

BigBite Drift Chamber Global Variables

Gregg Franklin
gbfranklin@cmu.edu

Seamus Riordan
riordan@jlab.org

Carnegie-Mellon University

November 22, 2005

This document describes the variables that are stored as Hall A Global Variables and are available for output to the Root Tree. They can also be examined in the analyzer using the *gHaVars* → *Print()* and *gHaVars* → *PrintFull()* commands. The subset of Global Variables that are actually written to the Root Tree is determined by a file described in the Hall A C++ Analyzer Documentation topic "Defining the Output".

1 General Global Variables

Global variables defined that are not specifically associated with the BigBite or Neutron Spectrometer arms.

1.1 Run and Event Information

tag	description
g.runnum	Run number
g.runttype	CODA run type
g.runtime	CODA run time
g.evnum	Event number
g.evtyp	Event type
g.evlen	Event Length
g.helicity	Beam helicity
g.timestamp	Time stamp

2 MWDC Plane Variables

Global variables associated with the individual chamber planes have labels of the form B.dc.<plane number>.tag. For example, the number of hits in plane v2 can be accessed using the label B.dc.v2.nhit.

2.1 (THaMWDCHit) TClonesArray* fHits

An fHits array is created for each chamber plane and contains the wire hit information for that plane.

tag	size	default	note	defining function	description
nhit	[1]	NULL	1	THaMWDCPlane::Decode	Number of hits
wire	[nhit]	NA		THaMWDCPlane::Decode	wire
rawtime	[nhit]	NA		THaMWDCPlane::Decode	Raw TDC time of hit
time	[nhit]	NA	2	THaMWDCPlane::Decode	Drift time (nsec)
offset	[nhit]	0.0		THaMWDCPlane::Decode	TDC offset parameter (nsec)
myref	[nhit]	0.0		THaMWDCPlane::Decode	Time of reference chan (nsec)
dist	[nhit]	0.0	?		
track	[nhit]	-1	?		

Note 1: To be added into the fHits array, the wire number must be valid. If the *no_negative* flag is TRUE, the time must be between fMinTime and fMaxTime

Note 2: The drifttime is computed as $time = rawtime * (TDCcalibration) - TDCOffset - ReferenceChannelTime$. If the reference channel time is not valid, it is not subtracted off, but the hit is stored and fRefOkay is set to FALSE.

2.2 Double_t fRawT[nWires], fCorT[nWires], fRefT[nRefWires], and Int_t fTCounter[nWires]

Array sizes set to be the number of wires in the plane and map to the wire number. The index of the array is the wire number.

tag	size	default	note	defining function	description
rawtimeof	[nWires]	-1e35		THaMWDCPlane::Decode	Raw TDC Time
cortimeof	[nWires]	-1e35		THaMWDCPlane::Decode	Drift time (nsec)
NumHitsof	[nWires]	0		THaMWDCPlane::Decode	Number of hits on this wire
reftimeof	[nRefWires]	-2e35		THaMWDCPlane::Decode	Time of reference channel (nsec)

2.3 Additional Plane Data

tag	size	default	note	defining function	description
refchokay	[1]	true		THaMWDCPlane::Decode	All reference channels in plane are OK

3 BigBite Variables

Global variables associated with the BigBite tracks are of the form B.tag.

3.1 (THaTrack) TClonesArray* fTracks

An fTracks array is created in the THaSpectrometer class. The tracks are defined in the BigBite detector-frame coordinate system with x towards higher momentum (downwards) z perpendicular to the wire chamber planes in the direction of the particle's momentum and y determined by a right-handed coordinate system. The x- and y- intercepts are defined at z=0. (The first chamber plane.)

tag	size	default	note	defining function	description
tr.n	[1]	NULL		THaMWDC	Number of tracks found
tr.x	[tr.n]	NA		THaMWDC	x at z=0
tr.y	[tr.n]	NA		THaMWDC	y at z=0
tr.xp	[tr.n]	NA		THaMWDC	x slope
tr.yp	[tr.n]	NA		THaMWDC	y slope
tr.chi2	[tr.n]	NA		THaMWDC	Chi squared (not reduced)
tr.ndof	[tr.n]	NA		THaMWDC	Number of degrees of freedom