SBSCalorimeter

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1 Introduction

SBSCalorimeter contructor inherits from the SBSGenericDetector and leaves the SBSModeADC::Mode as kADCSimple and SBSModeTDC::Mode as kNone. There is no separate Decode or CoarseProcess method which are in SBSHcal and SBSTotalShower. There is a ClearEvent method. The MakeGoodBlocks method for creating the fGoodBlock output data structure and the internal fBlockSet. The FindClusters method.

2 ReadDatabase

First it calls SBSGenericDetector::ReadDatabase. All additional parameters are optional.

Parameter name	Description	Global variable
emin	minimum energy (GeV) to include in cluster	fEmin
cluster_dim	vector of x and ymax cluster size	cluster_dim
nmax_cluster	Max number of clusters to store	fMaxNclus
const	constant for gain correction	fConst
slope	slope for gain correction	fSlope
acc_charge	Accumulated charge	fAccCharge

3 MakeGoodBlocks method

Loops through all fElements to fill the fGoodBlocks which is an output SBSCalBlocks object which is a structure of vectors. If element is expecting

TDC and ADC, then fills the fGoodBlock structure if both TDC and ADC of good_hit index not equal to -1. If element is only expecting ADC, then fills the fGoodBlock structure if ADC of good_hit index not equal to -1. After filling the fGoodBlocks stucture, then fills fBlockSet vector of SBSBlockSetList structures which is used in FindClusters method. The fBlockSet is filled if the fGoodBlock has an energy greater than fEmin. The SBSBlockSetList structure has the row, col, id , x, y, TDCTime, e and ADCTime. The fBlockSet is sorted by energy.

Variable	Description	Element method
row	Row	GetRow()
col	Column	GetCol()
id	Element ID	GetID()
x	x position (m)	GetX()
y	y position (m)	GetY()
TDCTime	LE tdc time (ns)	fTDC[good_hit].le.val
e	Energy (GeV)	fADC[good_hit].integral.val or GetIntegral().val
ADCTime	ADC time(ns)	fADC[good_hit].time.val or GetTime().val

4 FindClusters

The method loops through the fBlockSet until each element is assigned to a cluster. Cluster information is stored in fClusters which is a vector of SBSCalorimeterCluster objects. The first cluster is started with the element that has the maximum energy and the first element in fCluster is created and the vector element is removed from fBlockSet. A while loop is started for adding additional detector elements in fBlockSet to the present fCluster. Inside the while loops, the code loops through fBlockSet until is finds a neighbor or reaches the end of fBlockSet. If it finds a neighbor, then the neighbor is added to the present fCluster element; the vector element is removed from fBlockSet; and it again fBlockSet until is finds a neighbor or reaches the end of fBlockSet. If it reaches the end of fBlockSet then it stops adding detector elements to the present fCluster. If there are detector elements remaining in the fBlockSet, then another cluster is created from the first element in the fBlockSet which has been sorted by energy. This continues until each element in fBlockSet has been assigned to a cluster.

Presently the neighbor is determined if the block is within given radius of the current cluster x and y position. Need to update this and have parameters in ReadDatabase

5 SBSCalorimeterCluster

SBSCalorimeterCluster is a class for storing calorimeter cluster information which is updated when a new element is added to the cluster. The class stores the number of blocks in the cluster, fMult. It stores the total energy, energy weighted x and y positions (fE, fX and fY) It stores the energy, row and col of the block with the highest energy. It stores a SBSElement vector of the elements in the cluster and a pointer to the element with the maximum energy. Need to add the TDC and ADC time information.

6 FineProcess

It first calls SBSGenericDetector::FineProcess and then it fills various cluster structures for the tree output. The cluster information for tree output is saved in the SBSCalorimeterOutput structure. The vectors in the structure are given in Table. The fMainClus is a SBSCalorimeterOutput structure for the cluster with the maximum energy os the vectors always have size of 1. There is a flag, fDataOutputLevel, which controls the additional output. This flag can be set with the function: SetDataOutputLevel(Int_t). If fDataOutputLevel $>$ 0, then the SBSCalorimeterOutput structure fMainClusBlk is filled in which information of each block that is in the main cluster is loaded into the vectors. If fDataOutputLevel $>$ 1, then the SBSCalorimeterOutput structure fOutClus is filled with the cluster information for each of the clusters.

Tree name	Description	Global variable
e	Energy of cluster	
e_c	Corrected energy of cluster	
x	x position (m) of cluster	
y	y position (m) of cluster	
blk_e	Energy of block with max energy	
blk_e_c	Corrected energy of block with max energy	
row	row of block with max energy	
col	column of block with max energy	
id	Element ID of block with max energy	