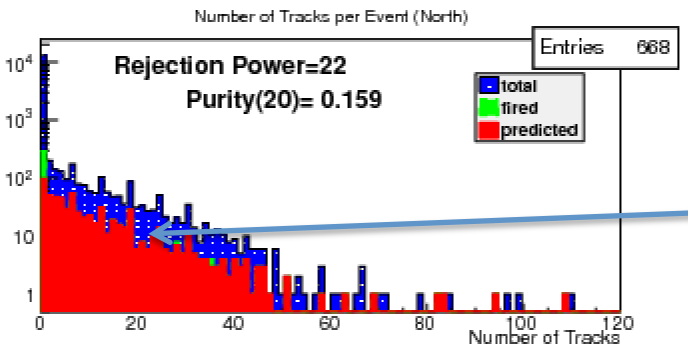
Run#456523 FVTX Trigger Matching Efficiency

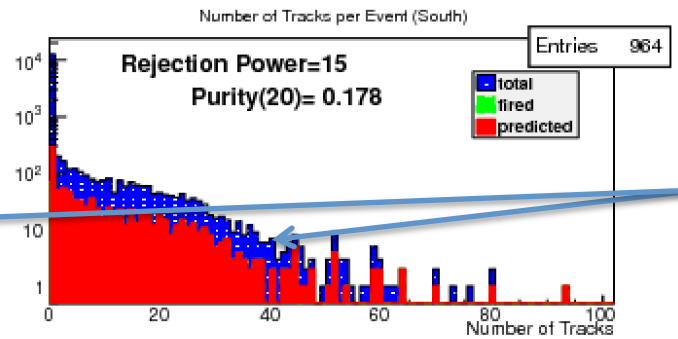
North Arm

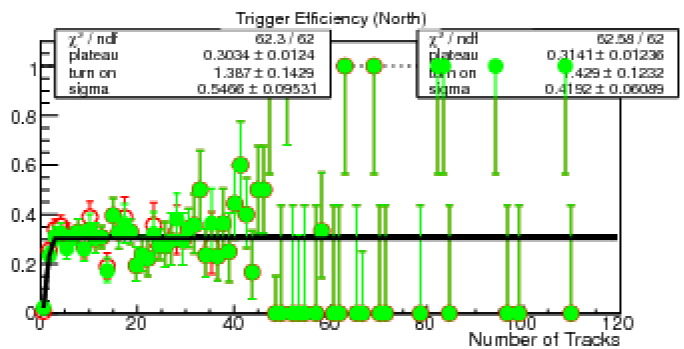
South Arm

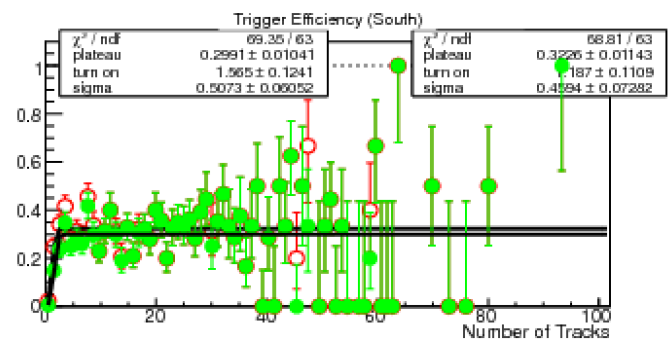












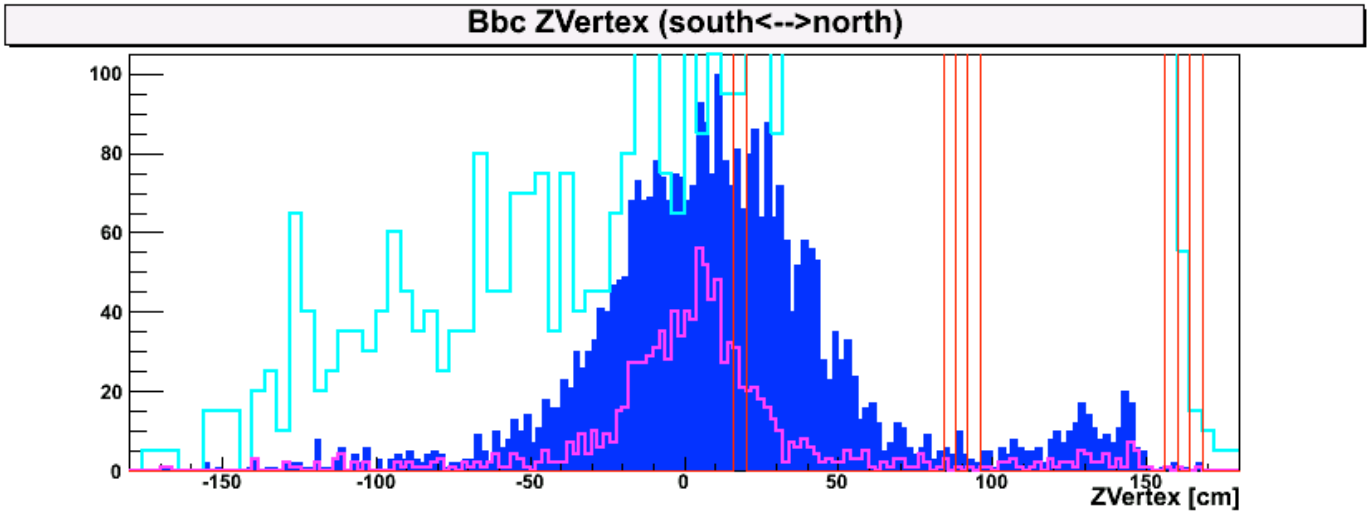
Fired events never reach BBCnoVTX spectrum even at high multiplicity

This doesn't sound right

Run#456540 : d+Au 20 GeV better beam quality

BBC ONLINE MONITOR

Run #456540 Events: 50830 Date:Mon May 30 11:40:59 2016



$Z^{Fit}_{BBLL1\ w/o\ Vtx}$ = 442.1 cm (σ = 214 cm) ... See Z_{ZDC} or Ask SL

Z [Trigger]	Zbbc [BBLL1]	Zzdc [ZDCLL1wide]	Zbbc [BBCLL1(noVtx)]	Zbbc [BBCLL1(narrowVtx)]
(Scale Fac.) #Evt.	(1) 13748	(1) 11	(10) 35499	(1) 4074

< All histograms are scaled by scaled factor>

Vertex Mean (RMS)	14cm (46.1 cm)	104.6cm (54.4 cm)	117.6cm (48.3 cm)	7.4cm (43.3 cm)

σ_{ZDC} = 0.000 ϵ_{BBC} = 0.000 $^{\text{beam in acceptance}}_{\text{ZDC}}$ = 0.173 $^{\text{beam in acceptance}}_{\text{BBC}}$ = 0.221

TimeZero vs ZVertex

Run#456540 Trigger Rates

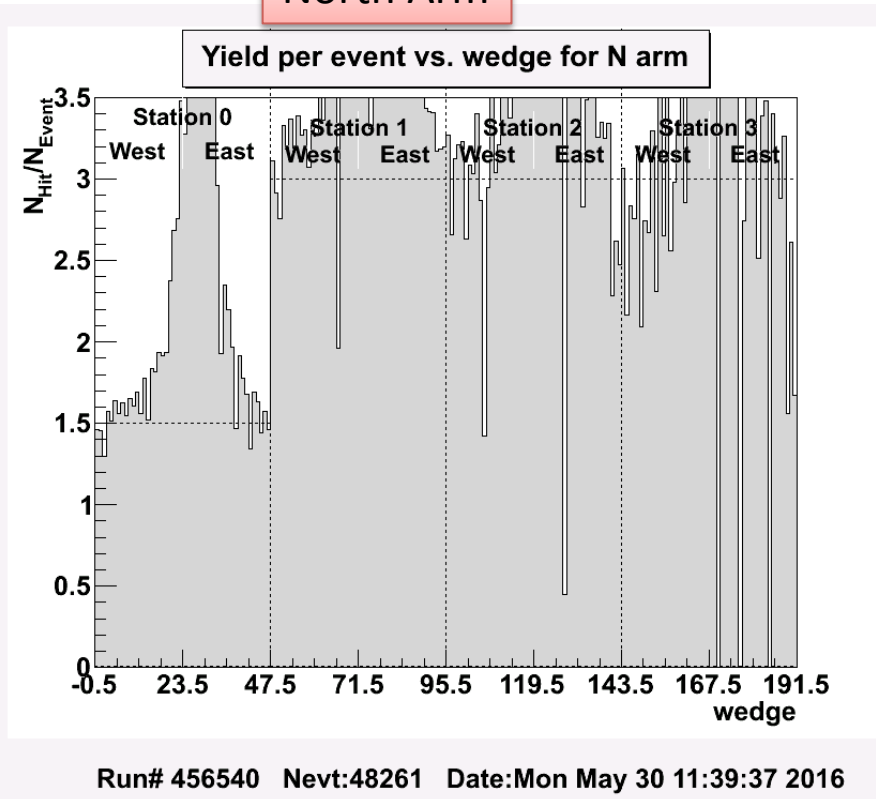
Note: L1 Trigger Scaler Entries in pink indicate an approximate count due to the fact that Run Control may have crashed and the run was not ended properly.
select * from trigger where runnumber = 456540 order by bitnb

Name	Bit Mask	Scale Down	State	Raw Trigger Count	Raw Trigger Rate	Live Trigger Count	Live Trigger Rate	Scaled Trigger Count	Scaled Trigger Rate	Livetime
BBCLL1(>0 tubes)	0x00000001	0	Enabled	104092	20.85	65737	13.17	65737	13.17	0.63
BBCLL1(>0 tubes) novertex	0x00000002	9	Enabled	2319881	464.63	1591021	318.65	159102	31.87	0.69
ZDCLL1wide	0x00000004	0	Enabled	115	0.02	57	0.01	57	0.01	0.50
BBCLL1(>0 tubes)_central_narrowvtx	0x00000008	9999999	Enabled	11666	2.34	6994	1.40	0	0.00	0.60
BBCLL1(>0 tubes) narrowvtx	0x00000010	0	Enabled	30851	6.18	19418	3.89	19418	3.89	0.63
ZDCNS	0x00000020	99	Enabled	15263	3.06	13097				
ERT_4x4b	0x00000040	9999999	Enabled	11247	2.25	10910				
ERT_4x4a&BBCLL1	0x00000080	9999999	Enabled	566	0.11					
ERT_4x4a	0x00000100	9999999	Enabled	26276	5.26	15917				
ERTLL1_E&BBCLL1(narrow)	0x00000200	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
FVTX_N	0x00000400	9999999	Enabled	431052136	86331.29	414943250	83106.00	41	0.01	0.96
FVTX_S	0x00000800	40	Enabled	65240229	13066.34	61998359	12417.06	1512155	302.85	0.95
MPC_N_A	0x00001000	20	Enabled	946494	189.56	639967	128.17	30475	6.10	0.68
MUIDLL1_N1D&BBCLL1 narrowvtx	0x00002000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_S1D&BBCLL1 narrowvtx	0x00004000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
ZDCN_BL	0x00008000	999	Enabled	907479	181.75	861241	172.49	861	0.17	0.95
CLOCK	0x00010000	90908	Enabled	46630378903	9339150.59	45075756437	9027790.19	495834	99.31	0.97
MPC_N_B	0x00020000	0	Enabled	539085	107.97	432498	86.62	432498	86.62	0.80
FVTX_NS	0x00040000	27	Enabled	44831352	8978.84	42421768	8496.25	1515063	303.44	0.95
ZDCS	0x00080000	999	Enabled	1349234	270.23	1053396	210.97	1053	0.21	0.78
FVTX_NS&BBCS_central	0x00100000	0	Enabled	1273189	254.99	1047141	209.72	1047141	209.72	0.82
FVTX_NS&BBC_S(>3)	0x00200000	9999999	Enabled	2790505	558.88	2341517	468.96	0	0.00	0.84
FVTX_NS&BBC_S(>0)	0x00400000	0	Enabled	3339496	668.84	2820144	564.82	2820144	564.82	0.84
UNUSED_1	0x00800000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_N2D&BBCLL1	0x01000000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_S2D&BBCLL1	0x02000000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00

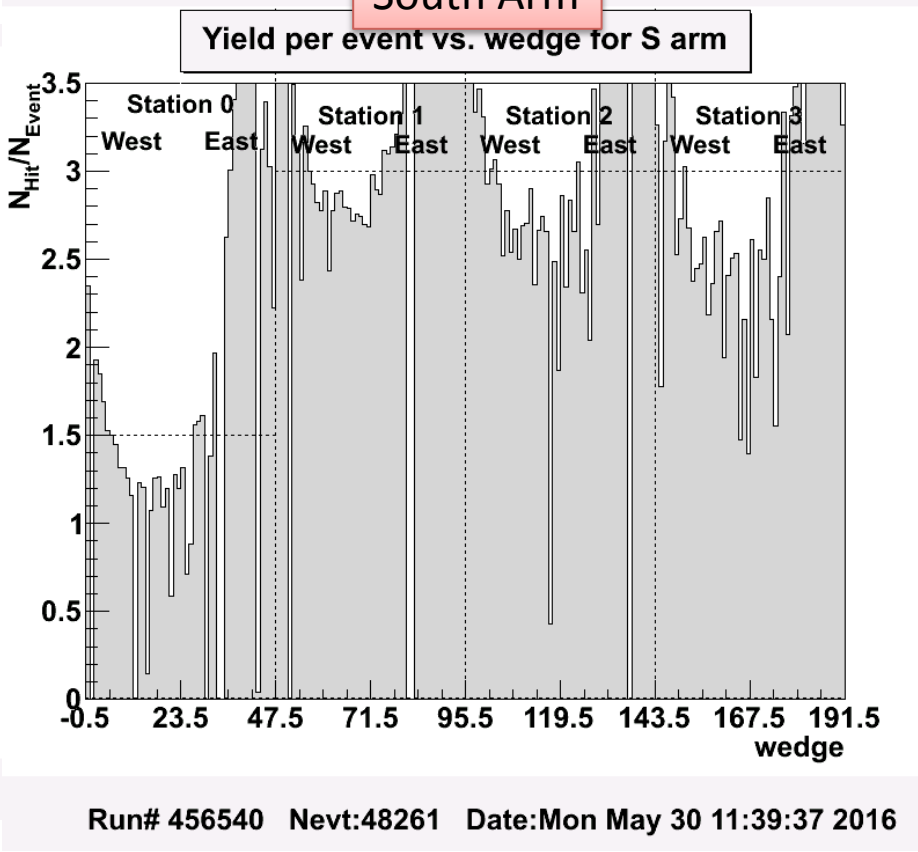
FVTX_NS/BBCnoVTX ~ 20 FVTX fired too much?

FVTX Wedge Hit per Event

North Arm



South Arm



1.5 ~ 4 hit/wedge/event

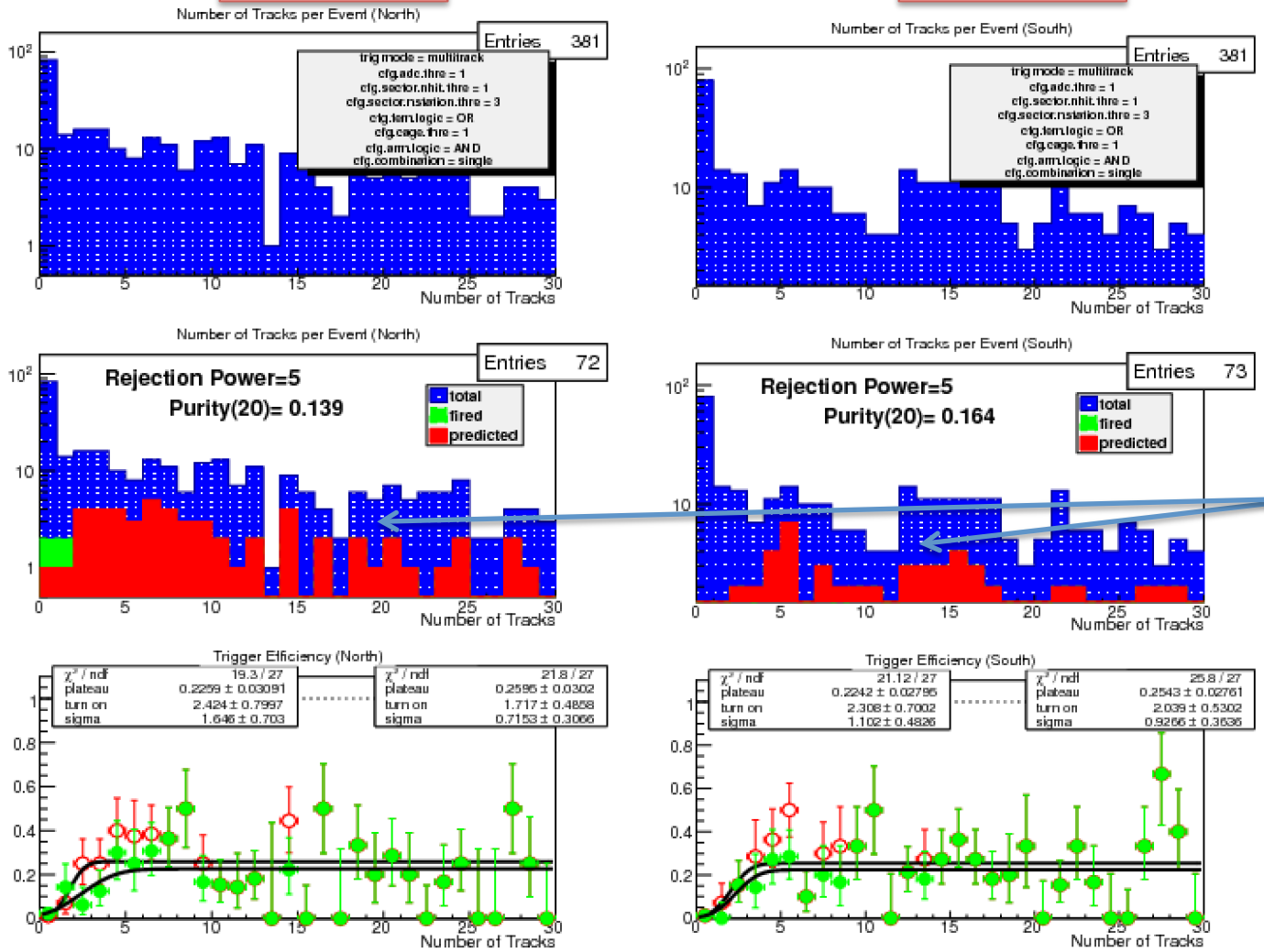
1.5 ~ 4 hit/wedge/event

Indeed FVTX hits are too much compared to other Runs.

Run#456523 FVTX Trigger Matching Efficiency

North Arm

South Arm



Fired events never reach BBCnoVTX spectrum even at high multiplicity

This doesn't sound right

Summary

- Health Check Summary

Run #	Energy [GeV]	BBC z-VTX	FVTX average hits	FVTX trigger
456283	64	good	good	good
456451	20	bad	reasonable	suspicious
456540	20	reasonable	Too high	suspicious

- The FVTX trigger performance looked healthy at 64 GeV at Emulator level.
- The FVTX trigger at 20GeV is operated exactly the same setting with 64GeV operation.
- The FVTX trigger behavior is not well understood yet at 20GeV.
- So far, we have not accumulating data which gives both BBC and FVTX average hits are in reasonable shape same time.
- We'll seek for good data tomorrow if suspicious behavior has something to do with the beam condition.

DELAY SCAN

Nominal FEMIB Delay

North=2, South =3

select * from trigger where runnumber = 456556 order by bitnb

Name	Bit Mask	Scale Down	State	Raw Trigger Count	Raw Trigger Rate	Live Trigger Count	Live Trigger Rate	Scaled Trigger Count	Scaled Trigger Rate	Livetime
BBCLL1(>0 tubes)	0x00000001	0	Enabled	10251	2.82	2438	0.67	2438	0.67	0.24
BBCLL1(>0 tubes) novertex	0x00000002	0	Enabled	242752	66.67	187547	51.51	187547	51.51	0.77
ZDCLL1wide	0x00000004	0	Enabled	0	0.00	0	0.00	0	0.00	0.00
BBCLL1(>0 tubes)_central_narrowvtx	0x00000008	9999999	Enabled	160	0.04	139	0.04	0	0.00	0.87
BBCLL1(>0 tubes) narrowvtx	0x00000010	0	Enabled	3247	0.89	772	0.21	772	0.21	0.24
ZDCNS	0x00000020	99	Enabled	9460	2.60	8839	2.43	88	0.02	0.93
ERT_4x4b	0x00000040	9999999	Enabled	8328	2.29	7729	2.12	0	0.00	0.93
ERT_4x4a&BBCLL1	0x00000080	9999999	Enabled	520	0.14	3	0.00	0	0.00	0.01
ERT_4x4a	0x00000100	9999999	Enabled	19210	5.28	11186	3.07	0	0.00	0.58
ERTLL1_E&BBCLL1(narrow)	0x00000200	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
FVTX_N	0x00000400	9999999	Enabled	41317491	11347.84	36497510	10024.03	4	0.00	0.88
FVTX_S	0x00000800	10	Enabled	26846209	7373.31	23463792	6444.33	2133072	585.85	0.87
MPC_N_A	0x00001000	20	Enabled	230034	63.18	146358	40.20	6970	1.91	0.64
MUIDLL1_N1D&BBCLL1 narrowvtx	0x00002000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_S1D&BBCLL1 narrowvtx	0x00004000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
ZDCN_BL	0x00008000	999	Enabled	218804	60.09	191824	52.68	192	0.05	0.88
CLOCK	0x00010000	90908	Enabled	33929877679	9318834.85	31487655127	8648078.86	346364	95.13	0.93
MPC_N_B	0x00020000	0	Enabled	127026	34.89	80512	22.11	80512	22.11	0.63
FVTX_NS	0x00040000	0	Enabled	17998466	4943.28	15633573	4293.76	15633573	4293.76	0.87
ZDCS	0x00080000	999	Enabled	79565	21.85	72185	19.83	72	0.02	0.91
FVTX_NS&BBCS_central	0x00100000	0	Enabled	60470	16.61	55094	15.13	55094	15.13	0.91
FVTX_NS&BBC_S(>3)	0x00200000	9999999	Enabled	213551	58.65	195021	53.56	0	0.00	0.91
FVTX_NS&BBC_S(>0)	0x00400000	0	Enabled	285381	78.38	258875	71.10	258875	71.10	0.91
UNUSED_1	0x00800000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_N2D&BBCLL1	0x01000000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
MUIDLL1_S2D&BBCLL1	0x02000000	9999999	Enabled	0	0.00	0	0.00	0	0.00	0.00
BBC_N	0x04000000	9999999	Enabled	3802089	1044.24	2053563	564.01	0	0.00	0.54