HET Table of Event Types

Version:

2

Assumes that ADCs with cross-talk flag and/or other cross-talk "features" have already been dropped. Otherwise this won't work! We MUST implement an efficient cross-talk eliminator at the front-end of the onboard analysis

Assumes that Events with "real" hits in ANY HET guard ring are rejected. i.e. all HETguard events are rejected Note: This may be too restrictive...do we really "reject" a Range 2 A event that has a hit in, say, H3Bg? Note: all rejected events are counted and assigned to an appropriate priority-bin

The tables below are condensed by the following nomenclature:

H1A is ANY OF H1Aa, H1Ab, H1Ac, H1Ad, H1Ae. Similar for H2A. H1Aa and H2Aa are the center bulls-eyes of H1A and H2A respectively. H3A is the center of H3A, and so on for H4A, etc. Similar for B-side layers Multiple hits in these layers are handled separately

Trigger modes:

| 33 | | | |
|---------------|------------------------|-------------|--|
| H1A·H2A | H1B·H2B | Nominal | |
| H1A·H2A·H2B | -H1B | Penetrating | |
| The OR of (H3 | A,H4A,H5A,H5B,H4B,H3B) | Neutral | |
| | | | |

| H=Hit | | ~=No | Hit | x = D | on't Ca | ire | | | | |
|-------|----------------|------|-----|---------|---------|--------|-----|-------|-----|-------|
| | Detector Layer | | | | | | | Event | | |
| H1A | H2A | H3A | H4A | H5A | H5B | H4B | H3B | H2B | H1B | Туре |
| Н | Н | Н | Н | Н | Н | Н | Н | Н | Н | PEN |
| Н | Н | Н | Н | Н | Н | Н | Н | H2Ba | ~ | RNG9A |
| Н | Н | Н | Н | Н | Н | Н | Н | ~ | ~ | RNG8A |
| Н | Н | Н | Н | Н | Н | Н | 1 | 2 | ~ | RNG7A |
| Н | Н | Н | Н | Н | Н | 2 | 1 | 2 | ~ | RNG6A |
| Н | Н | Н | н | н | ~ | ~ | ~ | ~ | ~ | RNG5A |
| Н | Н | Н | Н | ~ | ~ | ~ | ~ | ~ | ~ | RNG4A |
| Н | Н | Н | ~ | ~ | 1 | ~ | ~ | 2 | ~ | RNG3A |
| Н | Н | ~ | 2 | 2 | 1 | 2 | ~ | 2 | ~ | RNG2A |
| ~ | H2Aa | Н | Н | Н | Н | Н | Н | Н | Н | RNG9B |
| ~ | ~ | Н | Н | Н | Н | Н | Н | Н | Н | RNG8B |
| ~ | 2 | ~ | Н | Н | Н | Н | Н | Н | Н | RNG7B |
| ~ | 2 | ~ | ~ | Н | Н | Н | Н | Н | Н | RNG6B |
| ~ | ~ | 2 | ~ | ~ | н | н | н | Н | н | RNG5B |
| ~ | ~ | ~ | ~ | ~ | 2 | Н | Н | Н | Н | RNG4B |
| ~ | ~ | ~ | ~ | ~ | ~ | ~ | Н | Н | Н | RNG3B |
| ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Н | Н | RNG2B |
| ~ | ~ | | The | OR of t | hese 6: | layers | | ~ | ~ | NEUT |



Notes: Each Range has a different geometry factor from the other ranges.

Is it possible for C to go below threshold in H1, for Dyno-states>0 ? NEUT category only valid for Dyno-state=0

Each category may have sub-categories, eg. Events close to normal incidence, for He(Ne) isotope analysis.

Events with any other hit-patterns are rejected for onboard analysis.

Rejects will be further categorized (coarsely) for counting and telemetry-priority purposes.

PEN is symmetric. Need A/B-side criteria for onboard analysis

The proposed HET Level 2 dynamic threshold state introduces a new trigger mode. This mode generates several new categories of events. It is designed to preserve capibility

to measure H and He. It is in addition to the nominal and penetrating modes Suggestion: require the Hit layers to be Hi-Gain only, to screen out Z>2

New Level 2 Trigger mode:

| H4A·H5A~H4B | (And ~G, as usual) | |
|-------------|--------------------|--|
| H4B·H5B~H4A | (And ~G, as usual) | |

| HH=H | HH=Hi-Gain Hit ~=No Hit x = Don't Care | | | | | | | | | |
|------|--|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| | Detector Layer | | | | | | | | | Event |
| H1A | H2A | НЗА | H4A | H5A | H5B | H4B | H3B | H2B | H1B | Туре |
| ~ | 2 | ~ | HH | HH | HH | ~ | ~ | ~ | 2 | RNG6WA |
| ~ | 2 | ~ | HH | HH | ~ | ~ | ~ | ~ | ۲ | RNG5WA |
| ~ | ~ | ~ | ~ | HH | HH | HH | ~ | ~ | ~ | RNG6WB |
| ~ | ~ | ~ | ~ | ~ | HH | HH | ~ | ~ | ~ | RNG5WB |

Notes: The ranges have different geometry factors.

"W" stands for "Wide-angle"

This mode enabled only for Level 2 dynamic threshold state. RNG5W is possibly not totally clean.



Version:

5

2014-04-23

LXXa is always the central bulls-eye

LET1 Table of Event Types

Assumes that ADCs with cross-talk flag and/or other cross-talk "features" have already been dropped.

Otherwise this won't work! We MUST implement an efficient cross-talk

eliminator at the front-end of the onboard analysis

Assumes that Events with "real" hits in L2Ag and/or L2Bg are rejected. i.e. all L2guard events are rejected Note: all rejected events are counted and assigned to an appropriate priority-bin

The table is condensed by the following nomenclature:

LOA means ANY of LOAa, LOAb, LOAc, LOAd, LOAe

L1A means ANY of L1Aa, L1Ab, L1Ac, L1Ad, L1Ae

L2A means ANY of L2Aa, L2Ab, L2Ac, L2Ad, L2Ae, AND NOT L2Ag

Multiple hits in these layers are handled separately Similar for B-Side layers.

Trigger modes:

| L0A·L1A | L0B·L1B | Nominal |
|-------------------|---------|------------------------|
| L1A·L2A | L1B·L2B | Nominal |
| L2Acenter-L2Bcent | er | Penetrating (proposed) |

| H=Hi | t | ~=No | Hit | x = D | on't Ca | re | | | | |
|------|----------------|------|------|-------|---------|------|------|-----|-----|------------|
| | Detector Layer | | | | | | | | | |
| L0A | L1A | L2A | L3A | L4A | L4B | L3B | L2B | L1B | L0B | Event Type |
| х | Х | L2Aa | Н | Н | Н | Н | L2Ba | х | х | PEN |
| х | Н | Н | Н | Н | Н | L3Ba | ~ | ~ | ~ | RNG6A |
| х | Н | Н | Н | Н | Н | 2 | ~ | 2 | ~ | RNG5A |
| х | Н | Н | Н | Н | ~ | ~ | ~ | ~ | ~ | RNG4A |
| х | Н | Н | Н | ~ | ~ | ~ | ~ | ~ | ~ | RNG3A |
| х | Н | Н | ~ | ~ | ~ | ~ | ~ | ~ | ~ | RNG2A |
| Н | Н | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | RNG1A |
| ~ | ~ | ~ | L3Aa | Н | Н | Н | Н | Н | х | RNG6B |
| ~ | ~ | ~ | Н | Н | Н | Н | Н | Н | х | RNG5B |
| ~ | ~ | ~ | ~ | ~ | Н | Н | Н | Н | х | RNG4B |
| ~ | ~ | ~ | ~ | ~ | ~ | Н | Н | Н | х | RNG3B |
| ~ | ~ | ~ | ~ | ~ | ~ | ~ | Н | Н | x | RNG2B |





num Shielding olvimide mount material

1.04

L1A

L1B

1.04

L1B

~ Notes: Range 1 has a different geometry factor from the other ranges. PEN also.

Range 6 has a different geometry factor from Ranges 2-5.

For Range 6, Require center of L3 layer, since L2 is not large enough

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Is it possible for C to go below threshold in L1, for Dyno-states>0 ?

Each category may have sub-categories, eg. Events close to normal incidence, for He(Ne) isotope analysis.

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RNG1B

Events with any other hit-patterns are rejected for onboard analysis.

Rejects will be further categorized (coarsely) for counting and telemetry-priority purposes.

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PEN is symmetric. Need A-side/B-side criteria for onboard analysis

The proposed LET1 Level 2 dynamic threshold state introduces a new trigger mode. This mode generates several new categories of events. It is designed to preserve capibility to measure H and He. It is in addition to the nominal and penetrating modes Suggestion: require the Hit layers to be Hi-Gain only, to screen out Z>2

New Level 2 Trigger mode:

L2Aa·L3A~L3B L2Ba·L3B~L3A

HH=Hi-Gain Hit ~=No Hit x = Don't Care

| | Detector Layer | | | | | | | | | |
|-----|----------------|------|-----|-----|-----|-----|------|-----|-----|------------|
| L0A | L1A | L2Aa | L3A | L4A | L4B | L3B | L2Ba | L1B | L0B | Event Type |
| ~ | ~ | HH | HH | HH | HH | ~ | ~ | ~ | ~ | RNG5WA |
| ~ | 2 | HH | HH | HH | 2 | 2 | 2 | ~ | 2 | RNG4WA |
| ~ | ~ | HH | HH | ~ | ~ | ~ | ~ | ~ | ~ | RNG3WA |
| ~ | ~ | ~ | ~ | HH | HH | HH | HH | ~ | ~ | RNG5WB |
| ~ | ~ | ~ | 2 | ~ | HH | HH | HH | ~ | ~ | RNG4WB |
| ~ | ~ | ~ | ~ | ~ | ~ | HH | HH | ~ | ~ | RNG3WB |



Notes: The ranges have different geometry factors. This mode enabled only for Level 2 dynamic threshold state. "W" stands for "Wide-angle"



| | | Versio | on: | 2 | |
|------|---|--------|-----|---|--|
| | _ | | | | |

LET2 Table of Event Types

Assumes that ADCs with cross-talk flag and/or other cross-talk "features" have already been dropped. Otherwise this won't work! We MUST implement an efficient cross-talk

eliminator at the front-end of the onboard analysis

Assumes that Events with "real" hits in L2Cg are rejected. i.e. all L2guard events are rejected

Note: all rejected events are counted and assigned to an appropriate priority-bin

The table is condensed by the following nomenclature:

L0C means ANY of L0Ca, L0Cb, L0Cc, L0Cd, L0Ce

L1C means ANY of L1Ca, L1Cb, L1Cc, L1Cd, L1Ce

L2C means ANY of L2Ca, L2Cb, L2Cc, L2Cd, L2Ce, AND NOT L2Cg Multiple hits in these layers are handled separately

Trigger modes:

| L0C·L1C~L6C | Nom |
|---------------------|------|
| L1C·L2C~L6C | Nom |
| L2Ccenter L6Ccenter | Pene |

| Nominal | |
|-----------|-------------------|
| Nominal | |
| Penetrati | ng (perhaps not?) |

| H=Hit | ~=No Hit | | | x = D | on't Ca | are | |
|-------|----------|------|---------|-------|---------|------|------------|
| | | Det | ector l | ayer | | | |
| L0C | L1C | L2C | L3C | L4C | L5C | L6C | Event Type |
| Х | Х | L2Ca | Н | Н | Н | L6Ca | PEN |
| х | Н | Н | Н | Н | Н | ~ | RNG5C |
| х | Н | Н | Н | Н | 2 | ~ | RNG4C |
| х | Н | Н | Н | ~ | ~ | ~ | RNG3C |
| х | Н | Н | ~ | ~ | ~ | ~ | RNG2C |
| Н | Н | 2 | 2 | 2 | ۲ | ~ | RNG1C |

Notes: Range 1 has a different geometry factor from the other ranges. PEN also.

Is it possible for C to go below threshold in L1, for Dyno-states>0 ?

Each category may have sub-categories, eg. Events close to normal incidence, for He(Ne) isotope analysis. Events with any other hit-patterns are rejected for onboard analysis.

Rejects will be further categorized (coarsely) for counting and telemetry-priority purposes.

Maybe PEN is no good, it is not clean???

The proposed LET2 Level 2 dynamic threshold state introduces a new trigger mode. This mode generates several new categories of events. It is designed to preserve capibility to measure H and He. It is in addition to the nominal and penetrating modes Suggestion: require the Hit layers to be Hi-Gain only, to screen out Z>2

New Level 2 Trigger mode:

L2Ca·L3C~L6C

| HH=H | Hi-Gain | Hit | | ~=No | Hit | x = Don't Care | | |
|------|---------|------|-----|------|-----|----------------|------------|--|
| | | | | | | | | |
| L0C | L1C | L2Ca | L3C | L4C | L5C | L6C | Event Type | |
| ~ | ~ | HH | HH | HH | HH | ~ | RNG5WC | |
| ~ | ~ | HH | HH | HH | ~ | ~ | RNG4WC | |
| ~ | 2 | HH | HH | 2 | 2 | 2 | RNG3WC | |

Notes: Each category has a different geometry factor.

This mode enabled only for Level 2 dynamic threshold state. "W" stands for "Wide-angle"





Silicon, nominal thresh Silicon, Z>2 thresholds nal thresho Silicon, Guard Inactive Si m Shielding mount materia



2014-04-23



Silicon, nominal thresholds Silicon, Z>2 thresholds Silicon, Guard Inactive Si Aluminum Shielding Polyimide mount material