Total Photon Veto Rejection in E787 and E949

BNL gamma meeting Aug/28/03

Changes

(1)Newly installed photon veto detectors

(A) BVL : adding 2.4 radiation length, covering 45 degree hole.

(B) Beam line PV : DPV, UPV, AD, CO

(2) Mean-timer :

Have a success in reducing veto gate width (10ns) (dead time). Online rejection might be changed.

Other related items…

(3) DAQ under high intensity environment : more accidentals and acceptance loss

(4) RD layer 20, 21 are removed : Traditional acceptance measurement method is not available.

Introduction

Before discussing on the Total Online PV rejection,
We should set common acceptance point and compare.

In both E949 and E787 analysis, acceptance is kept 80%.

	Blank out method	Layer 18 Method
HEX	93.5%	93.3%
BV	------	98.5%
EC	98.7%	98.8%
BL	------	97.8%
Sub total	92.3 %	88.8%
RSHEX/2	95.3%	90.2%
TGPVCUT	99.3%	98.9%
Sub total	94.6%	89.3%
PVCUT02	86.3%	87.5 %

High lights

(1)HEX : all measurements are well consistent with each other.

E787 : 2.73 ~ 2.77, E949 : 2.98+/-0.04

see Tamaki's slides.

(2)HEX after burner : agreement to some extent.

E787 : 1.06~1.14, E949 : 1.11+/- 0.04

see Tamaki's slides

(3) ONLINE BV*(BVL)*EC :

various answers are existing…(and depend on setup cuts)

E787 1208+/-196 ('97 TY) 2837+/-290 ('97 SK)
2495+/-880 ('98 KM) *see Tamaki's slides*

E949 1162+/-100 (SK) 1981+/-309(KM)
→ 1896+/- 265 (SK+PSCUT02)

(4) INTIME :

E787 1.13+/-0.04 ('97) 2.00+/-0.707('98)

E949 1.32+/-0.11 (KM) 1.22+/-0.05 (SK)

(Note : we don't use INTIME in E949)

(5) OFFLINE :

E787 : ~50('98) , E949 : ~150

(6) TOTAL PV rejection : discuss later …

E949 0.98(+/-0.15) * 10^6

(7) E949 Meantimer and Analog sum :

MT : 1981+/-309, ASUM : 10155+/-3590

Online PV rejection (SETUP)

SETUP cut condition

Common cut conditions.

BAD_RUN, BAD_STC, RD_TRK, TRKTIM, UTC, RANGE1, TARGET, STLAY, TDCUT,

pdc.lt.280.0	layv4.ge.11.and.layv4.le.18
abs(cos3d).le.0.5	itgqualt.eq.0
abs(tk-b4strobe).le.4.0	abs(tpi-trs).lt.5.0
trs.lt.50.0	

Additional cut conditions.

‘98	‘02
pscut5.f	pscut02.f RUN .gt. 48003 (run range cuts)

Online PV rejection (2002)

KP22

After setup cut : 81,242 events

- Mean-timer : 41 events. 1981 +/- 309
- Analog sum : 8 events. 10155+/- 3590
  - INTIME : 31 events 1.32 +/- 0.11

Rejection by BV*BVL*EC : 1981 +/- 309

KP21

After setup cut : 9,538 events

- HEX : 3,199 events. 2.981+/-0.043
  - HEX afterburner : 2,881 events. 1.11+/-0.006

Rejection by HEX*HEX afterburner : 3.31 +/- 0.05

Online PV rejection (1998)

KP21

After setup cut : 53,864 events

- HEX: 19,966 events. 2.69+/-0.015
  - HEX afterburner: 18,459 events 1.082+/-0.002
  - BV*EC : 8 events 2495+/-882
    - INTIME : 4 events. 2.0 +/- 0.707
- Kp22 : 12,251 events
  - BV*EC : 1 events 12251+/-12250

Total rejection is 7250 +/- 2550

Steve's online PV measurement.

1) Trig = l0z.and.l11.and.ext(2).and.ipiflg.eq.0
2) pass1 = ipiflg.eq.0, RD_TRK, STLAY, RSHEX, TRKTIM, FITPI, UTC, RDUTM, PDC, LAY14, RSHEX2
3) Box = KPI2BOX
4) beam = DELCO, PSCUT, PSCUT1, DELCO1
5) Additional = KIN*TD

KP21

year	HEX	L1.2	HEX*L12	BV*EC	INTIME	Total
1997	2.77	1.27*	3.51*	3397	1.25	14906*
error	0.02	0.004 *1.14*	0.02 *3.51*	1500	0.28	7500
2002	3.03	1.18	3.57	1382	1.5	8163
error	0.03	0.007	0.04	800	0.6	5800

Acceptance loss of L1.1 is 10%, we need to multiply these values by 0.9. (then 14906 -> 13400)

KP22

year	BV*BVL*EC	INTIME	Total	
1997	2837	1.13	3204	(10127)
error	290	0.04	350	
2002	1162	1.22	1421	(5060)
error	100	0.05	140	

PSCUT02 *1896+/-265*

Combined online rejection.

	‘98	'02
HEX	2.69+-0.02	2.98+-0.04
HEXaft	1.08+-0.002	1.11+-0.01
BV*BVL*EC	2495+-880	1980+-310
Tot onl	7250+-2550	6550+-1025
INTIME	1.3+-0.3(97)	1.0 (1.3+-0.1)
offline	~50	~150
TOTAL	0.47(0.20)*10^6	0.98(0.15)*10^6