

Single & Double Cut Failure Study

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Abstract

1 How to implement 1 & 2 cut failure

- Protect against observing inside of box.

Do test run(s) on a sample with an inverted cut (do not include the inverted cut in the cut list).

- Study will never include cuts that may be removed, such as *ev5*, *chi5max*.

Need to obtain this list.

- Initial study not consider cuts that have a high chance of being changed soon or later, such as *ccdpul*.

Need to obtain this list.

- Only consider the loosest cuts. i.e. Big & Small boxes.

TDNN

PNN2-Box

Photon-Veto

DELCO

CHI567

- Grouping highly correlated hits. i.e. an event fails only 3 highly correlated cuts then consider this as a 1 cut failure.

- Setup cuts

Bad_Run

SKIM(5) or SKIM(6) or SKIM(7) for 1/3 and SKIM(1) or SKIM(2) or SKIM(3) for 2/3 sample.

2 Cut List & Grouping of Cuts

Grouping cuts such that if any combination of a group will only count as a one cut failure will yield a larger set of one-cut failure events than a basic one-cut failure study, as was done in E787-PNN2. We have decided to group the cuts into 13 groups. 6 of these groups are single cuts (not grouped), 3 groups are groups of two or three cuts, the other groups are TD cuts, Kinematic cuts, Beam cuts, and Other cuts. The list of all cuts used are shown in the following tables.

Special non-grouped Cuts	
Cut name	additional info
PV(no AD, no TG)	Loose version
PV(AD)	
B4EKZ	
DELCO-3	Loose Version. delc+DELO3
TGZfool	
<i>PNN2Box_{loose}</i>	Loose version (E787 box)

Small Groups	
Cut name	additional info
<i>TGPV_{loose}</i> OPSveto	Extra energy in TG due to other particles
CCDPUL EPIONK TIMKF	Energy under the Kaon related.
TGCEO KIC	Pathological beam events entering thru IC.

TD cuts	
Cut name	additional info
IPIflg	
ELveto	
TDFool	
<i>TDV_{arnn_{loose}}</i>	
RSHEX	
RSHEX2	

Table 1: Note that *ev5* is not included in the loose version of TD cuts.

Kinematic Cuts	
Cut name	additional info
cos3d	
zfrf	
zutout	
UTCqual	
TIC	
EIC	
layv4	$5 \geq \text{layv4} \geq 19$
icodel14	Found RSSC hit.
LAYER14	layv4.eq.14.and.dzutsc14 _i -99. (lay 14 stop and used z info in UTC).
RngMom	
prrf	prrf1,prrfz
RSdEdX	rsdedxcl,rsdedxmax,rslike

Beam Cuts	
Cut name	additional info
BWtrs	
CKtrs	
CKtail	
CPItrs	
CPItail	
B4dEdX	
B4trs	
B4ccd	
timcon	

Other TG cuts	
Cut name	additional info
TGqualt	
npitg	
epitg	
epimax	
TGer	
targf	
dtgttp	
rtdif	
drp	
TGKtim	
TGedge	
TGdEdX	rtghi,etghi,tgdedx1,tgdedx2
TGenr	
pigap	
TGlike	tglike1,tglike2
TGB4	tgdb4,tgdb4tip,tgdvxtip,tgdvxtpi
PhiVtx	
<i>chi567_{loose}</i>	Zhe's loose version
verrng	
angli	
TGfitallK	
tpics	PNN2, st.dev of energy weighted TG-fiber pion times
TGtcon	cut on Kaon timing (energy dependent)
B4etcon	ADC/CCD Energy and Time consistency.

Table 2: eic,tic not belong here?

Other pathological cuts?	
Cut name	additional info
upvtrs	
rvtrs	

Removed Cuts - NO LONGER USED	
Cut name	additional info
B4tim	
chi5max	
eickin	

PASS1 & Pass 2 Cuts	
Cut name	additional info
Lev1.1	
Lev1.2	
RD_TRK	
TRKTIM	
TARGET	
PSCUT	
TGCUT	
STLAY	
UTC	
RDUTM	
BAD_STC	
FITPI	
PDC	
TDCUT	
PVCUT	

3 How to analyze these events.

Do the following first:

- List Run, Event number, cut(s) that the event failed.
- One histogram tallying the group that failed.
- 7 histograms, one for each group, that tallies failed cuts.
- A histogram for each cut in every group. If it fails this cut, what other cuts within the same group did it fail.

We then would determine if there should be any changes in the group definitions.