

GlastRelease Histogram Definitions

Monte Carlo distributions.

These are distributions of quantities stored in the full MC tree.

General Quantities:

Histogram	Description
PARTCOUNTMC	number of McParticles
INTCOUNTMC	Number of integrating hits
POSCOUNTMC	Number of Position hits

MC Particle quantities:

Histogram	Description
ENERGYMC	Initial energy of each MC particle (recently changed to just be for the primary particle)
MCTERMZ	Final z position of each MC particle.
MCX	Initial x position of each MC particle.
MCY	Initial y position of each MC particle.
MCPARTBITS	MC particle status bits (do we really need this?)

MC position hits:

Histogram	Description
POSENERGYDE P	Deposited energy of each position hit.
POSMCTYPE	Particle id for each position hit (is this the particle id that generated the position hit?)
POSMCZ	z of position hit.
POSMCTKRTRAY	The tracker tray number that contains each position hit.

MC Integrating hits:

At the moment INTCOUNTMC is all integrating hits, all the other integrating hit distributions only consider hits in the Cal.
At the moment all integrating hits are hits in the Cal.

Histogram	Description
INTENERGYDEPCA L	energy of each single integrating hit in the Cal
INTSEGMENT	Segment number of Cal integrating hit (each xtal is divided into 12 segments)
INTMOMPOS	Position calculated from segment and moment. I am not sure what this is. It is calculated as $\text{float momPos} = 326. * (\text{segn} + 0.5) / 12 + \text{moment} - 163.;$
INTENERGYTOT	Total energy deposited in active volumes in the Cal.

Trigger related distributions:

These are obtained from `evt->getL1T()`;

Histogram	Description
TRGBITS	Trigger bit that were set.

TRGWORD	Trigger word
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Digitization Quantities

Cal Digi Distributions:

These are obtained from the digi root tree.

Histogram	Description
CALDIGICOUNT	The number of CAL digis in each event.
CALADC	The ADC value from both faces of each xtal.
CALADCN	The ADC value from negative face of each xtal.
CALADCP	The ADC value from positive face of each xtal.
CALRANGE	The range for each xtal end. There are 4, high and low gain for the small and large diodes.
CALEAVE	Sum of the ADC on each face/2. We are not accounting for the different ranges here, so this does not quite correspond to an energy.
CALEAVETOTAL	This is the sum of all the CALEAVE for each event. We should make this be the actual digi energy. This will not be the same as theMC integrating hit total energy because we should see the effect of noise and direct hits to diodes.
CALLAYER	The layer (in the Cal) of this digi.
CALTOWER	The tower of this digi.
CALCOLUMN	The column of this digi.
CALNLAYERx	The number of cal digi hits in layer x
CALELAYERx	The sum of CALEAVE in layer x

ACD Digi Distributions:

These are obtained from the digi root tree.

Histogram	Description
ACDDIGICOUNT	The number of ACD digis.
ACDADC	The ADC value of each hit pmt in the ACD.
ACDADCTOT	The sum of ADC values over all pmts.

Reconstruction quantities

Tracker Recon distributions:

The prefix TKR means that the distribution come from TkrRecon in the recon root tree. If the prefix is TKRTRK then the distribution is for all tracks. If the prefix is TKRHIT then the distribution is filled in a loop over all recon hits (this is a loop over all tracks and all hits with each track – so hits can be counted more than once). If the prefix is TKRVTX then the distribution is for all vertices in each event.

Histogram	Description
TKRNUMTRACKS	The number of fit tracks per event.
TKRNUMVERTICES	The number of vertices per event.
TKRTRKNHITS	The number of hits per track.
TKRTRKQUALITY	The track quality.
TKRTRKSTARTZ	The z position of the first hit of each track.

TKRTRKSTARTX	The x position of the first hit of each track.
TKRTRKSTARTY	The y position of the first hit of each track.
TKRTRKSLOPEX	The x slope of each track.
TKRTRKSLOPEY	The y slope of each track.
TKRTRKENERGY	The track energy (track->getKalEnergy)

Cal Recon distributions:

Histogram	Description
CALCLUSCOUNT	The number of reconstructed clusters
CALRMSTRANS	The spread of each cluster in the transverse direction.
CALRMSLONG	The spread of each cluster in the longitudinal direction.
CALTRANSVOFFSET	The ransverse offset of average position in the calorimeter with respect to the position predicted from tracker information
CALXPOS	Cal Cluster x position
CALYPOS	Cal Cluster y position
CALZPOS	Cal Cluster z position
CALDRC	Cal Cluster direction cosine
CALRECESUM	Raw energy sum. This should be renamed CalEnergySum
CALRECELEAK	This should be renamed CAENERGYLLCORR
CALRECECORR	Energy from CalValsTool. This should be renames CAENERGYCORR
CALRECEFIT	Profile fit corrected energy

ACD Recon Distributions:

Histogram	Description
ACDTILECOUNT	Number of hit tiles.
ACDENERGY	Total Energy deposited in the ACD (not including ribbons?)
ACDDOCA	Minimum distance between a track and the center of all ACD tiles.
ACDACTDIST	Minimum distance between a track and the edges of ACD tiles.
ACDGAMMADOC A	Distance of vertex extrapolation to the center of the closest tile

Ntuple-derived histograms

Variables which have a name that is a mixture of upper and lower case letters are drawn from the merit tuple, which is documented elsewhere. Some cuts have been applied to clean the distributions. "GltWord > 3 && TkrNumTracks>0" for all distributions. There is an additional cut of "CalEnergySum>0.5" for CalEnergyCorr, CalEnergyLLCorr, EvtMcEnergySigma, EvtEnergySumOpt, Tkr1PhiErr and Tkr1ThetaErr. These cuts, and the choice of distributions is still under review.