

dEdxRecon

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7.1.4 * Contains declarations for data structures, helper classes and functions	23
7.1.5 * used to compute energy loss estimates used by the reconstruction pipeline.	23
7.1.6 *	23

7.1.7 *	23
7.1.8 * The implementation (dEdx.cxx) contains the core numerical routines and	23
7.1.9 * algorithms used to compute energy loss per unit length from reconstructed	23
7.1.10 * cluster and pad information, together with helper utilities for particle	23
7.1.11 * identification. Interfaces for computing WF and XP estimates, GigaWaveform	23
7.1.12 * helpers and truncated estimators are declared here; heavy numerical work	23
7.1.13 * and algorithmic details live in the source file.	23
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2.1 Namespace List

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Chapter 6

Directory Documentation

6.1 Apps Directory Reference

Files

- file [Analysis.cxx](#)
- file [DrawOut.cxx](#)

6.2 Fitters Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

6.3 Fitters/inc Directory Reference

Files

- file [ClusterFitter.h](#)
Declarations for cluster-level fitters used to fit pad-cluster charge distributions.
- file [PRFParameters.h](#)
Parameter container and evaluator for the [Pad](#) Response Function (PRF).
- file [TrackFitter.h](#)
Declaration of the [TrackFitter](#) class used to perform track fits.
- file [TrackRecon.h](#)
Declarations for track reconstruction utilities and helpers.

6.4 ModelEvent/inc Directory Reference

Files

- file [AmplitudeError.h](#)
Amplitude error model utilities.
- file [Cluster.h](#)
Cluster container representing a group of pads forming a detected charge.
- file [Event.h](#)
Event container holding modules, clusters and tracks.
- file [FitOutput.h](#)
Containers to hold fit results from cluster/track fitters.
- file [Module.h](#)
Module container representing a detector module of pads and clusters.
- file [Pad.h](#)
Pad class representing a single readout pad and its waveform data.
- file [ROBoard.h](#)
Read-out board ([ROBoard](#)) abstraction and mapping helpers.
- file [Sample.h](#)
Sample container representing a dataset (collection of events).
- file [SetOfTracks.h](#)
Container for collections of [Track](#) objects.
- file [TimeError.h](#)
Time error model utilities.
- file [Track.h](#)
Track class representing a reconstructed particle trajectory.

6.5 ModelSignal/inc Directory Reference

Files

- file [Model_Charge0D.h](#)
0D charge model declaration (inherits from [Model_Charge](#)).
- file [Model_Charge1D.h](#)
1D charge model declaration (inherits from [Model_Charge](#)).
- file [Model_ChargeI.h](#)
Abstract base class for charge models.
- file [Model_Electronics.h](#)
Electronics response model declaration.
- file [Model_ReadOutGeometry.h](#)
Readout geometry model declaration.

6.6 Reconstruction/inc Directory Reference

Files

- file [CombinedFit.h](#)
Combined fitting utilities declaration.
- file [Control.h](#)
High-level orchestration function declaration.
- file [dEdx.h](#)
- file [Displays.h](#)
High-level display utilities and plotting helpers.
- file [DrawOuts.h](#)
Declaration of the DrawOuts helper class for plotting and summaries.
- file [DrawOuts_old.h](#)
Legacy plotting helpers (kept for reference).
- file [LUTs.h](#)
- file [Monitoring.h](#)
Monitoring utilities and entry points for analysis workflows.
- file [Recon_LinkDef.h](#)
ROOT linkdef file for [Reconstruction](#) module classes.
- file [ReconTools.h](#)
Miscellaneous reconstruction helper functions and utilities.
- file [Selector.h](#)
Selection utilities to filter events, modules and clusters.
- file [Variables.h](#)
Central place to declare reconstruction-wide variables and helpers.

6.7 Uploader/inc Directory Reference

Files

- file [GiveMe_Uploader.h](#)
Factory that constructs a concrete [Uploader](#) instance.
- file [Uploader.h](#)
Abstract base class for data uploaders.
- file [Uploader_ERAM01.h](#)
[Uploader](#) for ERAM01-format data files.
- file [Uploader_MockUp_V1.h](#)
Mock-up uploader (version 1) declaration for testing.
- file [Uploader_MockUp_V2.h](#)
Mock-up uploader (version 2) declaration for richer test datasets.
- file [Uploader_Prototype.h](#)
Prototype-format uploader declaration.

6.8 Utilities/inc Directory Reference

Files

- file [FuncFromTGraph.h](#)
Create function wrappers from ROOT TGraph objects.
- file [GaussFunction.h](#)
Gaussian function wrapper declaration.
- file [Misc.h](#)
Small general-purpose utilities and common definitions.
- file [ParabolaFunction.h](#)
Parabola helper function declaration.
- file [ParabolaFunctionNG.h](#)
Non-symmetric parabola helper function declaration.
- file [SignalTools.h](#)
Signal-processing helper declarations (baseline, pulse finding, ...).

6.9 ModelEvent Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

6.10 ModelSignal Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

6.11 Reconstruction Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

6.12 Fitters/src Directory Reference

Files

- file [ClusterFitter.cxx](#)
- file [PRFParameters.cxx](#)
- file [TrackFitter.cxx](#)
- file [TrackRecon.cxx](#)

6.13 ModelEvent/src Directory Reference

Files

- file [AmplitudeError.cxx](#)
- file [Cluster.cxx](#)
- file [Event.cxx](#)
- file [FitOutput.cxx](#)
- file [Module.cxx](#)
- file [Pad.cxx](#)
- file [ROBoard.cxx](#)
- file [Sample.cxx](#)
- file [SetOfTracks.cxx](#)
- file [TimeError.cxx](#)
- file [Track.cxx](#)

6.14 ModelSignal/src Directory Reference

Files

- file [Model_Charge0D.cxx](#)
- file [Model_Charge1D.cxx](#)
- file [Model_ChargeI.cxx](#)
- file [Model_Electronics.cxx](#)
- file [Model_ReadOutGeometry.cxx](#)

6.15 Reconstruction/src Directory Reference

Files

- file [CombinedFit.cxx](#)
- file [Control.cxx](#)
- file [dEdx.cxx](#)
- file [Displays.cxx](#)
- file [DrawOuts.cxx](#)
- file [DrawOuts_old.cxx](#)
- file [LUTs.cxx](#)
- file [Monitoring.cxx](#)
- file [ReconTools.cxx](#)
- file [Selector.cxx](#)
- file [Variables.cxx](#)

6.16 Uploader/src Directory Reference

Files

- file [GiveMe_Uploader.cxx](#)
- file [Uploader.cxx](#)
- file [Uploader_ERAM01.cxx](#)
- file [Uploader_MockUp_V1.cxx](#)
- file [Uploader_MockUp_V2.cxx](#)
- file [Uploader_Prototype.cxx](#)

6.17 Utilities/src Directory Reference

Files

- file [FuncFromTGraph.cxx](#)
- file [GaussFunction.cxx](#)
- file [ParabolaFunction.cxx](#)
- file [ParabolaFunctionNG.cxx](#)
- file [SignalTools.cxx](#)

6.18 Uploader Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

6.19 Utilities Directory Reference

Directories

- directory [inc](#)
- directory [src](#)

Chapter 7

Namespace Documentation

7.1 Reconstruction Namespace Reference

dE/dx estimation and particle identification declarations.

Classes

- class [RecoPad](#)
- class [RecoCluster](#)
- class [RecoModule](#)
- class [RecoEvent](#)
- class [dEdx](#)
- class [DrawOuts](#)

Plotting helper for reconstruction results.

- class [ERAMMaps](#)
- class [LUT](#)

Functions

- void [Monitoring](#) ()
- void [Correction](#) (const int &corrRC=1, const int &corrGain=1, const int &corrWF=1, const int &corrDrift=1, const int &saveSelectOnly=1)
- void [Settings](#) (const std::string &testbeam, const std::string &multiScanName, const std::string &scanName, const std::string &scanspec, const std::string &runvarstr_name, const int &uploader, const int &modules, const int &peaking_time, const int &diffusion, const int &drift_dist, const int &timbin)
- void [ClearVectors](#) ()
- void [DefaultAnalysis](#) ()
- void [DrawSingleScan](#) (const int &methods=0)
- void [DrawMultipleScan](#) (const int &methods=0)
- void [DrawCERN22Scan](#) ()
- void [WFCorrection](#) (const std::string &OutCorr)

Variables

- [Reconstruction::dEdx](#) * [p_dEdx](#)
- [Reconstruction::DrawOuts](#) * [p_DrawOuts](#)
- int [prototype](#) = 0
- int [CERN_Escan](#) = 1
- int [CERN_drift](#) = 0
- int [DESY_zscan](#)
- int [DESY_yscan](#)
- int [DESY_phi](#) = 0
- int [DESY_theta](#) = 0
- int [dedx](#) = 1
- int [DO_Control](#)
- int [DO_dEdx](#)
- int [DO_Comparison](#)
- [Uploader](#) * [p_uploader](#)
- [Reconstruction::LUT](#) * [p_lut](#)
- const std::string [dEdxPath](#) = "../"
- const std::string [dataPath](#) = [dEdxPath](#) + "Data/"
- std::string [dataScanPath](#) = ""
- const std::string [drawoutPath](#) = [dEdxPath](#) + "OUT_Reconstruction_GP/"
- std::string [drawoutMultiScanPath](#) = ""
- std::string [drawoutScanPath](#) = ""
- std::string [drawoutRunPath](#) = ""
- std::string [drawout_file](#) = ""
- std::string [rootout_file](#) = ""
- std::string [log_file](#) = ""
- std::string [comment](#)
- std::string [selectionSet](#)
- std::string [inputDir](#)
- int [drawWhichMethods](#) = 0
- std::string [corrFuncPath](#) = ""
- std::vector< std::string > [vcorrFuncPaths](#)
- std::vector< float > [vScanVals](#)
- std::vector< std::string > [vScanLabels](#)
- std::vector< std::string > [v_scanspec](#)
- std::vector< std::string > [v_comments](#)
- std::vector< std::string > [vTags](#)
- std::vector< std::string > [v_datafiles](#)
- std::vector< std::string > [v_rootout_files](#)
- std::string [tag](#)
- std::string [testbeam](#)
- std::string [multiScanName](#)
- std::string [scanName](#)
- std::string [runvarstr](#)
- int [scanIndex](#) = 0
- int [intUploader](#)
- int [moduleCase](#)
- int [PT](#)
- int [Dt](#)
- int [DtB](#)
- int [DtnoB](#)
- int [driftDist](#)
- int [TB](#)
- int [fcorrectGain](#)

- int [fcorrectRC](#)
- int [fcorrectWF](#)
- int [fcorrectDrift](#)
- int [fsaveSelectOnly](#)
- int [DESY_drift](#) = 0
- int [DESY_row](#) = 0
- int [correction_wf](#) = 0
- int [Draw_Control](#) = 0
- int [Draw_dEdx](#) = 0
- int [Draw_Comparison](#) = 0
- int [Draw_Corrections](#) = 0
- int [Draw_DESY21SingleScan](#) = 0
- int [Draw_DESY21MultScan](#) = 0
- int [Draw_CERN22Scan](#) = 0
- int [DtwithBhere](#) = 286
- int [DtwithoutBhere](#) = 323
- [Uploader](#) * [pUploader](#)

7.1.1 Detailed Description

dE/dx estimation and particle identification declarations.

7.1.2 * @file dEdx.h

7.1.3 *

7.1.4 * Contains declarations for data structures, helper classes and functions

7.1.5 * used to compute energy loss estimates used by the reconstruction pipeline.

7.1.6 *

7.1.7 *

7.1.8 * The implementation (dEdx.cxx) contains the core numerical routines and

7.1.9 * algorithms used to compute energy loss per unit length from reconstructed

7.1.10 * cluster and pad information, together with helper utilities for particle

7.1.11 * identification. Interfaces for computing WF and XP estimates, GigaWaveform

7.1.12 * helpers and truncated estimators are declared here; heavy numerical work

7.1.13 * and algorithmic details live in the source file.

7.1.14 autotoc_md13

7.1.15 Function Documentation

7.1.15.1 ClearVectors()

```
void Reconstruction::ClearVectors ()
```

7.1.15.2 Correction()

```
void Reconstruction::Correction (
    const int & corrRC = 1,
    const int & corrGain = 1,
    const int & corrWF = 1,
    const int & corrDrift = 1,
    const int & saveSelectOnly = 1)
```

7.1.15.3 DefaultAnalysis()

```
void Reconstruction::DefaultAnalysis ()
```

7.1.15.4 DrawCERN22Scan()

```
void Reconstruction::DrawCERN22Scan ()
```

7.1.15.5 DrawMultipleScan()

```
void Reconstruction::DrawMultipleScan (
    const int & methods = 0)
```

7.1.15.6 DrawSingleScan()

```
void Reconstruction::DrawSingleScan (
    const int & methods = 0)
```

7.1.15.7 Monitoring()

```
void Reconstruction::Monitoring ()
```

7.1.15.8 Settings()

```
void Reconstruction::Settings (
    const std::string & testbeam,
    const std::string & multiScanName,
    const std::string & scanName,
    const std::string & scanspec,
    const std::string & runvarstr_name,
    const int & uploader,
    const int & modules,
    const int & peaking_time,
    const int & diffusion,
    const int & drift_dist,
    const int & timbin)
```

7.1.15.9 WFCorrection()

```
void Reconstruction::WFCorrection (  
    const std::string & OutCorr)
```

7.1.16 Variable Documentation

7.1.16.1 CERN_drift

```
int Reconstruction::CERN_drift = 0
```

7.1.16.2 CERN_Escan

```
int Reconstruction::CERN_Escan = 1
```

7.1.16.3 comment

```
std::string Reconstruction::comment
```

7.1.16.4 correction_wf

```
int Reconstruction::correction_wf = 0
```

7.1.16.5 corrFuncPath

```
std::string Reconstruction::corrFuncPath = ""
```

7.1.16.6 dataPath

```
const std::string Reconstruction::dataPath = dEdxPath + "Data/"
```

7.1.16.7 dataScanPath

```
std::string Reconstruction::dataScanPath = ""
```

7.1.16.8 dedx

```
int Reconstruction::dedx = 1
```

7.1.16.9 dEdxPath

```
const std::string Reconstruction::dEdxPath = "../"
```

7.1.16.10 DESY_drift

```
int Reconstruction::DESY_drift = 0
```

7.1.16.11 DESY_phi

```
int Reconstruction::DESY_phi = 0
```

7.1.16.12 DESY_row

```
int Reconstruction::DESY_row = 0
```

7.1.16.13 DESY_theta

```
int Reconstruction::DESY_theta = 0
```

7.1.16.14 DESY_yscan

```
int Reconstruction::DESY_yscan [extern]
```

7.1.16.15 DESY_zscan

```
int Reconstruction::DESY_zscan [extern]
```

7.1.16.16 DO_Comparison

```
int Reconstruction::DO_Comparison [extern]
```

7.1.16.17 DO_Control

```
int Reconstruction::DO_Control [extern]
```

7.1.16.18 DO_dEdx

```
int Reconstruction::DO_dEdx [extern]
```

7.1.16.19 Draw_CERN22Scan

```
int Reconstruction::Draw_CERN22Scan = 0
```

7.1.16.20 Draw_Comparison

```
int Reconstruction::Draw_Comparison = 0
```

7.1.16.21 Draw_Control

```
int Reconstruction::Draw_Control = 0
```

7.1.16.22 Draw_Corrections

```
int Reconstruction::Draw_Corrections = 0
```

7.1.16.23 Draw_dEdx

```
int Reconstruction::Draw_dEdx = 0
```

7.1.16.24 Draw_DESY21MultScan

```
int Reconstruction::Draw_DESY21MultScan = 0
```

7.1.16.25 Draw_DESY21SingleScan

```
int Reconstruction::Draw_DESY21SingleScan = 0
```

7.1.16.26 drawout_file

```
std::string Reconstruction::drawout_file = ""
```

7.1.16.27 drawoutMultiScanPath

```
std::string Reconstruction::drawoutMultiScanPath = ""
```

7.1.16.28 drawoutPath

```
const std::string Reconstruction::drawoutPath = dEdxPath + "OUT_Reconstruction_GP/"
```

7.1.16.29 drawoutRunPath

```
std::string Reconstruction::drawoutRunPath = ""
```

7.1.16.30 drawoutScanPath

```
std::string Reconstruction::drawoutScanPath = ""
```

7.1.16.31 drawWhichMethods

```
int Reconstruction::drawWhichMethods = 0
```

7.1.16.32 driftDist

```
int Reconstruction::driftDist
```

7.1.16.33 Dt

```
int Reconstruction::Dt
```

7.1.16.34 DtB

```
int Reconstruction::DtB
```

7.1.16.35 DtnoB

```
int Reconstruction::DtnoB
```

7.1.16.36 DtwithBhere

```
int Reconstruction::DtwithBhere = 286
```

7.1.16.37 DtwithoutBhere

```
int Reconstruction::DtwithoutBhere = 323
```

7.1.16.38 fcorrectDrift

```
int Reconstruction::fcorrectDrift
```

7.1.16.39 fcorrectGain

```
int Reconstruction::fcorrectGain
```


7.1.16.40 fcorrectRC

```
int Reconstruction::fcorrectRC
```

7.1.16.41 fcorrectWF

```
int Reconstruction::fcorrectWF
```

7.1.16.42 fsaveSelectOnly

```
int Reconstruction::fsaveSelectOnly
```

7.1.16.43 inputDir

```
std::string Reconstruction::inputDir
```

7.1.16.44 intUploader

```
int Reconstruction::intUploader
```

7.1.16.45 log_file

```
std::string Reconstruction::log_file = ""
```

7.1.16.46 moduleCase

```
int Reconstruction::moduleCase
```

7.1.16.47 multiScanName

```
std::string Reconstruction::multiScanName
```

7.1.16.48 p_dEdx

```
Reconstruction::dEdx * Reconstruction::p_dEdx
```

7.1.16.49 p_DrawOuts

```
Reconstruction::DrawOuts * Reconstruction::p_DrawOuts
```

7.1.16.50 p_lut

```
Reconstruction::LUT * Reconstruction::p_lut
```

7.1.16.51 p_uploader

```
Uploader * Reconstruction::p_uploader
```

7.1.16.52 prototype

```
int Reconstruction::prototype = 0
```

7.1.16.53 PT

```
int Reconstruction::PT
```

7.1.16.54 pUploader

```
Uploader* Reconstruction::pUploader
```

7.1.16.55 rootout_file

```
std::string Reconstruction::rootout_file = ""
```

7.1.16.56 runvarstr

```
std::string Reconstruction::runvarstr
```

7.1.16.57 scanIndex

```
int Reconstruction::scanIndex = 0
```

7.1.16.58 scanName

```
std::string Reconstruction::scanName
```

7.1.16.59 selectionSet

```
std::string Reconstruction::selectionSet
```

7.1.16.60 tag

```
std::string Reconstruction::tag
```

7.1.16.61 TB

```
int Reconstruction::TB
```

7.1.16.62 testbeam

```
std::string Reconstruction::testbeam
```

7.1.16.63 v_comments

```
std::vector< std::string > Reconstruction::v_comments
```

7.1.16.64 v_datafiles

```
std::vector< std::string > Reconstruction::v_datafiles
```

7.1.16.65 v_rootout_files

```
std::vector< std::string > Reconstruction::v_rootout_files
```

7.1.16.66 v_scanspec

```
std::vector< std::string > Reconstruction::v_scanspec
```

7.1.16.67 vcorrFuncPaths

```
std::vector< std::string > Reconstruction::vcorrFuncPaths
```

7.1.16.68 vScanLabels

```
std::vector< std::string > Reconstruction::vScanLabels
```

7.1.16.69 vScanVals

```
std::vector< float > Reconstruction::vScanVals
```

7.1.16.70 vTags

```
std::vector< std::string > Reconstruction::vTags
```


Chapter 8

Class Documentation

8.1 Cluster Class Reference

```
#include <Cluster.h>
```

Public Member Functions

- [Cluster](#) (const int &EventNber, const int &EntryNber, const int &ModuleNber)
Construct a [Cluster](#).
- virtual [~Cluster](#) ()
Virtual destructor.
- int [Get_EventNber](#) () const
- int [Get_EntryNber](#) () const
- int [Get_ModuleNber](#) () const
- void [WriteOut](#) () const
- int [IsValid](#) () const
- void [Validate](#) ()
- void [Invalidate](#) ()
- double [Get_Acluster](#) () const
- double [Get_XWeight](#) () const
- double [Get_YWeight](#) () const
- void [Add_Pad](#) (Pad *pPad)
- void [DoClosure](#) ()
- int [Get_NberOfPads](#) () const
- Pad * [Get_Pad](#) (const int &Index1D) const
- Pad * [Get_LeadingPad](#) () const
- double [Get_YLeading](#) () const
- double [Get_TMaxLeading](#) () const
- double [Get_AMaxLeading](#) () const
- Pad * [Get_NextLeadingPad](#) () const
- Pad * [Get_NextNextLeadingPad](#) () const
- void [Set_XTrack](#) (const double &XTrack)
- void [Set_YTrack](#) (const double &YTrack)
- void [Set_eXTrack](#) (const double &eXTrack)
- void [Set_eYTrack](#) (const double &eYTrack)
- int [StatusFit](#) ()
- double [Get_XTrack](#) () const

- double [Get_eXTrack](#) () const
- double [Get_YTrack](#) () const
- double [Get_eYTrack](#) () const
- double [Get_Chi2Min](#) () const
- double [Get_XTrack_BeforeMinimisation](#) () const
- double [Get_YTrack_BeforeMinimisation](#) () const
- int [StatusFit_Horizontal](#) ()
- void [SetEval_Horizontal](#) (TF1 *pTF1)
- double [Eval_Horizontal](#) (const double &Xin)
- int [SetParameter_Horizontal](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults_Horizontal](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults_FailedFit_Horizontal](#) (const int &Verbose)
- double [Chi2_Horizontal](#) (double par[])
- int [FitRes_Horizontal_Get_NberOfTermsInChi2](#) () const
- Pad * [FitRes_Horizontal_Get_Pad](#) (const int &Index1D) const
- double [FitRes_Horizontal_Get_Residual](#) (const int &Index1D) const
- double [FitRes_Horizontal_Get_Pull](#) (const int &Index1D) const
- int [StatusFit_Diagonal](#) ()
- void [SetEval_Diagonal](#) (TF1 *pTF1)
- double [Eval_Diagonal](#) (const double &Xin)
- int [SetParameter_Diagonal](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults_Diagonal](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults_FailedFit_Diagonal](#) (const int &Verbose)
- double [Chi2_Diagonal](#) (double par[])
- int [FitRes_Diagonal_Get_NberOfTermsInChi2](#) () const
- Pad * [FitRes_Diagonal_Get_Pad](#) (const int &Index1D) const
- double [FitRes_Diagonal_Get_Residual](#) (const int &Index1D) const
- double [FitRes_Diagonal_Get_Pull](#) (const int &Index1D) const

Public Attributes

- double [m_AngleRot](#)

8.1.1 Constructor & Destructor Documentation

8.1.1.1 Cluster()

```
Cluster::Cluster (
    const int & EventNber,
    const int & EntryNber,
    const int & ModuleNber)
```

Construct a [Cluster](#).

Parameters

<i>EventNber</i>	event number
<i>EntryNber</i>	entry index
<i>ModuleNber</i>	module index

8.1.1.2 ~Cluster()

```
Cluster::~Cluster () [virtual]
```

Virtual destructor.

8.1.2 Member Function Documentation

8.1.2.1 Add_Pad()

```
void Cluster::Add_Pad (  
    Pad * pPad)
```

8.1.2.2 Chi2_Diagonal()

```
double Cluster::Chi2_Diagonal (  
    double par[])
```

8.1.2.3 Chi2_Horizontal()

```
double Cluster::Chi2_Horizontal (  
    double par[])
```

8.1.2.4 DoClosure()

```
void Cluster::DoClosure ()
```

8.1.2.5 Eval_Diagonal()

```
double Cluster::Eval_Diagonal (  
    const double & Xin)
```

8.1.2.6 Eval_Horizontal()

```
double Cluster::Eval_Horizontal (  
    const double & Xin)
```

8.1.2.7 FitRes_Diagonal_Get_NberOfTermsInChi2()

```
int Cluster::FitRes_Diagonal_Get_NberOfTermsInChi2 () const
```

8.1.2.8 FitRes_Diagonal_Get_Pad()

```
Pad * Cluster::FitRes_Diagonal_Get_Pad (  
    const int & Index1D) const
```

8.1.2.9 FitRes_Diagonal_Get_Pull()

```
double Cluster::FitRes_Diagonal_Get_Pull (  
    const int & Index1D) const
```

8.1.2.10 FitRes_Diagonal_Get_Residual()

```
double Cluster::FitRes_Diagonal_Get_Residual (  
    const int & Index1D) const
```

8.1.2.11 FitRes_Horizontal_Get_NberOfTermsInChi2()

```
int Cluster::FitRes_Horizontal_Get_NberOfTermsInChi2 () const
```

8.1.2.12 FitRes_Horizontal_Get_Pad()

```
Pad * Cluster::FitRes_Horizontal_Get_Pad (  
    const int & Index1D) const
```

8.1.2.13 FitRes_Horizontal_Get_Pull()

```
double Cluster::FitRes_Horizontal_Get_Pull (  
    const int & Index1D) const
```

8.1.2.14 FitRes_Horizontal_Get_Residual()

```
double Cluster::FitRes_Horizontal_Get_Residual (  
    const int & Index1D) const
```

8.1.2.15 Get_Acluster()

```
double Cluster::Get_Acluster () const
```

8.1.2.16 Get_AMaxLeading()

```
double Cluster::Get_AMaxLeading () const
```


8.1.2.17 Get_Chi2Min()

```
double Cluster::Get_Chi2Min () const
```

8.1.2.18 Get_EntryNber()

```
int Cluster::Get_EntryNber () const
```

8.1.2.19 Get_EventNber()

```
int Cluster::Get_EventNber () const
```

8.1.2.20 Get_eXTrack()

```
double Cluster::Get_eXTrack () const
```

8.1.2.21 Get_eYTrack()

```
double Cluster::Get_eYTrack () const
```

8.1.2.22 Get_LeadingPad()

```
Pad * Cluster::Get_LeadingPad () const
```

8.1.2.23 Get_ModuleNber()

```
int Cluster::Get_ModuleNber () const
```

8.1.2.24 Get_NberOfPads()

```
int Cluster::Get_NberOfPads () const
```

8.1.2.25 Get_NextLeadingPad()

```
Pad * Cluster::Get_NextLeadingPad () const
```

8.1.2.26 Get_NextNextLeadingPad()

```
Pad * Cluster::Get_NextNextLeadingPad () const
```

8.1.2.27 Get_Pad()

```
Pad * Cluster::Get_Pad (  
    const int & Index1D) const
```

8.1.2.28 Get_TMaxLeading()

```
double Cluster::Get_TMaxLeading () const
```

8.1.2.29 Get_XTrack()

```
double Cluster::Get_XTrack () const
```

8.1.2.30 Get_XTrack_BeforeMinimisation()

```
double Cluster::Get_XTrack_BeforeMinimisation () const
```

8.1.2.31 Get_XWeight()

```
double Cluster::Get_XWeight () const
```

8.1.2.32 Get_YLeading()

```
double Cluster::Get_YLeading () const
```

8.1.2.33 Get_YTrack()

```
double Cluster::Get_YTrack () const
```

8.1.2.34 Get_YTrack_BeforeMinimisation()

```
double Cluster::Get_YTrack_BeforeMinimisation () const
```

8.1.2.35 Get_YWeight()

```
double Cluster::Get_YWeight () const
```

8.1.2.36 Invalidate()

```
void Cluster::Invalidate ()
```

8.1.2.37 IsValid()

```
int Cluster::IsValid () const
```

8.1.2.38 Set_eXTrack()

```
void Cluster::Set_eXTrack (
    const double & eXTrack)
```

8.1.2.39 Set_eYTrack()

```
void Cluster::Set_eYTrack (
    const double & eYTrack)
```

8.1.2.40 Set_XTrack()

```
void Cluster::Set_XTrack (
    const double & XTrack)
```

8.1.2.41 Set_YTrack()

```
void Cluster::Set_YTrack (
    const double & YTrack)
```

8.1.2.42 SetEval_Diagonal()

```
void Cluster::SetEval_Diagonal (
    TF1 * pTF1)
```

8.1.2.43 SetEval_Horizontal()

```
void Cluster::SetEval_Horizontal (
    TF1 * pTF1)
```

8.1.2.44 SetParameter_Diagonal()

```
int Cluster::SetParameter_Diagonal (
    TVirtualFitter * pTVirtualFitter)
```

8.1.2.45 SetParameter_Horizontal()

```
int Cluster::SetParameter_Horizontal (
    TVirtualFitter * pTVirtualFitter)
```

8.1.2.46 SetResults_Diagonal()

```
void Cluster::SetResults_Diagonal (
    TVirtualFitter * pTVirtualFitter)
```

8.1.2.47 SetResults_FailedFit_Diagonal()

```
void Cluster::SetResults_FailedFit_Diagonal (
    const int & Verbose)
```

8.1.2.48 SetResults_FailedFit_Horizontal()

```
void Cluster::SetResults_FailedFit_Horizontal (
    const int & Verbose)
```

8.1.2.49 SetResults_Horizontal()

```
void Cluster::SetResults_Horizontal (
    TVirtualFitter * pTVirtualFitter)
```

8.1.2.50 StatusFit()

```
int Cluster::StatusFit ()
```

8.1.2.51 StatusFit_Diagonal()

```
int Cluster::StatusFit_Diagonal ()
```

8.1.2.52 StatusFit_Horizontal()

```
int Cluster::StatusFit_Horizontal ()
```

8.1.2.53 Validate()

```
void Cluster::Validate ()
```

8.1.2.54 WriteOut()

```
void Cluster::WriteOut () const
```

8.1.3 Member Data Documentation

8.1.3.1 m_AngleRot

```
double Cluster::m_AngleRot
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Cluster.h](#)
- ModelEvent/src/[Cluster.cxx](#)

8.2 ClusterFitter_Diagonal Class Reference

```
#include <ClusterFitter.h>
```

Public Member Functions

- [ClusterFitter_Diagonal](#) (const std::string &FitterName)
Construct a diagonal cluster fitter.
- virtual [~ClusterFitter_Diagonal](#) ()
Virtual destructor.
- void [Set_Cluster](#) ([Cluster](#) *pCluster)
Set the cluster to be fitted.
- int [DoMinimisation](#) ()
Run minimisation for the current diagonal cluster.
- double [Chi2](#) (double par[])
Compute chi2 for given parameters.

Protected Attributes

- std::string [m_FitterName](#)
- [Cluster](#) * [p_Cluster](#)
- TVirtualFitter * [p_TVirtualFitter](#)
Fitter.

8.2.1 Constructor & Destructor Documentation

8.2.1.1 ClusterFitter_Diagonal()

```
ClusterFitter_Diagonal::ClusterFitter_Diagonal (
    const std::string & FitterName)
```

Construct a diagonal cluster fitter.

Parameters

<i>FitterName</i>	name used to identify the fitter instance
-------------------	---

8.2.1.2 ~ClusterFitter_Diagonal()

```
ClusterFitter_Diagonal::~~ClusterFitter_Diagonal () [virtual]
```

Virtual destructor.

8.2.2 Member Function Documentation

8.2.2.1 Chi2()

```
double ClusterFitter_Diagonal::Chi2 (
    double par[])
```

Compute chi2 for given parameters.

Parameters

<i>par</i>	parameter array for chi2 evaluation
------------	-------------------------------------

Returns

chi2 value

8.2.2.2 DoMinimisation()

```
int ClusterFitter_Diagonal::DoMinimisation ()
```

Run minimisation for the current diagonal cluster.

Returns

0 on success, non-zero on failure

8.2.2.3 Set_Cluster()

```
void ClusterFitter_Diagonal::Set_Cluster (
    Cluster * pCluster)
```

Set the cluster to be fitted.

Parameters

<i>pCluster</i>	pointer to the Cluster (ownership not transferred)
-----------------	--

8.2.3 Member Data Documentation

8.2.3.1 m_FitterName

```
std::string ClusterFitter_Diagonal::m_FitterName [protected]
```

8.2.3.2 p_Cluster

```
Cluster* ClusterFitter_Diagonal::p_Cluster [protected]
```

8.2.3.3 p_TVirtualFitter

```
TVirtualFitter* ClusterFitter_Diagonal::p_TVirtualFitter [protected]
```

Fitter.

The documentation for this class was generated from the following files:

- [Fitters/inc/ClusterFitter.h](#)
- [Fitters/src/ClusterFitter.cxx](#)

8.3 ClusterFitter_Horizontal Class Reference

```
#include <ClusterFitter.h>
```

Public Member Functions

- [ClusterFitter_Horizontal](#) (const std::string &FitterName)
Construct a horizontal cluster fitter.
- virtual [~ClusterFitter_Horizontal](#) ()
Virtual destructor.
- void [Set_Cluster](#) ([Cluster](#) *pCluster)
Set the cluster to be fitted.
- int [DoMinimisation](#) ()
Run minimisation for the current cluster.
- double [Chi2](#) (double par[])
Compute chi2 for given parameters.

Protected Attributes

- `std::string m_FitterName`
- `Cluster * p_Cluster`
- `TVirtualFitter * p_TVirtualFitter`
Fitter.

8.3.1 Constructor & Destructor Documentation

8.3.1.1 ClusterFitter_Horizontal()

```
ClusterFitter_Horizontal::ClusterFitter_Horizontal (
    const std::string & FitterName)
```

Construct a horizontal cluster fitter.

Parameters

<i>FitterName</i>	name used to identify the fitter instance
-------------------	---

8.3.1.2 ~ClusterFitter_Horizontal()

```
ClusterFitter_Horizontal::~~ClusterFitter_Horizontal () [virtual]
```

Virtual destructor.

8.3.2 Member Function Documentation

8.3.2.1 Chi2()

```
double ClusterFitter_Horizontal::Chi2 (
    double par[])
```

Compute chi2 for given parameters.

Parameters

<i>par</i>	parameter array for chi2 evaluation
------------	-------------------------------------

Returns

chi2 value

8.3.2.2 DoMinimisation()

```
int ClusterFitter_Horizontal::DoMinimisation ()
```

Run minimisation for the current cluster.

Returns

0 on success, non-zero on failure

8.3.2.3 Set_Cluster()

```
void ClusterFitter_Horizontal::Set_Cluster (
    Cluster * pCluster)
```

Set the cluster to be fitted.

Parameters

<i>pCluster</i>	pointer to the Cluster (ownership not transferred)
-----------------	--

8.3.3 Member Data Documentation

8.3.3.1 m_FitterName

```
std::string ClusterFitter_Horizontal::m_FitterName [protected]
```

8.3.3.2 p_Cluster

```
Cluster* ClusterFitter_Horizontal::p_Cluster [protected]
```

8.3.3.3 p_TVirtualFitter

```
TVirtualFitter* ClusterFitter_Horizontal::p_TVirtualFitter [protected]
```

Fitter.

The documentation for this class was generated from the following files:

- [Fitters/inc/ClusterFitter.h](#)
- [Fitters/src/ClusterFitter.cxx](#)

8.4 Reconstruction::dEdx Class Reference

```
#include <dEdx.h>
```

Public Member Functions

- [dEdx](#) ()
- virtual [~dEdx](#) ()
- void [Reconstruction](#) ()
- float [ComputedEdxWF](#) (std::vector< float > v_dEdxWF, const int &NClusters, const float &alpha)
- float [ComputedEdxXP](#) (const std::vector< float > &v_dEdx, const std::vector< float > &v_dE, const std::vector< float > &v_dx, const int &nCrossedPads, const float &alpha)
- float [ComputedEdxGP1](#) (const std::vector< TH1F > &vClusWF, const std::vector< float > &v_dEdx, const std::vector< float > &v_Aclus, const std::vector< float > &v_Lclus, const int &nClusters, const float &alpha)
- float [ComputedEdxGP](#) (const TH1F *GWF, const std::vector< TH1F > &vWF, const std::vector< float > &v_dEdx, const std::vector< float > &v_Amax, const float &eventLength, const std::vector< float > &v_Length, const int &nElements, const float &alpha)
- TH1F * [GetGigaWaveform](#) (const std::vector< TH1F > &vClusWF)
- TH1F * [GetTruncatedGigaWaveformGP1](#) (const std::vector< TH1F > &vClusWF, const std::vector< float > &v_dEdx, const int &nClusters)
- void [DiscardedModule](#) ()

8.4.1 Constructor & Destructor Documentation

8.4.1.1 dEdx()

```
Reconstruction::dEdx::dEdx ()
```

8.4.1.2 ~dEdx()

```
Reconstruction::dEdx::~~dEdx () [virtual]
```

8.4.2 Member Function Documentation

8.4.2.1 ComputedEdxGP()

```
float Reconstruction::dEdx::ComputedEdxGP (
    const TH1F * GWF,
    const std::vector< TH1F > & vWF,
    const std::vector< float > & v_dEdx,
    const std::vector< float > & v_Amax,
    const float & eventLength,
    const std::vector< float > & v_Length,
    const int & nElements,
    const float & alpha)
```

8.4.2.2 ComputedEdxGP1()

```
float Reconstruction::dEdx::ComputedEdxGP1 (
    const std::vector< TH1F > & vClusWF,
    const std::vector< float > & v_dEdx,
    const std::vector< float > & v_Aclus,
    const std::vector< float > & v_Lclus,
    const int & nClusters,
    const float & alpha)
```

8.4.2.3 ComputedEdxWF()

```
float Reconstruction::dEdx::ComputedEdxWF (
    std::vector< float > v_dEdxWF,
    const int & NClusters,
    const float & alpha)
```

8.4.2.4 ComputedEdxXP()

```
float Reconstruction::dEdx::ComputedEdxXP (
    const std::vector< float > & v_dEdx,
    const std::vector< float > & v_dE,
    const std::vector< float > & v_dx,
    const int & nCrossedPads,
    const float & alpha)
```

dEdx = sum(dE)/Sum(dx) and not average(dE/dx) of each pad = > less sensitive to statistical fluctuations

8.4.2.5 DiscardedModule()

```
void Reconstruction::dEdx::DiscardedModule ()
```

8.4.2.6 GetGigaWaveform()

```
TH1F * Reconstruction::dEdx::GetGigaWaveform (
    const std::vector< TH1F > & vClusWF)
```

8.4.2.7 GetTruncatedGigaWaveformGP1()

```
TH1F * Reconstruction::dEdx::GetTruncatedGigaWaveformGP1 (
    const std::vector< TH1F > & vClusWF,
    const std::vector< float > & v_dEdx,
    const int & nClusters)
```

8.4.2.8 Reconstruction()

```
void Reconstruction::dEdx::Reconstruction ()
```

The documentation for this class was generated from the following files:

- [Reconstruction/inc/dEdx.h](#)
- [Reconstruction/src/dEdx.cxx](#)

8.5 Reconstruction::DrawOuts Class Reference

Plotting helper for reconstruction results.

```
#include <DrawOuts.h>
```

Public Member Functions

- [DrawOuts](#) ()
Default constructor.
- [DrawOuts](#) (const std::string &inputFile)
Construct from a single input file.
- [DrawOuts](#) (const std::vector< std::string > &v_inputFiles)
Construct from a list of input files.
- virtual [~DrawOuts](#) ()
Virtual destructor.
- void [SetStyle](#) ()
Set plotting style (ROOT style settings).
- void [DESY21ScanFill](#) ()
Fill DESY21 single-run scan data.
- void [DESY21ScanDraw](#) ()
Draw DESY21 scan summaries.
- void [CERN22ScanFill](#) ()
Fill CERN22 single-run scan data.
- void [CERN22ScanDraw](#) ()
Draw CERN22 scan summaries.
- void [Control](#) ()
General control/entry point for plotting.
- void [EnergyLoss](#) (const int &methods=0)
Produce energy-loss plots.
- void [FileComparison](#) ()
Produce file comparison plots.
- void [DESY21SingleScan](#) (const int &methods=0)
Draw DESY21 single scan.
- void [DESY21MultiScan](#) (const int &methods=0)
Draw DESY21 multi-scan summaries.
- void [CERN22Scan](#) ()
Draw CERN22 scan summaries (wrapper).
- void [AmplitudeVSLength](#) ()
Plot amplitude versus cluster length.

8.5.1 Detailed Description

Plotting helper for reconstruction results.

Provides methods to create scan drawings, energy loss plots, comparisons and other visual summaries used by the analysis tools.

8.5.2 Constructor & Destructor Documentation

8.5.2.1 DrawOuts() [1/3]

```
Reconstruction::DrawOuts::DrawOuts ()
```

Default constructor.

8.5.2.2 DrawOuts() [2/3]

```
Reconstruction::DrawOuts::DrawOuts (  
    const std::string & inputFile)
```

Construct from a single input file.

Parameters

<i>inputFile</i>	path to the input file
------------------	------------------------

8.5.2.3 DrawOuts() [3/3]

```
Reconstruction::DrawOuts::DrawOuts (
    const std::vector< std::string > & v_inputFiles)
```

Construct from a list of input files.

Parameters

<i>v_inputFiles</i>	vector with input file paths
---------------------	------------------------------

8.5.2.4 ~DrawOuts()

```
Reconstruction::DrawOuts::~~DrawOuts () [virtual]
```

Virtual destructor.

8.5.3 Member Function Documentation

8.5.3.1 AmplitudeVSLength()

```
void Reconstruction::DrawOuts::AmplitudeVSLength ()
```

Plot amplitude versus cluster length.

8.5.3.2 CERN22Scan()

```
void Reconstruction::DrawOuts::CERN22Scan ()
```

Draw CERN22 scan summaries (wrapper).

8.5.3.3 CERN22ScanDraw()

```
void Reconstruction::DrawOuts::CERN22ScanDraw ()
```

Draw CERN22 scan summaries.

8.5.3.4 CERN22ScanFill()

```
void Reconstruction::DrawOuts::CERN22ScanFill ()
```

Fill CERN22 single-run scan data.

8.5.3.5 Control()

```
void Reconstruction::DrawOuts::Control ()
```

General control/entry point for plotting.

8.5.3.6 DESY21MultiScan()

```
void Reconstruction::DrawOuts::DESY21MultiScan (  
    const int & methods = 0)
```

Draw DESY21 multi-scan summaries.

Parameters

<i>methods</i>	selection of methods (0: both, 1: only WF, 2: only XP)
----------------	--

8.5.3.7 DESY21ScanDraw()

```
void Reconstruction::DrawOuts::DESY21ScanDraw ()
```

Draw DESY21 scan summaries.

8.5.3.8 DESY21ScanFill()

```
void Reconstruction::DrawOuts::DESY21ScanFill ()
```

Fill DESY21 single-run scan data.

8.5.3.9 DESY21SingleScan()

```
void Reconstruction::DrawOuts::DESY21SingleScan (  
    const int & methods = 0)
```

Draw DESY21 single scan.

Parameters

<i>methods</i>	selection of methods (0: both, 1: only WF, 2: only XP)
----------------	--

8.5.3.10 EnergyLoss()

```
void Reconstruction::DrawOuts::EnergyLoss (  
    const int & methods = 0)
```

Produce energy-loss plots.

Parameters

<i>methods</i>	selection of methods (0: both, 1: only WF, 2: only XP)
----------------	--

Truncated ETF

8.5.3.11 FileComparison()

```
void Reconstruction::DrawOuts::FileComparison ()
```

Produce file comparison plots.

8.5.3.12 SetStyle()

```
void Reconstruction::DrawOuts::SetStyle ()
```

Set plotting style (ROOT style settings).

The documentation for this class was generated from the following files:

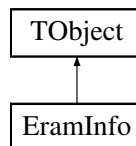
- [Reconstruction/inc/DrawOuts.h](#)
- [Reconstruction/src/DrawOuts.cxx](#)

8.6 EramInfo Class Reference

Lookup table utilities used by reconstruction algorithms.

```
#include <LUTs.h>
```

Inheritance diagram for EramInfo:



Public Member Functions

- [EramInfo \(\)](#)
- virtual [~EramInfo \(\)](#)

Public Attributes

- int [Id](#)
- int [Position](#)
- int [XX](#)
- int [YY](#)
- float [RC](#)
- float [Gain](#)
- float [Resolution](#)
- int [Endplate](#)
- bool [InbTPC](#)
- bool [IntTPC](#)

8.6.1 Detailed Description

Lookup table utilities used by reconstruction algorithms.

8.6.2 * @file LUTs.h

8.6.3 *

8.6.4 * Declares data structures and helpers for building and accessing LUTs

8.6.5 * (geometry, calibration, etc.) used by dE/dx and track/cluster

8.6.6 * reconstruction.

8.6.7 *

8.6.8 *

8.6.9 * The implementation file LUTs.cxx constructs ERAM maps, fills lookup tables

8.6.10 * and exposes accessors used across the reconstruction pipeline. The source

8.6.11 * also contains helpers to fill and repair maps (FillHoles), and code to

8.6.12 * compute mean gains/RC values used in calibration steps.

8.6.13 autotoc_md26

8.6.14 Constructor & Destructor Documentation

8.6.14.1 EramInfo()

```
EramInfo::EramInfo () [inline]
```

8.6.14.2 ~EramInfo()

```
virtual EramInfo::~~EramInfo () [inline], [virtual]
```

8.6.15 Member Data Documentation

8.6.15.1 Endplate

```
int EramInfo::Endplate
```

8.6.15.2 Gain

```
float EramInfo::Gain
```

8.6.15.3 Id

```
int EramInfo::Id
```

8.6.15.4 InbTPC

```
bool EramInfo::InbTPC
```

8.6.15.5 IntTPC

```
bool EramInfo::IntTPC
```

8.6.15.6 Position

```
int EramInfo::Position
```

8.6.15.7 RC

```
float EramInfo::RC
```

8.6.15.8 Resolution

```
float EramInfo::Resolution
```

8.6.15.9 XX

```
int EramInfo::XX
```

8.6.15.10 YY

```
int EramInfo::YY
```

The documentation for this class was generated from the following file:

- Reconstruction/inc/[LUTs.h](#)

8.7 Reconstruction::ERAMMaps Class Reference

```
#include <LUTs.h>
```

Public Member Functions

- [ERAMMaps](#) (const std::string &file="\$HOME/Documents/Code/ERAMInfo/ERAMInfo.root")
- virtual [~ERAMMaps](#) ()
- int [ID](#) (const int &position)
- float [RC](#) (const int &position, const int &iX, const int &iY)
- float [Gain](#) (const int &position, const int &iX, const int &iY)
- float [Resolution](#) (const int &position, const int &iX, const int &iY)
- float [MeanGain](#) (const int &position)
- float [MeanRC](#) (const int &position)

8.7.1 Constructor & Destructor Documentation

8.7.1.1 ERAMMaps()

```
Reconstruction::ERAMMaps::ERAMMaps (
    const std::string & file = "$HOME/Documents/Code/ERAMInfo/ERAMInfo.root")
```

8.7.1.2 ~ERAMMaps()

```
Reconstruction::ERAMMaps::~~ERAMMaps () [virtual]
```

8.7.2 Member Function Documentation

8.7.2.1 Gain()

```
float Reconstruction::ERAMMaps::Gain (
    const int & position,
    const int & iX,
    const int & iY)
```

8.7.2.2 ID()

```
int Reconstruction::ERAMMaps::ID (
    const int & position)
```

8.7.2.3 MeanGain()

```
float Reconstruction::ERAMMaps::MeanGain (
    const int & position)
```

8.7.2.4 MeanRC()

```
float Reconstruction::ERAMMaps::MeanRC (
    const int & position)
```

8.7.2.5 RC()

```
float Reconstruction::ERAMMaps::RC (
    const int & position,
    const int & iX,
    const int & iY)
```

8.7.2.6 Resolution()

```
float Reconstruction::ERAMMaps::Resolution (
    const int & position,
    const int & iX,
    const int & iY)
```

The documentation for this class was generated from the following files:

- Reconstruction/inc/[LUTs.h](#)
- Reconstruction/src/[LUTs.cxx](#)

8.8 Event Class Reference

```
#include <Event.h>
```

Public Member Functions

- [Event](#) (const int &EventNber, const int &EntryNber, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Chargel](#) *pModel_Chargel)
- virtual [~Event](#) ()
- int [Get_EventNber](#) () const
- int [Get_EntryNber](#) () const
- void [SmallDump](#) () const
- void [WriteOut](#) () const
- const [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- const [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- const [Model_Chargel](#) * [Get_Model_Chargel](#) ()
- int [IsValid](#) () const
- void [Validate](#) ()
- void [Invalidate](#) ()
- void [Clear_Modules](#) ()
- void [Add_Module](#) ([Module](#) *pModule)
- [Module](#) * [Get_ThisModule](#) (const int &ModuleNber)
- const [Module](#) * [Get_ThisModuleConst](#) (const int &ModuleNber) const
- int [Get_NberOfModule](#) () const
- [Module](#) * [Get_Module_InArray](#) (const int &Index1D)

- int [Validity_ForThisModule](#) (const int &ModuleNber) const
- void [Validate_ThisModule](#) (const int &ModuleNber)
- void [Invalidate_ThisModule](#) (const int &ModuleNber)
- std::vector< [Cluster](#) * > [GiveMe_Clusters_ForThisModule](#) (const int &ModuleNber)
- double [GiveMe_CutSlopeXY_ForThisModule](#) (const int &ModuleNber)
- double [GiveMe_CutSlopeXZ_ForThisModule](#) (const int &ModuleNber)
- double [GiveMe_CutInterCeptXZ_ForThisModule](#) (const int &ModuleNber)
- std::vector< double > [GiveMe_CutSlopeXYZ_ForThisModule](#) (const int &ModuleNber)
- void [Replace_Clusters_ForThisModule](#) (std::vector< [Cluster](#) * > &VCluster, const int &ModuleNber)
- [Cluster](#) * [Get_Cluster_Copy](#) ([Cluster](#) *pCluster)
- [Track](#) * [GiveMe_AnUnfittedTrack_ForThisModule](#) (const int &ModuleNber)
- void [Set_Track_ForThisModule](#) ([Track](#) *pTrack, const int &ModuleNber)
- const [Track](#) * [GiveMe_Track_ForThisModule](#) (const int &ModuleNber)

8.8.1 Constructor & Destructor Documentation

8.8.1.1 Event()

```
Event::Event (
    const int & EventNber,
    const int & EntryNber,
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI)
```

Constructor

8.8.1.2 ~Event()

```
Event::~Event () [virtual]
```

8.8.2 Member Function Documentation

8.8.2.1 Add_Module()

```
void Event::Add_Module (
    Module * pModule)
```

8.8.2.2 Clear_Modules()

```
void Event::Clear_Modules ()
```

8.8.2.3 Get_Cluster_Copy()

```
Cluster * Event::Get_Cluster_Copy (
    Cluster * pCluster)
```

8.8.2.4 Get_EntryNber()

```
int Event::Get_EntryNber () const
```

8.8.2.5 Get_EventNber()

```
int Event::Get_EventNber () const
```

8.8.2.6 Get_Model_ChargeI()

```
const Model_ChargeI * Event::Get_Model_ChargeI ()
```

8.8.2.7 Get_Model_Electronics()

```
const Model_Electronics * Event::Get_Model_Electronics ()
```

8.8.2.8 Get_Model_ReadOutGeometry()

```
const Model_ReadOutGeometry * Event::Get_Model_ReadOutGeometry ()
```

8.8.2.9 Get_Module_InArray()

```
Module * Event::Get_Module_InArray (  
    const int & Index1D)
```

8.8.2.10 Get_NberOfModule()

```
int Event::Get_NberOfModule () const
```

8.8.2.11 Get_ThisModule()

```
Module * Event::Get_ThisModule (  
    const int & ModuleNber)
```

8.8.2.12 Get_ThisModuleConst()

```
const Module * Event::Get_ThisModuleConst (  
    const int & ModuleNber) const
```

8.8.2.13 GiveMe_AnUnfittedTrack_ForThisModule()

```
Track * Event::GiveMe_AnUnfittedTrack_ForThisModule (  
    const int & ModuleNber)
```

8.8.2.14 GiveMe_Clusters_ForThisModule()

```
std::vector< Cluster * > Event::GiveMe_Clusters_ForThisModule (
    const int & ModuleNber)
```

8.8.2.15 GiveMe_CutInterCeptXZ_ForThisModule()

```
double Event::GiveMe_CutInterCeptXZ_ForThisModule (
    const int & ModuleNber)
```

8.8.2.16 GiveMe_CutSlopeXY_ForThisModule()

```
double Event::GiveMe_CutSlopeXY_ForThisModule (
    const int & ModuleNber)
```

8.8.2.17 GiveMe_CutSlopeXYZ_ForThisModule()

```
std::vector< double > Event::GiveMe_CutSlopeXYZ_ForThisModule (
    const int & ModuleNber)
```

8.8.2.18 GiveMe_CutSlopeXZ_ForThisModule()

```
double Event::GiveMe_CutSlopeXZ_ForThisModule (
    const int & ModuleNber)
```

8.8.2.19 GiveMe_Track_ForThisModule()

```
const Track * Event::GiveMe_Track_ForThisModule (
    const int & ModuleNber)
```

8.8.2.20 Invalidate()

```
void Event::Invalidate ()
```

8.8.2.21 Invalidate_ThisModule()

```
void Event::Invalidate_ThisModule (
    const int & ModuleNber)
```

8.8.2.22 IsValid()

```
int Event::IsValid () const
```

8.8.2.23 Replace_Clusters_ForThisModule()

```
void Event::Replace_Clusters_ForThisModule (
    std::vector< Cluster * > & VCluster,
    const int & ModuleNber)
```

8.8.2.24 Set_Track_ForThisModule()

```
void Event::Set_Track_ForThisModule (
    Track * pTrack,
    const int & ModuleNber)
```

8.8.2.25 SmallDump()

```
void Event::SmallDump () const
```

8.8.2.26 Validate()

```
void Event::Validate ()
```

8.8.2.27 Validate_ThisModule()

```
void Event::Validate_ThisModule (
    const int & ModuleNber)
```

8.8.2.28 Validity_ForThisModule()

```
int Event::Validity_ForThisModule (
    const int & ModuleNber) const
```

8.8.2.29 WriteOut()

```
void Event::WriteOut () const
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Event.h](#)
- ModelEvent/src/[Event.cxx](#)

8.9 FitOutput Class Reference

```
#include <FitOutput.h>
```


Public Member Functions

- [FitOutput](#) ()
- virtual [~FitOutput](#) ()
- [FitOutput](#) (const [FitOutput](#) &ToBeCopied)
- [FitOutput](#) & [operator=](#) (const [FitOutput](#) &ToBeCopied)
- void [Reset](#) ()
- void [Set](#) (const int &NberOfModelParameters)
- void [SetResults](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults](#) (const std::vector< std::string > &V_PARname, const std::vector< double > &V_PAR, const std::vector< double > &V_ePAR)
- void [PrintFitOutput](#) ()
- void [PrintFitOutputInCanvas](#) (double Xstart, double Ystart, double Step)

Public Attributes

- std::string [m_NameOfTheModel](#)
- int [m_NberOfModelParameters](#)
- int [m_NberOfDataPoints](#)
- double * [p_par](#)
Parameters.
- std::string * [p_parName](#)
Name.
- double * [p_eparplus](#)
Errors.
- double * [p_eparminus](#)
Errors.
- double * [p_eparparab](#)
Errors.
- double * [p_CovMatrix](#)
Cov matrix.
- double [m_MinnLL](#)
Likelihood.
- std::string [m_Description](#)

8.9.1 Constructor & Destructor Documentation**8.9.1.1 FitOutput() [1/2]**

```
FitOutput::FitOutput ()
```

8.9.1.2 ~FitOutput()

```
FitOutput::~FitOutput () [virtual]
```

8.9.1.3 FitOutput() [2/2]

```
FitOutput::FitOutput (
    const FitOutput & ToBeCopied)
```

8.9.2 Member Function Documentation

8.9.2.1 operator=()

```
FitOutput & FitOutput::operator= (  
    const FitOutput & ToBeCopied)
```

8.9.2.2 PrintFitOutput()

```
void FitOutput::PrintFitOutput ()
```

8.9.2.3 PrintFitOutputInCanvas()

```
void FitOutput::PrintFitOutputInCanvas (  
    double Xstart,  
    double Ystart,  
    double Step)
```

8.9.2.4 Reset()

```
void FitOutput::Reset ()
```

8.9.2.5 Set()

```
void FitOutput::Set (  
    const int & NberOfModelParameters)
```

8.9.2.6 SetResults() [1/2]

```
void FitOutput::SetResults (  
    const std::vector< std::string > & V_PARname,  
    const std::vector< double > & V_PAR,  
    const std::vector< double > & V_ePAR)
```

8.9.2.7 SetResults() [2/2]

```
void FitOutput::SetResults (  
    TVirtualFitter * pTVirtualFitter)
```

8.9.3 Member Data Documentation

8.9.3.1 m_Description

```
std::string FitOutput::m_Description
```

8.9.3.2 m_MinnLL

```
double FitOutput::m_MinnLL
```

Likelihood.

8.9.3.3 m_NameOfTheModel

```
std::string FitOutput::m_NameOfTheModel
```

8.9.3.4 m_NberOfDataPoints

```
int FitOutput::m_NberOfDataPoints
```

8.9.3.5 m_NberOfModelParameters

```
int FitOutput::m_NberOfModelParameters
```

8.9.3.6 p_CovMatrix

```
double* FitOutput::p_CovMatrix
```

Cov matrix.

8.9.3.7 p_eparminus

```
double* FitOutput::p_eparminus
```

Errors.

8.9.3.8 p_eparparab

```
double* FitOutput::p_eparparab
```

Errors.

8.9.3.9 p_eparplus

```
double* FitOutput::p_eparplus
```

Errors.

8.9.3.10 p_par

```
double* FitOutput::p_par
```

Parameters.

8.9.3.11 p_parName

```
std::string* FitOutput::p_parName
```

Name.

The documentation for this class was generated from the following files:

- ModelEvent/inc/[FitOutput.h](#)
- ModelEvent/src/[FitOutput.cxx](#)

8.10 GaussFunction Class Reference

```
#include <GaussFunction.h>
```

Public Member Functions

- [GaussFunction](#) ()
- virtual [~GaussFunction](#) ()
- double [Get_Norm](#) ()
- double [Get_Mean](#) ()
- double [Get_Sigma](#) ()
- void [Set_Norm](#) (const double &Norm)
- void [Set_Mean](#) (const double &Mean)
- void [Set_Sigma](#) (const double &Sigma)
- double [operator\(\)](#) (double *x, double *par)

8.10.1 Constructor & Destructor Documentation

8.10.1.1 GaussFunction()

```
GaussFunction::GaussFunction ()
```

Constructor

8.10.1.2 ~GaussFunction()

```
GaussFunction::~~GaussFunction () [virtual]
```

8.10.2 Member Function Documentation

8.10.2.1 Get_Mean()

```
double GaussFunction::Get_Mean ()
```

8.10.2.2 Get_Norm()

```
double GaussFunction::Get_Norm ()
```

8.10.2.3 Get_Sigma()

```
double GaussFunction::Get_Sigma ()
```

8.10.2.4 operator()()

```
double GaussFunction::operator() (
    double * x,
    double * par)
```

8.10.2.5 Set_Mean()

```
void GaussFunction::Set_Mean (
    const double & Mean)
```

8.10.2.6 Set_Norm()

```
void GaussFunction::Set_Norm (
    const double & Norm)
```

8.10.2.7 Set_Sigma()

```
void GaussFunction::Set_Sigma (
    const double & Sigma)
```

The documentation for this class was generated from the following files:

- Utilities/inc/[GaussFunction.h](#)
- Utilities/src/[GaussFunction.cxx](#)

8.11 GlobalChi2_4 Struct Reference

Public Member Functions

- [GlobalChi2_4](#) (ROOT::Math::IMultiGenFunction &f1, ROOT::Math::IMultiGenFunction &f2, ROOT::Math::IMultiGenFunction &f3, ROOT::Math::IMultiGenFunction &f4)
- double [operator\(\)](#) (const double *par) const

Public Attributes

- const ROOT::Math::IMultiGenFunction * [fChi2_1](#)
- const ROOT::Math::IMultiGenFunction * [fChi2_2](#)
- const ROOT::Math::IMultiGenFunction * [fChi2_3](#)
- const ROOT::Math::IMultiGenFunction * [fChi2_4](#)

8.11.1 Constructor & Destructor Documentation

8.11.1.1 GlobalChi2_4()

```
GlobalChi2_4::GlobalChi2_4 (
    ROOT::Math::IMultiGenFunction & f1,
    ROOT::Math::IMultiGenFunction & f2,
    ROOT::Math::IMultiGenFunction & f3,
    ROOT::Math::IMultiGenFunction & f4) [inline]
```

8.11.2 Member Function Documentation

8.11.2.1 operator()

```
double GlobalChi2_4::operator() (
    const double * par) const [inline]
```

8.11.3 Member Data Documentation

8.11.3.1 fChi2_1

```
const ROOT::Math::IMultiGenFunction* GlobalChi2_4::fChi2_1
```

8.11.3.2 fChi2_2

```
const ROOT::Math::IMultiGenFunction* GlobalChi2_4::fChi2_2
```

8.11.3.3 fChi2_3

```
const ROOT::Math::IMultiGenFunction* GlobalChi2_4::fChi2_3
```

8.11.3.4 fChi2_4

```
const ROOT::Math::IMultiGenFunction* GlobalChi2_4::fChi2_4
```

The documentation for this struct was generated from the following file:

- Reconstruction/src/[CombinedFit.cxx](#)

8.12 Reconstruction::LUT Class Reference

```
#include <LUTs.h>
```

Public Member Functions

- [LUT](#) (const int &transDiffCoeffB, const int &transDiffCoeffnoB, const int &peakingTime)
- [LUT](#) (const std::string &file)
- virtual [~LUT](#) ()
- float [getRatio](#) (const int &Dt, const int &RC, const float &drift, const float &impact, const float &angle)

8.12.1 Constructor & Destructor Documentation

8.12.1.1 LUT() [1/2]

```
Reconstruction::LUT::LUT (
    const int & transDiffCoeffB,
    const int & transDiffCoeffnoB,
    const int & peakingTime)
```

8.12.1.2 LUT() [2/2]

```
Reconstruction::LUT::LUT (
    const std::string & file)
```

8.12.1.3 ~LUT()

```
Reconstruction::LUT::~~LUT () [virtual]
```

8.12.2 Member Function Documentation

8.12.2.1 getRatio()

```
float Reconstruction::LUT::getRatio (
    const int & Dt,
    const int & RC,
    const float & drift,
    const float & impact,
    const float & angle)
```

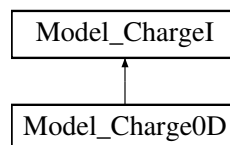
The documentation for this class was generated from the following files:

- Reconstruction/inc/[LUTs.h](#)
- Reconstruction/src/[LUTs.cxx](#)

8.13 Model_Charge0D Class Reference

```
#include <Model_Charge0D.h>
```

Inheritance diagram for Model_Charge0D:



Public Member Functions

- [Model_Charge0D](#) ()
- virtual [~Model_Charge0D](#) ()
- double [Get_Qprim](#) () const
- void [Set_Qprim](#) (const double &Qprim)
- double [Get_Qpad](#) (const double &Time, const double &Time0, const double &XTrue, const double &YTrue, const double &XL, const double &XH, const double &YL, const double &YH) const
- void [WriteOut](#) () const
- void [Set_Ion](#) (const int &Dolons, const double &Tion, const double &RTrue, const double &RFactor)

Public Member Functions inherited from [Model_ChargeI](#)

- [Model_ChargeI](#) ()
- virtual [~Model_ChargeI](#) ()
- double [Get_RC](#) () const
- double [Get_Width](#) () const
- double [Get_Gain](#) () const
- void [Set_RC](#) (const double &RC)
- void [Set_Width](#) (const double &Width)
- void [Set_Gain](#) (const double &Gain)
- void [Set_WidthFromDriftDistance](#) (const double &DriftDistance_cm)

Protected Member Functions

- void [SetSecondaries](#) ()

Protected Member Functions inherited from [Model_Charge1](#)

- void [WidthFromDriftDistance](#) (const double &DriftDistance_cm)

Protected Attributes

- double [m_Qprim](#)
- int [m_Dolons](#)
- double [m_Tion](#)
- double [m_RTrue](#)
- double [m_RFactor](#)

Protected Attributes inherited from [Model_Charge1](#)

- double [m_RC](#)
- double [m_Width](#)
- double [m_Gain](#)
- double [m_2RCinv](#)
- double [m_Width2](#)
- double [m_NormQPad](#)

8.13.1 Constructor & Destructor Documentation**8.13.1.1 Model_Charge0D()**

```
Model_Charge0D::Model_Charge0D ()
```

Constructor

8.13.1.2 ~Model_Charge0D()

```
Model_Charge0D::~~Model_Charge0D () [virtual]
```

8.13.2 Member Function Documentation**8.13.2.1 Get_Qpad()**

```
double Model_Charge0D::Get_Qpad (
    const double & Time,
    const double & Time0,
    const double & XTrue,
    const double & YTrue,
    const double & XL,
    const double & XH,
    const double & YL,
    const double & YH) const [virtual]
```

Implements [Model_Charge1](#).

8.13.2.2 Get_Qprim()

```
double Model_Charge0D::Get_Qprim () const
```

8.13.2.3 Set_Ion()

```
void Model_Charge0D::Set_Ion (
    const int & DoIons,
    const double & Tion,
    const double & RTrue,
    const double & RFactor)
```

8.13.2.4 Set_Qprim()

```
void Model_Charge0D::Set_Qprim (
    const double & Qprim)
```

8.13.2.5 SetSecondaries()

```
void Model_Charge0D::SetSecondaries () [protected], [virtual]
```

Implements [Model_Chargel](#).

8.13.2.6 WriteOut()

```
void Model_Charge0D::WriteOut () const [virtual]
```

Implements [Model_Chargel](#).

8.13.3 Member Data Documentation

8.13.3.1 m_Dolons

```
int Model_Charge0D::m_DoIons [protected]
```

8.13.3.2 m_Qprim

```
double Model_Charge0D::m_Qprim [protected]
```

8.13.3.3 m_RFactor

```
double Model_Charge0D::m_RFactor [protected]
```

8.13.3.4 m_RTrue

```
double Model_Charge0D::m_RTrue [protected]
```

8.13.3.5 m_Tion

```
double Model_Charge0D::m_Tion [protected]
```

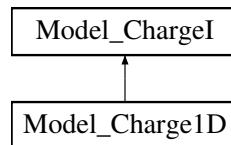
The documentation for this class was generated from the following files:

- [ModelSignal/inc/Model_Charge0D.h](#)
- [ModelSignal/src/Model_Charge0D.cxx](#)

8.14 Model_Charge1D Class Reference

```
#include <Model_Charge1D.h>
```

Inheritance diagram for Model_Charge1D:



Public Member Functions

- [Model_Charge1D](#) ()
- virtual [~Model_Charge1D](#) ()
- double [Get_Lambda](#) () const
- void [Set_Lambda](#) (const double &Lambda)
- double [Get_Qpad](#) (const double &Time, const double &Time0, const double &XTrue, const double &YTrue, const double &XL, const double &XH, const double &YL, const double &YH) const
- void [WriteOut](#) () const

Public Member Functions inherited from [Model_ChargeI](#)

- [Model_ChargeI](#) ()
- virtual [~Model_ChargeI](#) ()
- double [Get_RC](#) () const
- double [Get_Width](#) () const
- double [Get_Gain](#) () const
- void [Set_RC](#) (const double &RC)
- void [Set_Width](#) (const double &Width)
- void [Set_Gain](#) (const double &Gain)
- void [Set_WidthFromDriftDistance](#) (const double &DriftDistance_cm)

Protected Member Functions

- void [SetSecondaries](#) ()

Protected Member Functions inherited from [Model_Charge1D](#)

- void [WidthFromDriftDistance](#) (const double &DriftDistance_cm)

Protected Attributes

- double [m_Lambda](#)

Protected Attributes inherited from [Model_Charge1D](#)

- double [m_RC](#)
- double [m_Width](#)
- double [m_Gain](#)
- double [m_2RCinv](#)
- double [m_Width2](#)
- double [m_NormQPad](#)

8.14.1 Constructor & Destructor Documentation

8.14.1.1 [Model_Charge1D](#)()

```
Model_Charge1D::Model_Charge1D ()
```

Constructor

8.14.1.2 [~Model_Charge1D](#)()

```
Model_Charge1D::~~Model_Charge1D () [virtual]
```

8.14.2 Member Function Documentation

8.14.2.1 [Get_Lambda](#)()

```
double Model_Charge1D::Get_Lambda () const
```

8.14.2.2 Get_Qpad()

```
double Model_Charge1D::Get_Qpad (
    const double & Time,
    const double & Time0,
    const double & XTrue,
    const double & YTrue,
    const double & XL,
    const double & XH,
    const double & YL,
    const double & YH) const [virtual]
```

Implements [Model_Charge1](#).

8.14.2.3 Set_Lambda()

```
void Model_Charge1D::Set_Lambda (
    const double & Lambda)
```

8.14.2.4 SetSecondaries()

```
void Model_Charge1D::SetSecondaries () [protected], [virtual]
```

Implements [Model_Charge1](#).

8.14.2.5 WriteOut()

```
void Model_Charge1D::WriteOut () const [virtual]
```

Implements [Model_Charge1](#).

8.14.3 Member Data Documentation

8.14.3.1 m_Lambda

```
double Model_Charge1D::m_Lambda [protected]
```

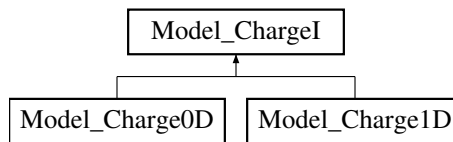
The documentation for this class was generated from the following files:

- ModelSignal/inc/[Model_Charge1D.h](#)
- ModelSignal/src/[Model_Charge1D.cxx](#)

8.15 Model_Chargel Class Reference

```
#include <Model_ChargeI.h>
```

Inheritance diagram for Model_Chargel:



Public Member Functions

- [Model_Chargel](#) ()
- virtual [~Model_Chargel](#) ()
- double [Get_RC](#) () const
- double [Get_Width](#) () const
- double [Get_Gain](#) () const
- void [Set_RC](#) (const double &RC)
- void [Set_Width](#) (const double &Width)
- void [Set_Gain](#) (const double &Gain)
- void [Set_WidthFromDriftDistance](#) (const double &DriftDistance_cm)
- virtual double [Get_Qpad](#) (const double &Time, const double &Time0, const double &XTrue, const double &YTrue, const double &XL, const double &XH, const double &YL, const double &YH) const =0
- virtual void [WriteOut](#) () const =0

Protected Member Functions

- void [WidthFromDriftDistance](#) (const double &DriftDistance_cm)
- virtual void [SetSecondaries](#) ()=0

Protected Attributes

- double [m_RC](#)
- double [m_Width](#)
- double [m_Gain](#)
- double [m_2RCinv](#)
- double [m_Width2](#)
- double [m_NormQPad](#)

8.15.1 Constructor & Destructor Documentation

8.15.1.1 Model_Chargel()

```
Model_ChargeI::Model_ChargeI ()
```

Constructor

8.15.1.2 ~Model_ChargeI()

```
Model_ChargeI::~~Model_ChargeI () [virtual]
```

8.15.2 Member Function Documentation

8.15.2.1 Get_Gain()

```
double Model_ChargeI::Get_Gain () const
```

8.15.2.2 Get_Qpad()

```
virtual double Model_ChargeI::Get_Qpad (  
    const double & Time,  
    const double & Time0,  
    const double & XTrue,  
    const double & YTrue,  
    const double & XL,  
    const double & XH,  
    const double & YL,  
    const double & YH) const [pure virtual]
```

Implemented in [Model_Charge0D](#), and [Model_Charge1D](#).

8.15.2.3 Get_RC()

```
double Model_ChargeI::Get_RC () const
```

8.15.2.4 Get_Width()

```
double Model_ChargeI::Get_Width () const
```

8.15.2.5 Set_Gain()

```
void Model_ChargeI::Set_Gain (  
    const double & Gain)
```

8.15.2.6 Set_RC()

```
void Model_ChargeI::Set_RC (  
    const double & RC)
```

8.15.2.7 Set_Width()

```
void Model_ChargeI::Set_Width (  
    const double & Width)
```

8.15.2.8 Set_WidthFromDriftDistance()

```
void Model_ChargeI::Set_WidthFromDriftDistance (  
    const double & DriftDistance_cm)
```

8.15.2.9 SetSecondaries()

```
virtual void Model_ChargeI::SetSecondaries () [protected], [pure virtual]
```

Implemented in [Model_Charge0D](#), and [Model_Charge1D](#).

8.15.2.10 WidthFromDriftDistance()

```
void Model_ChargeI::WidthFromDriftDistance (  
    const double & DriftDistance_cm) [protected]
```

8.15.2.11 WriteOut()

```
virtual void Model_ChargeI::WriteOut () const [pure virtual]
```

Implemented in [Model_Charge0D](#), and [Model_Charge1D](#).

8.15.3 Member Data Documentation

8.15.3.1 m_2RCinv

```
double Model_ChargeI::m_2RCinv [protected]
```

8.15.3.2 m_Gain

```
double Model_ChargeI::m_Gain [protected]
```

8.15.3.3 m_NormQPad

```
double Model_ChargeI::m_NormQPad [protected]
```

8.15.3.4 m_RC

```
double Model_ChargeI::m_RC [protected]
```

8.15.3.5 m_Width

```
double Model_ChargeI::m_Width [protected]
```


8.15.3.6 m_Width2

```
double Model_ChargeI::m_Width2 [protected]
```

The documentation for this class was generated from the following files:

- [ModelSignal/inc/Model_ChargeI.h](#)
- [ModelSignal/src/Model_ChargeI.cxx](#)

8.16 Model_Electronics Class Reference

```
#include <Model_Electronics.h>
```

Public Member Functions

- [Model_Electronics](#) ()
- virtual [~Model_Electronics](#) ()
- double [Get_QValue](#) () const
- double [Get_ws](#) () const
- double [Get_Amplitude](#) () const
- void [Set_TimeShape](#) (const double &QValue, const double &ws)
- void [Set_Amplitude](#) (const double &Amplitude)
- double [Response_Base](#) (const double &Time) const
- double [Derive_Response_Base](#) (const double &Time) const
- void [WriteOut](#) () const

8.16.1 Constructor & Destructor Documentation

8.16.1.1 Model_Electronics()

```
Model_Electronics::Model_Electronics ()
```

Constructor

8.16.1.2 ~Model_Electronics()

```
Model_Electronics::~~Model_Electronics () [virtual]
```

8.16.2 Member Function Documentation

8.16.2.1 Derive_Response_Base()

```
double Model_Electronics::Derive_Response_Base (
    const double & Time) const
```

8.16.2.2 Get_Amplitude()

```
double Model_Electronics::Get_Amplitude () const
```

8.16.2.3 Get_QValue()

```
double Model_Electronics::Get_QValue () const
```

8.16.2.4 Get_ws()

```
double Model_Electronics::Get_ws () const
```

8.16.2.5 Response_Base()

```
double Model_Electronics::Response_Base (  
    const double & Time) const
```

8.16.2.6 Set_Amplitude()

```
void Model_Electronics::Set_Amplitude (  
    const double & Amplitude)
```

8.16.2.7 Set_TimeShape()

```
void Model_Electronics::Set_TimeShape (  
    const double & QValue,  
    const double & ws)
```

8.16.2.8 WriteOut()

```
void Model_Electronics::WriteOut () const
```

The documentation for this class was generated from the following files:

- [ModelSignal/inc/Model_Electronics.h](#)
- [ModelSignal/src/Model_Electronics.cxx](#)

8.17 Model_ReadOutGeometry Class Reference

```
#include <Model_ReadOutGeometry.h>
```

Public Member Functions

- [Model_ReadOutGeometry](#) ()
- virtual [~Model_ReadOutGeometry](#) ()
- double [Get_LX](#) () const
- double [Get_LY](#) () const
- double [Get_Xpad_min](#) () const
- double [Get_Ypad_min](#) () const
- int [Get_Nx](#) () const
- int [Get_Ny](#) () const
- void [SwapGeometry](#) ()
- void [SquareGeometry](#) ()
- void [Set_LX](#) (const double &LX)
- void [Set_LY](#) (const double &LY)
- void [Set_Xpad_min](#) (const double &Xpad_min)
- void [Set_Ypad_min](#) (const double &Ypad_min)
- void [Set_Nx](#) (const int &Nx)
- void [Set_Ny](#) (const int &Ny)
- double [Get_XcPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- double [Get_YcPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- double [Get_XLPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- double [Get_YLPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- double [Get_XHPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- double [Get_YHPad](#) (const int &iX, const int &iY, const int &ModuleNber) const
- void [GetPadEdges](#) (const int &iX, const int &iY, const int &ModuleNber, double &XL, double &XH, double &YL, double &YH) const
- void [WriteOut](#) () const

8.17.1 Constructor & Destructor Documentation**8.17.1.1 Model_ReadOutGeometry()**

```
Model_ReadOutGeometry::Model_ReadOutGeometry ()
```

Constructor

8.17.1.2 ~Model_ReadOutGeometry()

```
Model_ReadOutGeometry::~~Model_ReadOutGeometry () [virtual]
```

8.17.2 Member Function Documentation**8.17.2.1 Get_LX()**

```
double Model_ReadOutGeometry::Get_LX () const
```

8.17.2.2 Get_LY()

```
double Model_ReadOutGeometry::Get_LY () const
```

8.17.2.3 Get_Nx()

```
int Model_ReadOutGeometry::Get_Nx () const
```

8.17.2.4 Get_Ny()

```
int Model_ReadOutGeometry::Get_Ny () const
```

8.17.2.5 Get_XcPad()

```
double Model_ReadOutGeometry::Get_XcPad (  
    const int & iX,  
    const int & iY,  
    const int & ModuleNber) const
```

8.17.2.6 Get_XHPad()

```
double Model_ReadOutGeometry::Get_XHPad (  
    const int & iX,  
    const int & iY,  
    const int & ModuleNber) const
```

8.17.2.7 Get_XLPad()

```
double Model_ReadOutGeometry::Get_XLPad (  
    const int & iX,  
    const int & iY,  
    const int & ModuleNber) const
```

8.17.2.8 Get_Xpad_min()

```
double Model_ReadOutGeometry::Get_Xpad_min () const
```

8.17.2.9 Get_YcPad()

```
double Model_ReadOutGeometry::Get_YcPad (  
    const int & iX,  
    const int & iY,  
    const int & ModuleNber) const
```

8.17.2.10 Get_YHPad()

```
double Model_ReadOutGeometry::Get_YHPad (
    const int & iX,
    const int & iY,
    const int & ModuleNber) const
```

8.17.2.11 Get_YLPad()

```
double Model_ReadOutGeometry::Get_YLPad (
    const int & iX,
    const int & iY,
    const int & ModuleNber) const
```

8.17.2.12 Get_Ypad_min()

```
double Model_ReadOutGeometry::Get_Ypad_min () const
```

8.17.2.13 GetPadEdges()

```
void Model_ReadOutGeometry::GetPadEdges (
    const int & iX,
    const int & iY,
    const int & ModuleNber,
    double & XL,
    double & XH,
    double & YL,
    double & YH) const
```

8.17.2.14 Set_LX()

```
void Model_ReadOutGeometry::Set_LX (
    const double & LX)
```

8.17.2.15 Set_LY()

```
void Model_ReadOutGeometry::Set_LY (
    const double & LY)
```

8.17.2.16 Set_Nx()

```
void Model_ReadOutGeometry::Set_Nx (
    const int & Nx)
```

8.17.2.17 Set_Ny()

```
void Model_ReadOutGeometry::Set_Ny (
    const int & Ny)
```

8.17.2.18 Set_Xpad_min()

```
void Model_ReadOutGeometry::Set_Xpad_min (
    const double & Xpad_min)
```

8.17.2.19 Set_Ypad_min()

```
void Model_ReadOutGeometry::Set_Ypad_min (
    const double & Ypad_min)
```

8.17.2.20 SquareGeometry()

```
void Model_ReadOutGeometry::SquareGeometry ()
```

8.17.2.21 SwapGeometry()

```
void Model_ReadOutGeometry::SwapGeometry ()
```

8.17.2.22 WriteOut()

```
void Model_ReadOutGeometry::WriteOut () const
```

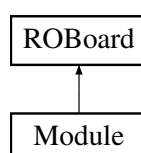
The documentation for this class was generated from the following files:

- [ModelSignal/inc/Model_ReadOutGeometry.h](#)
- [ModelSignal/src/Model_ReadOutGeometry.cxx](#)

8.18 Module Class Reference

```
#include <Module.h>
```

Inheritance diagram for Module:



Public Member Functions

- [Module](#) (const int &EventNber, const int &EntryNber, const int &ModuleNber, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)
- virtual [~Module](#) ()
- int [Get_EventNber](#) () const
- int [Get_EntryNber](#) () const
- int [Get_ModuleNber](#) () const
- void [SmallDump](#) () const
- void [WriteOut](#) () const
- int [IsValid](#) () const
- void [Validate](#) ()
- void [Invalidate](#) ()
- virtual void [Add_Pad](#) ([Pad](#) *pPad)
- void [Clear_Clusters](#) ()
- void [Add_Cluster](#) ([Cluster](#) *pCluster)
- std::vector< [Cluster](#) * > [GiveMe_Clusters_ForThisModule](#) ()
- int [Get_NberOfCluster](#) () const
- [Cluster](#) * [Get_Cluster](#) (const int &Index1D)
- void [ReplaceClusters](#) (std::vector< [Cluster](#) * > &V_Cluster)
- [Cluster](#) * [Get_Cluster_Copy](#) ([Cluster](#) *pCluster)
- const [Track](#) * [GiveMe_ModuleTrack](#) ()
- void [Set_ModuleTrack](#) ([Track](#) *pTrack)
- [Track](#) * [GiveMe_AnUnfittedTrack](#) ()

Public Member Functions inherited from [ROBoard](#)

- [ROBoard](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)
- virtual [~ROBoard](#) ()
- const [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- const [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- const [Model_ChargeI](#) * [Get_Model_ChargeI](#) ()
- int [Get_NberOfPads](#) () const
- [Pad](#) * [Get_Pad](#) (const int &Index1D)
- int [Get_IsThisPadExisting](#) (const int &iX, const int &iY) const
- [Pad](#) * [Get_Pad](#) (const int &iX, const int &iY)
- [Pad](#) * [Get_Pad](#) ([Pad](#) *pPad)

Additional Inherited Members

Protected Member Functions inherited from [ROBoard](#)

- int [GetLinearIndex](#) (const int &iX, const int &iY) const
- void [Ini_Models](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)

Protected Attributes inherited from [ROBoard](#)

- short int [m_Nx](#)
- short int [m_Ny](#)
- `std::vector< int >` [V_ExisFlag2D](#)
- `std::vector< Pad * >` [V_Pad](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_ChargeI](#) * [p_Model_ChargeI](#)

8.18.1 Constructor & Destructor Documentation

8.18.1.1 [Module\(\)](#)

```
Module::Module (
    const int & EventNber,
    const int & EntryNber,
    const int & ModuleNber,
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI)
```

Constructor

8.18.1.2 [~Module\(\)](#)

```
Module::~Module () [virtual]
```

8.18.2 Member Function Documentation

8.18.2.1 [Add_Cluster\(\)](#)

```
void Module::Add_Cluster (
    Cluster * pCluster)
```

8.18.2.2 [Add_Pad\(\)](#)

```
void Module::Add_Pad (
    Pad * pPad) [virtual]
```

Reimplemented from [ROBoard](#).

8.18.2.3 [Clear_Clusters\(\)](#)

```
void Module::Clear_Clusters ()
```


8.18.2.4 Get_Cluster()

```
Cluster * Module::Get_Cluster (
    const int & Index1D)
```

8.18.2.5 Get_Cluster_Copy()

```
Cluster * Module::Get_Cluster_Copy (
    Cluster * pCluster)
```

8.18.2.6 Get_EntryNber()

```
int Module::Get_EntryNber () const
```

8.18.2.7 Get_EventNber()

```
int Module::Get_EventNber () const
```

8.18.2.8 Get_ModuleNber()

```
int Module::Get_ModuleNber () const
```

8.18.2.9 Get_NberOfCluster()

```
int Module::Get_NberOfCluster () const
```

8.18.2.10 GiveMe_AnUnfittedTrack()

```
Track * Module::GiveMe_AnUnfittedTrack ()
```

8.18.2.11 GiveMe_Clusters_ForThisModule()

```
std::vector< Cluster * > Module::GiveMe_Clusters_ForThisModule ()
```

8.18.2.12 GiveMe_ModuleTrack()

```
const Track * Module::GiveMe_ModuleTrack ()
```

8.18.2.13 Invalidate()

```
void Module::Invalidate ()
```

8.18.2.14 IsValid()

```
int Module::IsValid () const
```

8.18.2.15 ReplaceClusters()

```
void Module::ReplaceClusters (
    std::vector< Cluster * > & V_Cluster)
```

8.18.2.16 Set_ModuleTrack()

```
void Module::Set_ModuleTrack (
    Track * pTrack)
```

8.18.2.17 SmallDump()

```
void Module::SmallDump () const
```

8.18.2.18 Validate()

```
void Module::Validate ()
```

8.18.2.19 WriteOut()

```
void Module::WriteOut () const
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Module.h](#)
- ModelEvent/src/[Module.cxx](#)

8.19 Pad Class Reference

```
#include <Pad.h>
```

Public Member Functions

- [Pad](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Chargel](#) *pModel_Chargel, std::string PadName, const int &EventNber, const int &EntryNber, const int &ModuleNber, const int &iX, const int &iY, const double &XL, const double &XH, const double &YL, const double &YH)

Construct a [Pad](#) with explicit edges.

- [Pad](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Chargel](#) *pModel_Chargel, std::string PadName, const int &EventNber, const int &EntryNber, const int &ModuleNber, const int &iX, const int &iY)

Construct a [Pad](#) using geometry lookup for edges.

- virtual [~Pad](#) ()

Virtual destructor.

- int [Get_EventNber](#) () const
- int [Get_EntryNber](#) () const
- int [Get_ModuleNber](#) () const
- int [Get_iX](#) () const
- int [Get_iY](#) () const
- void [WriteOut](#) () const
- int [IsValid](#) () const
- void [Validate](#) ()
- void [Invalidate](#) ()
- const [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) () const
- const [Model_Electronics](#) * [Get_Model_Electronics](#) () const
- const [Model_Chargel](#) * [Get_Model_Chargel](#) () const
- std::string [Get_PadName](#) () const
- double [Get_XPad](#) () const
- double [Get_YPad](#) () const
- double [Get_XL](#) () const
- double [Get_XH](#) () const
- double [Get_YL](#) () const
- double [Get_YH](#) () const
- double [Get_LX](#) () const
- double [Get_LY](#) () const
- double [Get_AMax](#) () const
- double [Get_TMax](#) () const
- void [Set_AMax](#) (const double &AMax)
- void [Set_TMax](#) (const double &TMax)
- void [Set_Data_2Use](#) (const int &iOpt)
- void [Clear_ADC](#) ()
- void [Set_ADC](#) (const int &iTimeb, const int &ADC)
- void [WF_DoClosure](#) ()
- std::vector< float > [Get_vADC](#) () const
- double [Get_AMax_FromSet](#) () const
- double [Get_TMax_FromSet](#) () const
- double [Get_AMax_WF](#) () const
- double [Get_TMax_WF](#) () const
- double [Get_AMax_WF_01](#) () const
- double [Get_TMax_WF_01](#) () const
- double [Get_AMax_FIT](#) () const
- double [Get_TMax_FIT](#) () const
- int [Get_FIT_Status](#) () const
- double [Get_FIT_A0P](#) () const
- double [Get_FIT_A0M](#) () const
- double [Get_FIT_X0](#) () const

- double [Get_FIT_Y0](#) () const
- double [Get_FIT_Xmin](#) () const
- double [Get_FIT_Xmax](#) () const
- double [Get_AMax_True](#) () const
- double [Get_TMax_True](#) () const
- void [Set_AMax_True](#) (const double &AMax)
- void [Set_TMax_True](#) (const double &TMax)
- void [SetSignalModel](#) (const double &Time0, const double &XTrue, const double &YTrue)
- double [Get_Time0](#) () const
- double [Get_XTrue](#) () const
- double [Get_YTrue](#) () const
- double [Get_Qpad](#) (const double &Time)
- double [Get_APad](#) (const double &Time)

8.19.1 Constructor & Destructor Documentation

8.19.1.1 [Pad\(\)](#) [1/2]

```
Pad::Pad (
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI,
    std::string PadName,
    const int & EventNber,
    const int & EntryNber,
    const int & ModuleNber,
    const int & iX,
    const int & iY,
    const double & XL,
    const double & XH,
    const double & YL,
    const double & YH)
```

Construct a [Pad](#) with explicit edges.

8.19.1.2 [Pad\(\)](#) [2/2]

```
Pad::Pad (
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI,
    std::string PadName,
    const int & EventNber,
    const int & EntryNber,
    const int & ModuleNber,
    const int & iX,
    const int & iY)
```

Construct a [Pad](#) using geometry lookup for edges.

8.19.1.3 ~Pad()

```
Pad::~~Pad () [virtual]
```

Virtual destructor.

8.19.2 Member Function Documentation

8.19.2.1 Clear_ADC()

```
void Pad::Clear_ADC ()
```

8.19.2.2 Get_AMax()

```
double Pad::Get_AMax () const
```

8.19.2.3 Get_AMax_FIT()

```
double Pad::Get_AMax_FIT () const
```

8.19.2.4 Get_AMax_FromSet()

```
double Pad::Get_AMax_FromSet () const
```

8.19.2.5 Get_AMax_True()

```
double Pad::Get_AMax_True () const
```

8.19.2.6 Get_AMax_WF()

```
double Pad::Get_AMax_WF () const
```

8.19.2.7 Get_AMax_WF_01()

```
double Pad::Get_AMax_WF_01 () const
```

8.19.2.8 Get_APad()

```
double Pad::Get_APad (  
    const double & Time)
```

8.19.2.9 Get_EntryNber()

```
int Pad::Get_EntryNber () const
```

8.19.2.10 Get_EventNber()

```
int Pad::Get_EventNber () const
```

8.19.2.11 Get_FIT_A0M()

```
double Pad::Get_FIT_A0M () const
```

8.19.2.12 Get_FIT_A0P()

```
double Pad::Get_FIT_A0P () const
```

8.19.2.13 Get_FIT_Status()

```
int Pad::Get_FIT_Status () const
```

8.19.2.14 Get_FIT_X0()

```
double Pad::Get_FIT_X0 () const
```

8.19.2.15 Get_FIT_Xmax()

```
double Pad::Get_FIT_Xmax () const
```

8.19.2.16 Get_FIT_Xmin()

```
double Pad::Get_FIT_Xmin () const
```

8.19.2.17 Get_FIT_Y0()

```
double Pad::Get_FIT_Y0 () const
```

8.19.2.18 Get_iX()

```
int Pad::Get_iX () const
```

8.19.2.19 Get_iY()

```
int Pad::Get_iY () const
```

8.19.2.20 Get_LX()

```
double Pad::Get_LX () const
```

8.19.2.21 Get_LY()

```
double Pad::Get_LY () const
```

8.19.2.22 Get_Model_ChargeI()

```
const Model\_ChargeI * Pad::Get_Model_ChargeI () const
```

8.19.2.23 Get_Model_Electronics()

```
const Model\_Electronics * Pad::Get_Model_Electronics () const
```

8.19.2.24 Get_Model_ReadOutGeometry()

```
const Model\_ReadOutGeometry * Pad::Get_Model_ReadOutGeometry () const
```

8.19.2.25 Get_ModuleNber()

```
int Pad::Get_ModuleNber () const
```

8.19.2.26 Get_PadName()

```
std::string Pad::Get_PadName () const
```

8.19.2.27 Get_Qpad()

```
double Pad::Get_Qpad (  
    const double & Time)
```

8.19.2.28 Get_Time0()

```
double Pad::Get_Time0 () const
```

8.19.2.29 Get_TMax()

```
double Pad::Get_TMax () const
```

8.19.2.30 Get_TMax_FIT()

```
double Pad::Get_TMax_FIT () const
```

8.19.2.31 Get_TMax_FromSet()

```
double Pad::Get_TMax_FromSet () const
```

8.19.2.32 Get_TMax_True()

```
double Pad::Get_TMax_True () const
```

8.19.2.33 Get_TMax_WF()

```
double Pad::Get_TMax_WF () const
```

8.19.2.34 Get_TMax_WF_01()

```
double Pad::Get_TMax_WF_01 () const
```

8.19.2.35 Get_vADC()

```
std::vector< float > Pad::Get_vADC () const
```

8.19.2.36 Get_XH()

```
double Pad::Get_XH () const
```

8.19.2.37 Get_XL()

```
double Pad::Get_XL () const
```

8.19.2.38 Get_XPad()

```
double Pad::Get_XPad () const
```


8.19.2.39 Get_XTrue()

```
double Pad::Get_XTrue () const
```

8.19.2.40 Get_YH()

```
double Pad::Get_YH () const
```

8.19.2.41 Get_YL()

```
double Pad::Get_YL () const
```

8.19.2.42 Get_YPad()

```
double Pad::Get_YPad () const
```

8.19.2.43 Get_YTrue()

```
double Pad::Get_YTrue () const
```

8.19.2.44 Invalidate()

```
void Pad::Invalidate ()
```

8.19.2.45 IsValid()

```
int Pad::IsValid () const
```

8.19.2.46 Set_ADC()

```
void Pad::Set_ADC (
    const int & iTimeb,
    const int & ADC)
```

8.19.2.47 Set_AMax()

```
void Pad::Set_AMax (
    const double & AMax)
```

8.19.2.48 Set_AMax_True()

```
void Pad::Set_AMax_True (
    const double & AMax)
```

8.19.2.49 Set_Data_2Use()

```
void Pad::Set_Data_2Use (
    const int & iOpt)
```

8.19.2.50 Set_TMax()

```
void Pad::Set_TMax (
    const double & TMax)
```

8.19.2.51 Set_TMax_True()

```
void Pad::Set_TMax_True (
    const double & TMax)
```

8.19.2.52 SetSignalModel()

```
void Pad::SetSignalModel (
    const double & Time0,
    const double & XTrue,
    const double & YTrue)
```

8.19.2.53 Validate()

```
void Pad::Validate ()
```

8.19.2.54 WF_DoClosure()

```
void Pad::WF_DoClosure ()
```

8.19.2.55 WriteOut()

```
void Pad::WriteOut () const
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Pad.h](#)
- ModelEvent/src/[Pad.cxx](#)

8.20 ParabolaFunction Class Reference

```
#include <ParabolaFunction.h>
```

Public Member Functions

- [ParabolaFunction](#) ()
- virtual [~ParabolaFunction](#) ()
- double [Get_A0](#) ()
- double [Get_X0](#) ()
- double [Get_Y0](#) ()
- void [Set_A0](#) (const double &A0)
- void [Set_X0](#) (const double &X0)
- void [Set_Y0](#) (const double &Y0)
- double [operator\(\)](#) (double *x, double *par)

8.20.1 Constructor & Destructor Documentation

8.20.1.1 ParabolaFunction()

```
ParabolaFunction::ParabolaFunction ()
```

Constructor

8.20.1.2 ~ParabolaFunction()

```
ParabolaFunction::~~ParabolaFunction () [virtual]
```

8.20.2 Member Function Documentation

8.20.2.1 Get_A0()

```
double ParabolaFunction::Get_A0 ()
```

8.20.2.2 Get_X0()

```
double ParabolaFunction::Get_X0 ()
```

8.20.2.3 Get_Y0()

```
double ParabolaFunction::Get_Y0 ()
```

8.20.2.4 operator()

```
double ParabolaFunction::operator() (  
    double * x,  
    double * par)
```

8.20.2.5 Set_A0()

```
void ParabolaFunction::Set_A0 (  
    const double & A0)
```

8.20.2.6 Set_X0()

```
void ParabolaFunction::Set_X0 (  
    const double & X0)
```

8.20.2.7 Set_Y0()

```
void ParabolaFunction::Set_Y0 (  
    const double & Y0)
```

The documentation for this class was generated from the following files:

- Utilities/inc/[ParabolaFunction.h](#)
- Utilities/src/[ParabolaFunction.cxx](#)

8.21 ParabolaFunctionNG Class Reference

```
#include <ParabolaFunctionNG.h>
```

Public Member Functions

- [ParabolaFunctionNG](#) ()
- virtual [~ParabolaFunctionNG](#) ()
- double [Get_A0P](#) ()
- double [Get_A0M](#) ()
- double [Get_X0](#) ()
- double [Get_Y0](#) ()
- void [Set_A0P](#) (const double &A0P)
- void [Set_A0M](#) (const double &A0M)
- void [Set_X0](#) (const double &X0)
- void [Set_Y0](#) (const double &Y0)
- double [operator\(\)](#) (double *x, double *par)

8.21.1 Constructor & Destructor Documentation

8.21.1.1 ParabolaFunctionNG()

```
ParabolaFunctionNG::ParabolaFunctionNG ()
```

Constructor

8.21.1.2 ~ParabolaFunctionNG()

```
ParabolaFunctionNG::~~ParabolaFunctionNG () [virtual]
```

8.21.2 Member Function Documentation

8.21.2.1 Get_A0M()

```
double ParabolaFunctionNG::Get_A0M ()
```

8.21.2.2 Get_A0P()

```
double ParabolaFunctionNG::Get_A0P ()
```

8.21.2.3 Get_X0()

```
double ParabolaFunctionNG::Get_X0 ()
```

8.21.2.4 Get_Y0()

```
double ParabolaFunctionNG::Get_Y0 ()
```

8.21.2.5 operator()()

```
double ParabolaFunctionNG::operator() (
    double * x,
    double * par)
```

8.21.2.6 Set_A0M()

```
void ParabolaFunctionNG::Set_A0M (
    const double & A0M)
```

8.21.2.7 Set_A0P()

```
void ParabolaFunctionNG::Set_A0P (
    const double & A0P)
```

8.21.2.8 Set_X0()

```
void ParabolaFunctionNG::Set_X0 (
    const double & X0)
```

8.21.2.9 Set_Y0()

```
void ParabolaFunctionNG::Set_Y0 (
    const double & Y0)
```

The documentation for this class was generated from the following files:

- Utilities/inc/[ParabolaFunctionNG.h](#)
- Utilities/src/[ParabolaFunctionNG.cxx](#)

8.22 PRFParameters Class Reference

```
#include <PRFParameters.h>
```

Public Member Functions

- [PRFParameters](#) ()
Default constructor.
- virtual [~PRFParameters](#) ()
Virtual destructor.
- double [Eval](#) (const double &Xin)
Evaluate the PRF at a given position.
- double [operator\(\)](#) (double *x, double *par)
Function-call operator used by ROOT TF1-style callbacks.
- void [SetPRF](#) (const double &Norm, const double &A2, const double &A4, const double &B2, const double &B4)
Set PRF polynomial parameters.

8.22.1 Constructor & Destructor Documentation

8.22.1.1 PRFParameters()

```
PRFParameters::PRFParameters ()
```

Default constructor.

8.22.1.2 ~PRFParameters()

```
PRFParameters::~~PRFParameters () [virtual]
```

Virtual destructor.

8.22.2 Member Function Documentation

8.22.2.1 Eval()

```
double PRFParameters::Eval (
    const double & Xin)
```

Evaluate the PRF at a given position.

Parameters

<i>Xin</i>	input position in cm
------------	----------------------

Returns

evaluated PRF value

8.22.2.2 operator()

```
double PRFParameters::operator() (
    double * x,
    double * par)
```

Function-call operator used by ROOT TF1-style callbacks.

8.22.2.3 SetPRF()

```
void PRFParameters::SetPRF (
    const double & Norm,
    const double & A2,
    const double & A4,
    const double & B2,
    const double & B4)
```

Set PRF polynomial parameters.

Parameters

<i>Norm</i>	normalization
<i>A2</i>	coefficient A2
<i>A4</i>	coefficient A4
<i>B2</i>	coefficient B2
<i>B4</i>	coefficient B4

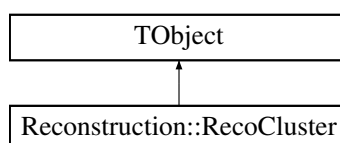
The documentation for this class was generated from the following files:

- Fitters/inc/[PRFParameters.h](#)
- Fitters/src/[PRFParameters.cxx](#)

8.23 Reconstruction::RecoCluster Class Reference

```
#include <dEdx.h>
```

Inheritance diagram for Reconstruction::RecoCluster:



Public Member Functions

- virtual [~RecoCluster](#) ()
- [ClassDef](#) ([RecoCluster](#), 1)

Public Attributes

- std::vector< [RecoPad](#) * > [v_pads](#)
- float [length](#) = 0
- float [charge](#) = 0
- float [ADCmax_base](#) = 0
- float [ALead_base](#) = 0
- float [ALead_GCorr](#) = 0
- int [TLead](#) = 0
- float [dEdxWF](#) = 0
- int [NPads](#) = 0
- float [ratioCorr](#) = 0
- float [yCluster](#) = 0
- float [yWeight](#) = 0
- float [LUTrhoLead](#) = 0

8.23.1 Constructor & Destructor Documentation

8.23.1.1 [~RecoCluster\(\)](#)

```
Reconstruction::RecoCluster::~~RecoCluster () [virtual]
```

8.23.2 Member Function Documentation

8.23.2.1 [ClassDef\(\)](#)

```
Reconstruction::RecoCluster::ClassDef (  
    RecoCluster ,  
    1 )
```

8.23.3 Member Data Documentation

8.23.3.1 [ADCmax_base](#)

```
float Reconstruction::RecoCluster::ADCmax_base = 0
```

8.23.3.2 [ALead_base](#)

```
float Reconstruction::RecoCluster::ALead_base = 0
```


8.23.3.3 ALead_GCorr

```
float Reconstruction::RecoCluster::ALead_GCorr = 0
```

8.23.3.4 charge

```
float Reconstruction::RecoCluster::charge = 0
```

8.23.3.5 dEdxWF

```
float Reconstruction::RecoCluster::dEdxWF = 0
```

8.23.3.6 length

```
float Reconstruction::RecoCluster::length = 0
```

8.23.3.7 LUTrhoLead

```
float Reconstruction::RecoCluster::LUTrhoLead = 0
```

8.23.3.8 NPads

```
int Reconstruction::RecoCluster::NPads = 0
```

8.23.3.9 ratioCorr

```
float Reconstruction::RecoCluster::ratioCorr = 0
```

8.23.3.10 TLead

```
int Reconstruction::RecoCluster::TLead = 0
```

8.23.3.11 v_pads

```
std::vector<RecoPad*> Reconstruction::RecoCluster::v_pads
```

8.23.3.12 yCluster

```
float Reconstruction::RecoCluster::yCluster = 0
```

8.23.3.13 yWeight

```
float Reconstruction::RecoCluster::yWeight = 0
```

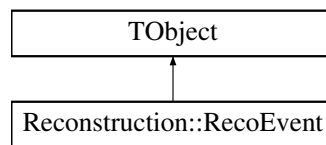
The documentation for this class was generated from the following files:

- [Reconstruction/inc/dEdx.h](#)
- [Reconstruction/src/dEdx.cxx](#)

8.24 Reconstruction::RecoEvent Class Reference

```
#include <dEdx.h>
```

Inheritance diagram for Reconstruction::RecoEvent:



Public Member Functions

- [RecoEvent](#) ()
- virtual [~RecoEvent](#) ()
- void [Clear](#) ()
- [ClassDef](#) ([RecoEvent](#), 1)

Public Attributes

- std::vector< [RecoModule](#) * > [v_modules](#)
- std::vector< int > [v_modules_position](#)
- bool [selected](#) = false
- int [eventNbr](#) = 0
- float [dEdxXP](#) = 0
- float [dEdxWF](#) = 0
- float [dEdxGP1](#) = 0
- float [dEdxGP2](#) = 0
- float [dEdxGP3](#) = 0
- float [dEdxGP4](#) = 0
- float [dEdxGP5](#) = 0
- float [dEdxXPnoTrunc](#) = 0
- float [dEdxWFnoTrunc](#) = 0
- int [NCrossedPads](#) = 0
- int [NPads](#) = 0
- int [NClusters](#) = 0
- float [lengthXP](#) = 0
- float [lengthWF](#) = 0
- int [numberOfModules](#) = 0
- float [avg_pad_mult](#) = 0
- TH1F * [GWF](#) = nullptr
- TH1F * [GWFtruncatedGP1](#) = nullptr
- int [peakingTime](#) = 0
- int [timeBinSize](#) = 0

8.24.1 Constructor & Destructor Documentation

8.24.1.1 RecoEvent()

```
Reconstruction::RecoEvent::RecoEvent ()
```

8.24.1.2 ~RecoEvent()

```
Reconstruction::RecoEvent::~RecoEvent () [virtual]
```

8.24.2 Member Function Documentation

8.24.2.1 ClassDef()

```
Reconstruction::RecoEvent::ClassDef (  
    RecoEvent ,  
    1 )
```

8.24.2.2 Clear()

```
void Reconstruction::RecoEvent::Clear ()
```

8.24.3 Member Data Documentation

8.24.3.1 avg_pad_mult

```
float Reconstruction::RecoEvent::avg_pad_mult = 0
```

8.24.3.2 dEdxGP1

```
float Reconstruction::RecoEvent::dEdxGP1 = 0
```

8.24.3.3 dEdxGP2

```
float Reconstruction::RecoEvent::dEdxGP2 = 0
```

8.24.3.4 dEdxGP3

```
float Reconstruction::RecoEvent::dEdxGP3 = 0
```

8.24.3.5 dEdxGP4

```
float Reconstruction::RecoEvent::dEdxGP4 = 0
```

8.24.3.6 dEdxGP5

```
float Reconstruction::RecoEvent::dEdxGP5 = 0
```

8.24.3.7 dEdxWF

```
float Reconstruction::RecoEvent::dEdxWF = 0
```

8.24.3.8 dEdxWFnoTrunc

```
float Reconstruction::RecoEvent::dEdxWFnoTrunc = 0
```

8.24.3.9 dEdxXP

```
float Reconstruction::RecoEvent::dEdxXP = 0
```

8.24.3.10 dEdxXPnoTrunc

```
float Reconstruction::RecoEvent::dEdxXPnoTrunc = 0
```

8.24.3.11 eventNbr

```
int Reconstruction::RecoEvent::eventNbr = 0
```

8.24.3.12 GWF

```
TH1F* Reconstruction::RecoEvent::GWF = nullptr
```

8.24.3.13 GWFtruncatedGP1

```
TH1F* Reconstruction::RecoEvent::GWFtruncatedGP1 = nullptr
```

8.24.3.14 lengthWF

```
float Reconstruction::RecoEvent::lengthWF = 0
```

8.24.3.15 lengthXP

```
float Reconstruction::RecoEvent::lengthXP = 0
```

8.24.3.16 NClusters

```
int Reconstruction::RecoEvent::NClusters = 0
```

8.24.3.17 NCrossedPads

```
int Reconstruction::RecoEvent::NCrossedPads = 0
```

8.24.3.18 NPads

```
int Reconstruction::RecoEvent::NPads = 0
```

8.24.3.19 numberOfModules

```
int Reconstruction::RecoEvent::numberOfModules = 0
```

8.24.3.20 peakingTime

```
int Reconstruction::RecoEvent::peakingTime = 0
```

8.24.3.21 selected

```
bool Reconstruction::RecoEvent::selected = false
```

8.24.3.22 timeBinSize

```
int Reconstruction::RecoEvent::timeBinSize = 0
```

8.24.3.23 v_modules

```
std::vector<RecoModule*> Reconstruction::RecoEvent::v_modules
```

8.24.3.24 v_modules_position

```
std::vector<int> Reconstruction::RecoEvent::v_modules_position
```

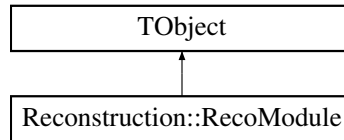
The documentation for this class was generated from the following files:

- [Reconstruction/inc/dEdx.h](#)
- [Reconstruction/src/dEdx.cxx](#)

8.25 Reconstruction::RecoModule Class Reference

```
#include <dEdx.h>
```

Inheritance diagram for Reconstruction::RecoModule:



Public Member Functions

- virtual [~RecoModule](#) ()
- [ClassDef](#) ([RecoModule](#), 1)

Public Attributes

- std::vector< [RecoCluster](#) * > [v_clusters](#)
- bool [selected](#) = false
- int [ID](#) = 0
- int [position](#) = 0
- float [dEdxXP](#) = 0
- float [dEdxWF](#) = 0
- float [dEdxXPnoTrunc](#) = 0
- float [dEdxWFnoTrunc](#) = 0
- int [NCrossedPads](#) = 0
- int [NClusters](#) = 0
- int [NPads](#) = 0
- float [lengthXP](#) = 0
- float [lengthWF](#) = 0
- float [phi](#) = 0
- float [avg_pad_mult](#) = 0
- TF1 * [Track](#) = new TF1("pTrackFit", "[0]*x+[1]+[2]*x*x", 0, 2000)

8.25.1 Constructor & Destructor Documentation

8.25.1.1 ~RecoModule()

```
Reconstruction::RecoModule::~~RecoModule () [virtual]
```

8.25.2 Member Function Documentation

8.25.2.1 ClassDef()

```
Reconstruction::RecoModule::ClassDef (
    RecoModule ,
    1 )
```

8.25.3 Member Data Documentation

8.25.3.1 avg_pad_mult

```
float Reconstruction::RecoModule::avg_pad_mult = 0
```

8.25.3.2 dEdxWF

```
float Reconstruction::RecoModule::dEdxWF = 0
```

8.25.3.3 dEdxWFnoTrunc

```
float Reconstruction::RecoModule::dEdxWFnoTrunc = 0
```

8.25.3.4 dEdxXP

```
float Reconstruction::RecoModule::dEdxXP = 0
```

8.25.3.5 dEdxXPnoTrunc

```
float Reconstruction::RecoModule::dEdxXPnoTrunc = 0
```

8.25.3.6 ID

```
int Reconstruction::RecoModule::ID = 0
```

8.25.3.7 lengthWF

```
float Reconstruction::RecoModule::lengthWF = 0
```

8.25.3.8 lengthXP

```
float Reconstruction::RecoModule::lengthXP = 0
```

8.25.3.9 NClusters

```
int Reconstruction::RecoModule::NClusters = 0
```

8.25.3.10 NCrossedPads

```
int Reconstruction::RecoModule::NCrossedPads = 0
```

8.25.3.11 NPads

```
int Reconstruction::RecoModule::NPads = 0
```

8.25.3.12 phi

```
float Reconstruction::RecoModule::phi = 0
```

8.25.3.13 position

```
int Reconstruction::RecoModule::position = 0
```

8.25.3.14 selected

```
bool Reconstruction::RecoModule::selected = false
```

8.25.3.15 Track

```
TFl* Reconstruction::RecoModule::Track = new TFl("pTrackFit", "[0]*x+[1]+[2]*x*x", 0, 2000)
```

8.25.3.16 v_clusters

```
std::vector<RecoCluster*> Reconstruction::RecoModule::v_clusters
```

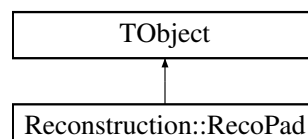
The documentation for this class was generated from the following files:

- [Reconstruction/inc/dEdx.h](#)
- [Reconstruction/src/dEdx.cxx](#)

8.26 Reconstruction::RecoPad Class Reference

```
#include <dEdx.h>
```

Inheritance diagram for Reconstruction::RecoPad:



Public Member Functions

- virtual [~RecoPad](#) ()
- [ClassDef](#) ([RecoPad](#), 1)

Public Attributes

- bool `leading` = false
- int `ix` = 0
- int `iy` = 0
- float `xPad` = 0
- float `yPad` = 0
- float `ADCmax` = 0
- float `ADCmax_base` = 0
- float `charge` = 0
- float `dEdxXP` = 0
- float `RC` = 0
- float `gain` = 0
- float `GainCorrection` = 0
- float `phi` = 0
- float `d` = 0
- float `dd` = 0
- float `length` = 0
- int `TMax` = 0
- int `T0` = 0
- float `driftDistance` = 0
- float `ratioDrift` = 0
- float `ratioFile` = 0
- float `ratio` = 0
- float `dy` = 0

8.26.1 Constructor & Destructor Documentation

8.26.1.1 `~RecoPad()`

```
Reconstruction::RecoPad::~~RecoPad () [virtual]
```

8.26.2 Member Function Documentation

8.26.2.1 `ClassDef()`

```
Reconstruction::RecoPad::ClassDef (
    RecoPad ,
    1 )
```

8.26.3 Member Data Documentation

8.26.3.1 `ADCmax`

```
float Reconstruction::RecoPad::ADCmax = 0
```

8.26.3.2 ADCmax_base

```
float Reconstruction::RecoPad::ADCmax_base = 0
```

8.26.3.3 charge

```
float Reconstruction::RecoPad::charge = 0
```

8.26.3.4 d

```
float Reconstruction::RecoPad::d = 0
```

8.26.3.5 dd

```
float Reconstruction::RecoPad::dd = 0
```

8.26.3.6 dEdxXP

```
float Reconstruction::RecoPad::dEdxXP = 0
```

8.26.3.7 driftDistance

```
float Reconstruction::RecoPad::driftDistance = 0
```

8.26.3.8 dy

```
float Reconstruction::RecoPad::dy = 0
```

8.26.3.9 gain

```
float Reconstruction::RecoPad::gain = 0
```

8.26.3.10 GainCorrection

```
float Reconstruction::RecoPad::GainCorrection = 0
```

8.26.3.11 ix

```
int Reconstruction::RecoPad::ix = 0
```

8.26.3.12 iy

```
int Reconstruction::RecoPad::iy = 0
```

8.26.3.13 leading

```
bool Reconstruction::RecoPad::leading = false
```

8.26.3.14 length

```
float Reconstruction::RecoPad::length = 0
```

8.26.3.15 phi

```
float Reconstruction::RecoPad::phi = 0
```

8.26.3.16 ratio

```
float Reconstruction::RecoPad::ratio = 0
```

8.26.3.17 ratioDrift

```
float Reconstruction::RecoPad::ratioDrift = 0
```

8.26.3.18 ratioFile

```
float Reconstruction::RecoPad::ratioFile = 0
```

8.26.3.19 RC

```
float Reconstruction::RecoPad::RC = 0
```

8.26.3.20 T0

```
int Reconstruction::RecoPad::T0 = 0
```

8.26.3.21 TMax

```
int Reconstruction::RecoPad::TMax = 0
```

8.26.3.22 xPad

```
float Reconstruction::RecoPad::xPad = 0
```

8.26.3.23 yPad

```
float Reconstruction::RecoPad::yPad = 0
```

The documentation for this class was generated from the following files:

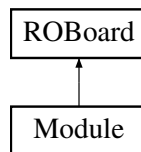
- [Reconstruction/inc/dEdx.h](#)
- [Reconstruction/src/dEdx.cxx](#)

8.27 ROBoard Class Reference

Abstraction for a read-out board grouping pads and providing mapping.

```
#include <ROBoard.h>
```

Inheritance diagram for ROBoard:



Public Member Functions

- [ROBoard](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)
- virtual [~ROBoard](#) ()
- const [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- const [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- const [Model_ChargeI](#) * [Get_Model_ChargeI](#) ()
- virtual void [Add_Pad](#) ([Pad](#) *pPad)
- int [Get_NberOfPads](#) () const
- [Pad](#) * [Get_Pad](#) (const int &Index1D)
- int [Get_IsThisPadExisting](#) (const int &iX, const int &iY) const
- [Pad](#) * [Get_Pad](#) (const int &iX, const int &iY)
- [Pad](#) * [Get_Pad](#) ([Pad](#) *pPad)

Protected Member Functions

- int [GetLinearIndex](#) (const int &iX, const int &iY) const
- void [Ini_Models](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)

Protected Attributes

- short int [m_Nx](#)
- short int [m_Ny](#)
- [std::vector< int > V_ExisFlag2D](#)
- [std::vector< Pad * > V_Pad](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_ChargeI](#) * [p_Model_ChargeI](#)

8.27.1 Detailed Description

Abstraction for a read-out board grouping pads and providing mapping.

8.27.2 Constructor & Destructor Documentation**8.27.2.1 ROBoard()**

```
ROBoard::ROBoard (
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI)
```

Constructor

8.27.2.2 ~ROBoard()

```
ROBoard::~~ROBoard () [virtual]
```

8.27.3 Member Function Documentation**8.27.3.1 Add_Pad()**

```
void ROBoard::Add_Pad (
    Pad * pPad) [virtual]
```

Reimplemented in [Module](#).

8.27.3.2 Get_IsThisPadExisting()

```
int ROBoard::Get_IsThisPadExisting (
    const int & iX,
    const int & iY) const
```

8.27.3.3 Get_Model_ChargeI()

```
const Model\_ChargeI * ROBoard::Get_Model_ChargeI ()
```

8.27.3.4 Get_Model_Electronics()

```
const Model_Electronics * ROBoard::Get_Model_Electronics ()
```

8.27.3.5 Get_Model_ReadOutGeometry()

```
const Model_ReadOutGeometry * ROBoard::Get_Model_ReadOutGeometry ()
```

8.27.3.6 Get_NberOfPads()

```
int ROBoard::Get_NberOfPads () const
```

8.27.3.7 Get_Pad() [1/3]

```
Pad * ROBoard::Get_Pad (  
    const int & Index1D)
```

8.27.3.8 Get_Pad() [2/3]

```
Pad * ROBoard::Get_Pad (  
    const int & iX,  
    const int & iY)
```

8.27.3.9 Get_Pad() [3/3]

```
Pad * ROBoard::Get_Pad (  
    Pad * pPad)
```

8.27.3.10 GetLinearIndex()

```
int ROBoard::GetLinearIndex (  
    const int & iX,  
    const int & iY) const [protected]
```

8.27.3.11 Ini_Models()

```
void ROBoard::Ini_Models (  
    Model_ReadOutGeometry * pModel_ReadOutGeometry,  
    Model_Electronics * pModel_Electronics,  
    Model_ChargeI * pModel_ChargeI) [protected]
```

8.27.4 Member Data Documentation

8.27.4.1 m_Nx

```
short int ROBoard::m_Nx [protected]
```

8.27.4.2 m_Ny

```
short int ROBoard::m_Ny [protected]
```

8.27.4.3 p_Model_ChargeI

```
Model_ChargeI* ROBoard::p_Model_ChargeI [protected]
```

8.27.4.4 p_Model_Electronics

```
Model_Electronics* ROBoard::p_Model_Electronics [protected]
```

8.27.4.5 p_Model_ReadOutGeometry

```
Model_ReadOutGeometry* ROBoard::p_Model_ReadOutGeometry [protected]
```

8.27.4.6 V_ExisFlag2D

```
std::vector<int> ROBoard::V_ExisFlag2D [protected]
```

8.27.4.7 V_Pad

```
std::vector<Pad *> ROBoard::V_Pad [protected]
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[ROBoard.h](#)
- ModelEvent/src/[ROBoard.cxx](#)

8.28 Sample Class Reference

```
#include <Sample.h>
```

Public Member Functions

- [Sample](#) ()
- [Sample](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_ChargeI](#) *pModel_ChargeI)
- virtual [~Sample](#) ()
- void [SmallDump](#) () const
- void [WriteOut](#) () const
- void [Set_Model_ReadOutGeometry](#) ([Model_ReadOutGeometry](#) *pModel_ReadOutGeometry)
- void [Set_Model_Electronics](#) ([Model_Electronics](#) *pModel_Electronics)
- void [Set_Model_Charge](#) ([Model_ChargeI](#) *pModel_ChargeI)
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_ChargeI](#) * [Get_Model_ChargeI](#) ()
- void [Add_Event](#) ([Event](#) *pEvent)
- int [Get_NberOfEvents](#) () const
- [Event](#) * [Get_Event](#) (int Index1D)
- [SetOfTracks](#) * [Get_SetOfTracks_ForThisModule](#) (const int &ModuleNber)
- void [SetFilePRF](#) (const double &Norm, const double &a2, const double &a4, const double &b2, const double &b4)
- void [GetFilePRF](#) (int &FilePRF_Exist, double &Norm, double &a2, double &a4, double &b2, double &b4)
- void [Set_RC](#) (const double &RC)
- void [Set_DD](#) (const double &RC)
- int [StatusFit](#) ()
- double [Get_RC](#) () const
- double [Get_eRC](#) () const
- double [Get_DD](#) () const
- double [Get_eDD](#) () const
- double [Get_Chi2Min](#) () const
- double [Get_RC_BeforeMinimisation](#) () const
- double [Get_DD_BeforeMinimisation](#) () const

8.28.1 Constructor & Destructor Documentation

8.28.1.1 [Sample\(\)](#) [1/2]

`Sample::Sample ()`

Constructor

8.28.1.2 [Sample\(\)](#) [2/2]

```
Sample::Sample (
    Model\_ReadOutGeometry * pModel_ReadOutGeometry,
    Model\_Electronics * pModel_Electronics,
    Model\_ChargeI * pModel_ChargeI)
```

8.28.1.3 [~Sample\(\)](#)

`Sample::~~Sample ()` [virtual]

8.28.2 Member Function Documentation

8.28.2.1 Add_Event()

```
void Sample::Add_Event (  
    Event * pEvent)
```

8.28.2.2 Get_Chi2Min()

```
double Sample::Get_Chi2Min () const
```

8.28.2.3 Get_DD()

```
double Sample::Get_DD () const
```

8.28.2.4 Get_DD_BeforeMinimisation()

```
double Sample::Get_DD_BeforeMinimisation () const
```

8.28.2.5 Get_eDD()

```
double Sample::Get_eDD () const
```

8.28.2.6 Get_eRC()

```
double Sample::Get_eRC () const
```

8.28.2.7 Get_Event()

```
Event * Sample::Get_Event (  
    int IndexID)
```

8.28.2.8 Get_Model_ChargeI()

```
Model_ChargeI * Sample::Get_Model_ChargeI ()
```

8.28.2.9 Get_Model_Electronics()

```
Model_Electronics * Sample::Get_Model_Electronics ()
```

8.28.2.10 Get_Model_ReadOutGeometry()

```
Model_ReadOutGeometry * Sample::Get_Model_ReadOutGeometry ()
```

8.28.2.11 Get_NberOfEvents()

```
int Sample::Get_NberOfEvents () const
```

8.28.2.12 Get_RC()

```
double Sample::Get_RC () const
```

8.28.2.13 Get_RC_BeforeMinimisation()

```
double Sample::Get_RC_BeforeMinimisation () const
```

8.28.2.14 Get_SetOfTracks_ForThisModule()

```
SetOfTracks * Sample::Get_SetOfTracks_ForThisModule (  
    const int & ModuleNber)
```

8.28.2.15 GetFilePRF()

```
void Sample::GetFilePRF (  
    int & FilePRF_Exist,  
    double & Norm,  
    double & a2,  
    double & a4,  
    double & b2,  
    double & b4)
```

8.28.2.16 Set_DD()

```
void Sample::Set_DD (  
    const double & RC)
```

8.28.2.17 Set_Model_Charge()

```
void Sample::Set_Model_Charge (  
    Model_ChargeI * pModel_ChargeI)
```

8.28.2.18 Set_Model_Electronics()

```
void Sample::Set_Model_Electronics (  
    Model_Electronics * pModel_Electronics)
```

8.28.2.19 Set_Model_ReadOutGeometry()

```
void Sample::Set_Model_ReadOutGeometry (
    Model\_ReadOutGeometry * pModel_ReadOutGeometry)
```

8.28.2.20 Set_RC()

```
void Sample::Set_RC (
    const double & RC)
```

8.28.2.21 SetFilePRF()

```
void Sample::SetFilePRF (
    const double & Norm,
    const double & a2,
    const double & a4,
    const double & b2,
    const double & b4)
```

8.28.2.22 SmallDump()

```
void Sample::SmallDump () const
```

8.28.2.23 StatusFit()

```
int Sample::StatusFit ()
```

8.28.2.24 WriteOut()

```
void Sample::WriteOut () const
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Sample.h](#)
- ModelEvent/src/[Sample.cxx](#)

8.29 Selector Class Reference

Encapsulates event/module/cluster selection logic.

```
#include <Selector.h>
```

Public Member Functions

- [Selector](#) (const std::string DefSelection)
- [Selector](#) ()
- virtual [~Selector](#) ()
- void [Reset_Selection](#) ()
Reset all selections to empty.
- void [Add_Selection](#) (const std::string &SelectionName)
Add a named selection.
- int [NberOfSelections](#) ()
Get number of selections.
- std::string [Get_SelectionName](#) (const int &iTem)
Retrieve a selection name by index.
- void [Tell_Selection](#) ()
Print selection information to stdout.
- void [ApplySelection](#) ([Sample](#) &aSample, const int &ModuleNber)
Apply selection to a [Sample](#).
- void [Apply_ASelection](#) ([Sample](#) &aSample, const int &ModuleNber, const int &iTem)
Apply a specific selection index to a [Sample](#).
- void [ApplySelection](#) ([Event](#) *pEvent)
Apply selection to an [Event](#).
- void [Apply_ASelection](#) ([Event](#) *pEvent, const int &ModuleNber, const int &iTem)
Apply a specific selection index to an [Event](#).
- void [Reset_StatCounters](#) ()
Reset statistical counters used for selection monitoring.
- void [PrintStat](#) ()
- double [Get_Cut_StageFinal_NCluster_Low](#) ()
- void [Set_Cut_StageFinal_NCluster_Low](#) (double Cut_StageFinal_NCluster_Low)
- double [Get_Cut_Stage5_Npads_Hig](#) ()
- void [Set_Cut_Stage5_Npads_Hig](#) (double Cut_Stage5_Npads_Hig)
- double [Get_Cut_Stage2_EventBased](#) ()
- void [Set_Cut_Stage2_EventBased](#) (double Cut_Stage2_EventBased)
- double [Get_Cut_Stage3_TLow](#) ()
- double [Get_Cut_Stage3_THigh](#) ()
- void [Set_Cut_Stage3_TLow](#) (double Cut_Stage3_TLow)
- void [Set_Cut_Stage3_THigh](#) (double Cut_Stage3_THigh)
- double [Get_Cut_Stage6_Amax_Low](#) ()
- void [Set_Cut_Stage6_Amax_Low](#) (double Cut_Stage6_Amax_Low)
- double [Get_Cut_Stage6_Amax_Hig](#) ()
- void [Set_Cut_Stage6_Amax_Hig](#) (double Cut_Stage6_Amax_Hig)
- double [Get_Cut_Stage4_APM_Low](#) ()
- void [Set_Cut_Stage4_APM_Low](#) (double Cut_Stage4_APM_Low)
- double [Get_Cut_Stage4_APM_High](#) ()
- void [Set_Cut_Stage4_APM_High](#) (double Cut_Stage4_APM_High)

8.29.1 Detailed Description

Encapsulates event/module/cluster selection logic.

8.29.2 Constructor & Destructor Documentation

8.29.2.1 Selector() [1/2]

```
Selector::Selector (  
    const std::string DefSelection)
```

Constructor with default selection name

8.29.2.2 Selector() [2/2]

```
Selector::Selector ()
```

Default constructor

8.29.2.3 ~Selector()

```
Selector::~~Selector () [virtual]
```

Virtual destructor

8.29.3 Member Function Documentation

8.29.3.1 Add_Selection()

```
void Selector::Add_Selection (  
    const std::string & SelectionName)
```

Add a named selection.

8.29.3.2 Apply_ASelection() [1/2]

```
void Selector::Apply_ASelection (  
    Event * pEvent,  
    const int & ModuleNber,  
    const int & iTem)
```

Apply a specific selection index to an [Event](#).

8.29.3.3 Apply_ASelection() [2/2]

```
void Selector::Apply_ASelection (  
    Sample & aSample,  
    const int & ModuleNber,  
    const int & iTem)
```

Apply a specific selection index to a [Sample](#).

8.29.3.4 ApplySelection() [1/2]

```
void Selector::ApplySelection (
    Event * pEvent)
```

Apply selection to an [Event](#).

8.29.3.5 ApplySelection() [2/2]

```
void Selector::ApplySelection (
    Sample & aSample,
    const int & ModuleNber)
```

Apply selection to a [Sample](#).

Parameters

<i>aSample</i>	reference to the Sample
<i>ModuleNber</i>	module index

8.29.3.6 Get_Cut_Stage2_EventBased()

```
double Selector::Get_Cut_Stage2_EventBased ()
```

8.29.3.7 Get_Cut_Stage3_THigh()

```
double Selector::Get_Cut_Stage3_THigh ()
```

8.29.3.8 Get_Cut_Stage3_TLow()

```
double Selector::Get_Cut_Stage3_TLow ()
```

8.29.3.9 Get_Cut_Stage4_APM_High()

```
double Selector::Get_Cut_Stage4_APM_High ()
```

8.29.3.10 Get_Cut_Stage4_APM_Low()

```
double Selector::Get_Cut_Stage4_APM_Low ()
```

8.29.3.11 Get_Cut_Stage5_Npads_Hig()

```
double Selector::Get_Cut_Stage5_Npads_Hig ()
```

8.29.3.12 Get_Cut_Stage6_Amax_Hig()

```
double Selector::Get_Cut_Stage6_Amax_Hig ()
```

8.29.3.13 Get_Cut_Stage6_Amax_Low()

```
double Selector::Get_Cut_Stage6_Amax_Low ()
```

8.29.3.14 Get_Cut_StageFinal_NCluster_Low()

```
double Selector::Get_Cut_StageFinal_NCluster_Low ()
```

8.29.3.15 Get_SelectionName()

```
std::string Selector::Get_SelectionName (
    const int & iTem)
```

Retrieve a selection name by index.

8.29.3.16 NberOfSelections()

```
int Selector::NberOfSelections ()
```

Get number of selections.

8.29.3.17 PrintStat()

```
void Selector::PrintStat ()
```

8.29.3.18 Reset_Selection()

```
void Selector::Reset_Selection ()
```

Reset all selections to empty.

8.29.3.19 Reset_StatCounters()

```
void Selector::Reset_StatCounters ()
```

Reset statistical counters used for selection monitoring.

8.29.3.20 Set_Cut_Stage2_EventBased()

```
void Selector::Set_Cut_Stage2_EventBased (
    double Cut_Stage2_EventBased)
```

8.29.3.21 Set_Cut_Stage3_THigh()

```
void Selector::Set_Cut_Stage3_THigh (  
    double Cut_Stage3_THigh)
```

8.29.3.22 Set_Cut_Stage3_TLow()

```
void Selector::Set_Cut_Stage3_TLow (  
    double Cut_Stage3_TLow)
```

8.29.3.23 Set_Cut_Stage4_APM_High()

```
void Selector::Set_Cut_Stage4_APM_High (  
    double Cut_Stage4_APM_High)
```

8.29.3.24 Set_Cut_Stage4_APM_Low()

```
void Selector::Set_Cut_Stage4_APM_Low (  
    double Cut_Stage4_APM_Low)
```

8.29.3.25 Set_Cut_Stage5_Npads_Hig()

```
void Selector::Set_Cut_Stage5_Npads_Hig (  
    double Cut_Stage5_Npads_Hig)
```

8.29.3.26 Set_Cut_Stage6_Amax_Hig()

```
void Selector::Set_Cut_Stage6_Amax_Hig (  
    double Cut_Stage6_Amax_Hig)
```

8.29.3.27 Set_Cut_Stage6_Amax_Low()

```
void Selector::Set_Cut_Stage6_Amax_Low (  
    double Cut_Stage6_Amax_Low)
```

8.29.3.28 Set_Cut_StageFinal_NCluster_Low()

```
void Selector::Set_Cut_StageFinal_NCluster_Low (  
    double Cut_StageFinal_NCluster_Low)
```


8.29.3.29 Tell_Selection()

```
void Selector::Tell_Selection ()
```

Print selection information to stdout.

The documentation for this class was generated from the following files:

- Reconstruction/inc/[Selector.h](#)
- Reconstruction/src/[Selector.cxx](#)

8.30 SetOfTracks Class Reference

```
#include <SetOfTracks.h>
```

Public Member Functions

- [SetOfTracks](#) ()
- virtual [~SetOfTracks](#) ()
- void [Add_Track](#) (const [Track](#) *pTrack)
- int [Get_NberOfTrack](#) () const
- const [Track](#) * [Get_Track](#) (int Index1D) const
- void [DumpRec](#) () const
- int [Get_MinimalNberOfEntries](#) ()
- void [Set_MinimalNberOfEntries](#) (const int &MinimalNberOfEntries)
- TH1F * [GiveMe_pTH1F_YTrackInTracks](#) (const std::string &TAG, const int &iYBeam)
- TH1F * [GiveMe_pTH1F_YTrackInTracks](#) (const std::string &TAG, const int &Nbins, const double &Ymin, const double &Ymax)
- TH1F * [GiveMe_pTH1F_YTrackInTracks](#) (const std::string &TAG, const int &iYBeam, const int &iCol)
- TH1F * [GiveMe_pTH1F_YTrackInTracks](#) (const std::string &TAG, const int &Nbins, const double &Ymin, const double &Ymax, const int &iCol)
- TH1F * [GiveMe_pTH1F_YFitCol](#) (const std::string &TAG, const int &iYBeam)
- TH1F * [GiveMe_pTH1F_YFitCol](#) (const std::string &TAG, const int &Nbins, const double &Ymin, const double &Ymax)
- TH1F * [GiveMe_pTH1F_YFitCol](#) (const std::string &TAG, const int &iYBeam, const int &iCol)
- TH1F * [GiveMe_pTH1F_YFitCol](#) (const std::string &TAG, const int &Nbins, const double &Ymin, const double &Ymax, const int &iCol)
- TH1F * [GiveMe_pTH1F_YTrackYPadInTracks](#) (const std::string &TAG, const int &iCol)
- TH1F * [GiveMe_pTH1F_YTrackYPadInTracks](#) (const std::string &TAG, const int &iCol, const int &Nbins, const double &Xmin, const double &Xmax)
- TH1F * [GiveMe_pTH1F_YTrackYPadLeadingInTracks](#) (const std::string &TAG, const int &iCol)
- TH1F * [GiveMe_pTH1F_YTrackYPadLeadingInTracks](#) (const std::string &TAG, const int &iCol, const int &Nbins, const double &Xmin, const double &Xmax)
- TH1F * [GiveMe_pTH1F_TrackDeltaT](#) (const std::string &TAG, const int &iCol)
- TH1F * [GiveMe_pTH1F_Ch2MinPerNODF](#) (const std::string &TAGFinal, const double &Xmax)
- TH1F * [GiveMe_pTH1F_Ch2Min](#) (const std::string &TAGFinal, const double &Xmax)
- TH1F * [GiveMe_pTH1F_Residual](#) (const std::string &TAGFinal, double &Mean, double &eMean, double &Sigma, double &eSigma)
- TH1F * [GiveMe_pTH1F_Residual](#) (const std::string &TAGFinal, const int &iX, double &Mean, double &eMean, double &Sigma, double &eSigma)
- TH1F * [GiveMe_pTH1F_Residual](#) (const std::string &TAGFinal, const int &iX, double YL, double YH, double YL_Rescaled, double YH_Rescaled, double &Mean, double &eMean, double &Sigma, double &eSigma)

- TH1F * [GiveMe_pTH1F_Pull](#) (const std::string &TAGFinal)
- TH1F * [GiveMe_pTH1F_Pull](#) (const std::string &TAGFinal, double &Mean, double &eMean, double &Sigma, double &eSigma)
- TH1F * [GiveMe_pTH1F_Pull](#) (const std::string &TAGFinal, double &Mean, double &eMean, double &Sigma, double &eSigma, const double &XminH, const double &XmaxH)
- TH1F * [GiveMe_pTH1F_Pull](#) (const std::string &TAGFinal, const int &iX, double &Mean, double &eMean, double &Sigma, double &eSigma)
- TH1F * [GiveMe_pTH1F_Pull](#) (const std::string &TAGFinal, const int &iX, double &Mean, double &eMean, double &Sigma, double &eSigma, const double &XminH, const double &XmaxH)

8.30.1 Constructor & Destructor Documentation

8.30.1.1 SetOfTracks()

```
SetOfTracks::SetOfTracks ()
```

8.30.1.2 ~SetOfTracks()

```
SetOfTracks::~~SetOfTracks () [virtual]
```

8.30.2 Member Function Documentation

8.30.2.1 Add_Track()

```
void SetOfTracks::Add_Track (
    const Track * pTrack)
```

8.30.2.2 DumpRec()

```
void SetOfTracks::DumpRec () const
```

8.30.2.3 Get_MinimalNberOfEntries()

```
int SetOfTracks::Get_MinimalNberOfEntries ()
```

8.30.2.4 Get_NberOfTrack()

```
int SetOfTracks::Get_NberOfTrack () const
```

8.30.2.5 Get_Track()

```
const Track * SetOfTracks::Get_Track (
    int IndexID) const
```

8.30.2.6 GiveMe_pTH1F_Ch2Min()

```
TH1F * SetOfTracks::GiveMe_pTH1F_Ch2Min (
    const std::string & TAGFinal,
    const double & Xmax)
```

8.30.2.7 GiveMe_pTH1F_Ch2MinPerNODF()

```
TH1F * SetOfTracks::GiveMe_pTH1F_Ch2MinPerNODF (
    const std::string & TAGFinal,
    const double & Xmax)
```

8.30.2.8 GiveMe_pTH1F_Pull() [1/5]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Pull (
    const std::string & TAGFinal)
```

8.30.2.9 GiveMe_pTH1F_Pull() [2/5]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Pull (
    const std::string & TAGFinal,
    const int & iX,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma)
```

8.30.2.10 GiveMe_pTH1F_Pull() [3/5]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Pull (
    const std::string & TAGFinal,
    const int & iX,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma,
    const double & XminH,
    const double & XmaxH)
```

8.30.2.11 GiveMe_pTH1F_Pull() [4/5]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Pull (
    const std::string & TAGFinal,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma)
```

8.30.2.12 GiveMe_pTH1F_Pull() [5/5]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Pull (
    const std::string & TAGFinal,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma,
    const double & XminH,
    const double & XmaxH)
```

8.30.2.13 GiveMe_pTH1F_Residual() [1/3]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Residual (
    const std::string & TAGFinal,
    const int & iX,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma)
```

8.30.2.14 GiveMe_pTH1F_Residual() [2/3]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Residual (
    const std::string & TAGFinal,
    const int & iX,
    double YL,
    double YH,
    double YL_Rescaled,
    double YH_Rescaled,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma)
```

8.30.2.15 GiveMe_pTH1F_Residual() [3/3]

```
TH1F * SetOfTracks::GiveMe_pTH1F_Residual (
    const std::string & TAGFinal,
    double & Mean,
    double & eMean,
    double & Sigma,
    double & eSigma)
```

8.30.2.16 GiveMe_pTH1F_TrackDeltaT()

```
TH1F * SetOfTracks::GiveMe_pTH1F_TrackDeltaT (
    const std::string & TAG,
    const int & iCol)
```

8.30.2.17 GiveMe_pTH1F_YFitCol() [1/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YFitCol (
    const std::string & TAG,
    const int & iYBeam)
```

8.30.2.18 GiveMe_pTH1F_YFitCol() [2/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YFitCol (
    const std::string & TAG,
    const int & iYBeam,
    const int & iCol)
```

8.30.2.19 GiveMe_pTH1F_YFitCol() [3/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YFitCol (
    const std::string & TAG,
    const int & Nbins,
    const double & Ymin,
    const double & Ymax)
```

8.30.2.20 GiveMe_pTH1F_YFitCol() [4/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YFitCol (
    const std::string & TAG,
    const int & Nbins,
    const double & Ymin,
    const double & Ymax,
    const int & iCol)
```

8.30.2.21 GiveMe_pTH1F_YTrackInTracks() [1/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackInTracks (
    const std::string & TAG,
    const int & iYBeam)
```

8.30.2.22 GiveMe_pTH1F_YTrackInTracks() [2/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackInTracks (
    const std::string & TAG,
    const int & iYBeam,
    const int & iCol)
```

8.30.2.23 GiveMe_pTH1F_YTrackInTracks() [3/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackInTracks (
    const std::string & TAG,
    const int & Nbins,
    const double & Ymin,
    const double & Ymax)
```

8.30.2.24 GiveMe_pTH1F_YTrackInTracks() [4/4]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackInTracks (
    const std::string & TAG,
    const int & Nbins,
    const double & Ymin,
    const double & Ymax,
    const int & iCol)
```

8.30.2.25 GiveMe_pTH1F_YTrackYPadInTracks() [1/2]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackYPadInTracks (
    const std::string & TAG,
    const int & iCol)
```

8.30.2.26 GiveMe_pTH1F_YTrackYPadInTracks() [2/2]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackYPadInTracks (
    const std::string & TAG,
    const int & iCol,
    const int & Nbins,
    const double & Xmin,
    const double & Xmax)
```

8.30.2.27 GiveMe_pTH1F_YTrackYPadLeadingInTracks() [1/2]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackYPadLeadingInTracks (
    const std::string & TAG,
    const int & iCol)
```

8.30.2.28 GiveMe_pTH1F_YTrackYPadLeadingInTracks() [2/2]

```
TH1F * SetOfTracks::GiveMe_pTH1F_YTrackYPadLeadingInTracks (
    const std::string & TAG,
    const int & iCol,
    const int & Nbins,
    const double & Xmin,
    const double & Xmax)
```

8.30.2.29 Set_MinimalNberOfEntries()

```
void SetOfTracks::Set_MinimalNberOfEntries (
    const int & MinimalNberOfEntries)
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[SetOfTracks.h](#)
- ModelEvent/src/[SetOfTracks.cxx](#)

8.31 StaticClusterFitter_Diagonal Class Reference

Public Member Functions

- [StaticClusterFitter_Diagonal](#) ()
- virtual [~StaticClusterFitter_Diagonal](#) ()

Static Public Member Functions

- static void [Set](#) ([ClusterFitter_Diagonal](#) *pClusterFitter_Diagonal)

Static Public Attributes

- static [ClusterFitter_Diagonal](#) * [p_ClusterFitter_Diagonal](#)

8.31.1 Constructor & Destructor Documentation

8.31.1.1 StaticClusterFitter_Diagonal()

```
StaticClusterFitter_Diagonal::StaticClusterFitter_Diagonal ()
```

8.31.1.2 ~StaticClusterFitter_Diagonal()

```
StaticClusterFitter_Diagonal::~~StaticClusterFitter_Diagonal () [virtual]
```

8.31.2 Member Function Documentation

8.31.2.1 Set()

```
void StaticClusterFitter_Diagonal::Set (
    ClusterFitter\_Diagonal * pClusterFitter_Diagonal) [static]
```

8.31.3 Member Data Documentation

8.31.3.1 p_ClusterFitter_Diagonal

```
ClusterFitter\_Diagonal * StaticClusterFitter_Diagonal::p_ClusterFitter_Diagonal [static]
```

Initial value:

```
=
    NULL
```

The documentation for this class was generated from the following file:

- [Fitters/src/ClusterFitter.cxx](#)

8.32 StaticClusterFitter_Horizontal Class Reference

Public Member Functions

- [StaticClusterFitter_Horizontal](#) ()
- virtual [~StaticClusterFitter_Horizontal](#) ()

Static Public Member Functions

- static void [Set](#) ([ClusterFitter_Horizontal](#) *pClusterFitter_Horizontal)

Static Public Attributes

- static [ClusterFitter_Horizontal](#) * [p_ClusterFitter_Horizontal](#) = NULL

8.32.1 Constructor & Destructor Documentation

8.32.1.1 StaticClusterFitter_Horizontal()

```
StaticClusterFitter_Horizontal::StaticClusterFitter_Horizontal ()
```

8.32.1.2 ~StaticClusterFitter_Horizontal()

```
StaticClusterFitter_Horizontal::~~StaticClusterFitter_Horizontal () [virtual]
```

8.32.2 Member Function Documentation

8.32.2.1 Set()

```
void StaticClusterFitter_Horizontal::Set (
    ClusterFitter\_Horizontal * pClusterFitter_Horizontal) [static]
```

8.32.3 Member Data Documentation

8.32.3.1 p_ClusterFitter_Horizontal

```
ClusterFitter\_Horizontal * StaticClusterFitter_Horizontal::p_ClusterFitter_Horizontal = NULL
[static]
```

The documentation for this class was generated from the following file:

- [Fitters/src/ClusterFitter.cxx](#)

8.33 StaticTrackFitter Class Reference

Public Member Functions

- [StaticTrackFitter](#) ()
- virtual [~StaticTrackFitter](#) ()

Static Public Member Functions

- static void [Set](#) ([TrackFitter](#) *pTrackFitter)

Static Public Attributes

- static [TrackFitter](#) * [p_TrackFitter](#) = NULL

8.33.1 Constructor & Destructor Documentation

8.33.1.1 StaticTrackFitter()

```
StaticTrackFitter::StaticTrackFitter ()
```

8.33.1.2 ~StaticTrackFitter()

```
StaticTrackFitter::~~StaticTrackFitter () [virtual]
```

8.33.2 Member Function Documentation

8.33.2.1 Set()

```
void StaticTrackFitter::Set (  
    TrackFitter * pTrackFitter) [static]
```

8.33.3 Member Data Documentation

8.33.3.1 p_TrackFitter

```
TrackFitter * StaticTrackFitter::p_TrackFitter = NULL [static]
```

The documentation for this class was generated from the following file:

- [Fitters/src/TrackFitter.cxx](#)

8.34 Track Class Reference

```
#include <Track.h>
```

Public Member Functions

- [Track](#) (const int &EventNber, const int &EntryNber, const int &ModuleNber)
Construct a [Track](#).
- virtual [~Track](#) ()
Virtual destructor.
- int [Get_EventNber](#) () const
Get [Event](#) number.
- int [Get_EntryNber](#) () const
Get [Entry](#) number.
- int [Get_ModuleNber](#) () const
Get [Module](#) number.
- void [SetNberOfParameters](#) (const int &NberOfParam)
- int [GetNberOfParameters](#) () const
- std::string [Get_ParameterName](#) (const int &iPar) const
- double [Get_ParameterValue](#) (const int &iPar) const
- double [Get_ParameterError](#) (const int &iPar) const
- double [Get_ParameterValue_BeforeMinimisation](#) (const int &iPar) const
- void [Add_Cluster](#) ([Cluster](#) *pCluster)
- int [Get_NberOfCluster](#) () const
- const [Cluster](#) * [Get_Cluster](#) (int Index1D) const
- double [Get_Residual](#) (int Index1D) const
- double [Get_Pull](#) (int Index1D) const
- void [DoClosure](#) ()
- void [DumpRec](#) () const
- double [Y_Position](#) (const double &X) const
- double [Get_Chi2Min](#) () const
- int [SetParameter](#) (TVirtualFitter *pTVirtualFitter)
- void [SetResults](#) (TVirtualFitter *pTVirtualFitter)
- double [Chi2](#) (double par[])
- void [SetParameters_Internal](#) (double par[])
- TMatrixD [Get_CovMatrix](#) () const

Public Attributes

- int [m_NberOfClusters](#)
- std::vector< [Cluster](#) * > [V_Cluster](#)
- std::vector< double > [V_Residual](#)
- std::vector< double > [V_Pull](#)

8.34.1 Constructor & Destructor Documentation

8.34.1.1 Track()

```
Track::Track (
    const int & EventNber,
    const int & EntryNber,
    const int & ModuleNber)
```

Construct a [Track](#).

Parameters

<i>EventNber</i>	event number
<i>EntryNber</i>	entry index
<i>ModuleNber</i>	module index

8.34.1.2 ~Track()

```
Track::~~Track () [virtual]
```

Virtual destructor.

8.34.2 Member Function Documentation

8.34.2.1 Add_Cluster()

```
void Track::Add_Cluster (  
    Cluster * pCluster)
```

8.34.2.2 Chi2()

```
double Track::Chi2 (  
    double par[])
```

8.34.2.3 DoClosure()

```
void Track::DoClosure ()
```

8.34.2.4 DumpRec()

```
void Track::DumpRec () const
```

8.34.2.5 Get_Chi2Min()

```
double Track::Get_Chi2Min () const
```

8.34.2.6 Get_Cluster()

```
const Cluster * Track::Get_Cluster (  
    int IndexID) const
```

8.34.2.7 Get_CovMatrix()

```
TMatrixD Track::Get_CovMatrix () const
```

8.34.2.8 Get_EntryNber()

```
int Track::Get_EntryNber () const
```

Get Entry number.

8.34.2.9 Get_EventNber()

```
int Track::Get_EventNber () const
```

Get [Event](#) number.

8.34.2.10 Get_ModuleNber()

```
int Track::Get_ModuleNber () const
```

Get [Module](#) number.

8.34.2.11 Get_NberOfCluster()

```
int Track::Get_NberOfCluster () const
```

8.34.2.12 Get_ParameterError()

```
double Track::Get_ParameterError (  
    const int & iPar) const
```

8.34.2.13 Get_ParameterName()

```
std::string Track::Get_ParameterName (  
    const int & iPar) const
```

8.34.2.14 Get_ParameterValue()

```
double Track::Get_ParameterValue (  
    const int & iPar) const
```

8.34.2.15 Get_ParameterValue_BeforeMinimisation()

```
double Track::Get_ParameterValue_BeforeMinimisation (  
    const int & iPar) const
```

8.34.2.16 Get_Pull()

```
double Track::Get_Pull (
    int IndexID) const
```

8.34.2.17 Get_Residual()

```
double Track::Get_Residual (
    int IndexID) const
```

8.34.2.18 GetNberOfParameters()

```
int Track::GetNberOfParameters () const
```

8.34.2.19 SetNberOfParameters()

```
void Track::SetNberOfParameters (
    const int & NberOfParam)
```

8.34.2.20 SetParameter()

```
int Track::SetParameter (
    TVirtualFitter * pTVirtualFitter)
```

8.34.2.21 SetParameters_Internal()

```
void Track::SetParameters_Internal (
    double par[])
```

8.34.2.22 SetResults()

```
void Track::SetResults (
    TVirtualFitter * pTVirtualFitter)
```

8.34.2.23 Y_Position()

```
double Track::Y_Position (
    const double & X) const
```

8.34.3 Member Data Documentation**8.34.3.1 m_NberOfClusters**

```
int Track::m_NberOfClusters
```

8.34.3.2 V_Cluster

```
std::vector<Cluster*> Track::V_Cluster
```

8.34.3.3 V_Pull

```
std::vector<double> Track::V_Pull
```

8.34.3.4 V_Residual

```
std::vector<double> Track::V_Residual
```

The documentation for this class was generated from the following files:

- ModelEvent/inc/[Track.h](#)
- ModelEvent/src/[Track.cxx](#)

8.35 TrackFitter Class Reference

```
#include <TrackFitter.h>
```

Public Member Functions

- [TrackFitter](#) (const std::string &FitterName, const int &NberOfParameters=2)
Construct a [TrackFitter](#).
- virtual [~TrackFitter](#) ()
Virtual destructor.
- void [Set_Track](#) ([Track](#) *pTrack)
Set the track to be fitted.
- int [DoMinimisation](#) ()
Run the minimisation routine.
- double [Chi2](#) (double par[])
Compute chi2 for the current parameter vector.

Protected Attributes

- std::string [m_FitterName](#)
- int [m_NberOfParameters](#)
- [Track](#) * [p_Track](#)
- TVirtualFitter * [p_TVirtualFitter](#)
Fitter.

8.35.1 Constructor & Destructor Documentation

8.35.1.1 TrackFitter()

```
TrackFitter::TrackFitter (
    const std::string & FitterName,
    const int & NberOfParameters = 2)
```

Construct a [TrackFitter](#).

Parameters

<i>FitterName</i>	name used to identify the fitter instance
<i>NberOfParameters</i>	number of fit parameters (default: 2)

8.35.1.2 ~TrackFitter()

```
TrackFitter::~~TrackFitter () [virtual]
```

Virtual destructor.

8.35.2 Member Function Documentation

8.35.2.1 Chi2()

```
double TrackFitter::Chi2 (  
    double par[])
```

Compute chi2 for the current parameter vector.

Parameters

<i>par</i>	parameter array used for the chi2 evaluation
------------	--

Returns

computed chi2 value

8.35.2.2 DoMinimisation()

```
int TrackFitter::DoMinimisation ()
```

Run the minimisation routine.

Returns

status code (0 on success, non-zero on failure)

8.35.2.3 Set_Track()

```
void TrackFitter::Set_Track (  
    Track * pTrack)
```

Set the track to be fitted.

Parameters

<i>pTrack</i>	pointer to a Track object (ownership not transferred)
---------------	---

8.35.3 Member Data Documentation

8.35.3.1 m_FitterName

```
std::string TrackFitter::m_FitterName [protected]
```

8.35.3.2 m_NberOfParameters

```
int TrackFitter::m_NberOfParameters [protected]
```

8.35.3.3 p_Track

```
Track* TrackFitter::p_Track [protected]
```

8.35.3.4 p_TVirtualFitter

```
TVirtualFitter* TrackFitter::p_TVirtualFitter [protected]
```

Fitter.

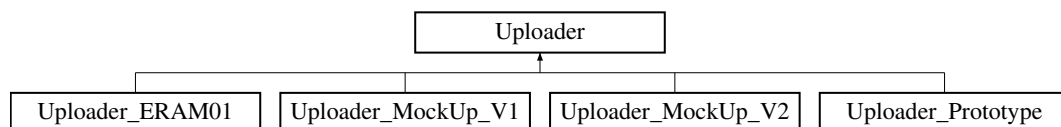
The documentation for this class was generated from the following files:

- [Fitters/inc/TrackFitter.h](#)
- [Fitters/src/TrackFitter.cxx](#)

8.36 Uploader Class Reference

```
#include <Uploader.h>
```

Inheritance diagram for Uploader:



Public Member Functions

- [Uploader](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader](#) ()
- std::string [Get_SampleFile](#) ()
- int [Get_NberOfEvent](#) ()
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use, const int &CloseWF=1)=0
- int [Get_PRF_exist](#) ()
- double [Get_Norm](#) ()
- double [Get_a2](#) ()
- double [Get_a4](#) ()
- double [Get_b2](#) ()
- double [Get_b4](#) ()
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_Charge1D](#) * [Get_Model_Charge1D](#) ()

Protected Attributes

- std::string [m_SampleFile](#)
- int [m_NberOfEvent](#)
- TFile * [p_TFile](#)
- TTree * [p_TTree](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_Charge1D](#) * [p_Model_Charge1D](#)
- short int [m_PRF_exist](#)
- double [m_Norm](#)
- double [m_a2](#)
- double [m_a4](#)
- double [m_b2](#)
- double [m_b4](#)

8.36.1 Constructor & Destructor Documentation**8.36.1.1 Uploader()**

```
Uploader::Uploader (
    const std::string & SampleFile,
    Model_ReadOutGeometry * pModel_ReadOutGeometry,
    Model_Electronics * pModel_Electronics,
    Model_Charge1D * pModel_Charge1D)
```

Constructor

8.36.1.2 ~Uploader()

```
Uploader::~Uploader () [virtual]
```

8.36.2 Member Function Documentation

8.36.2.1 Get_a2()

```
double Uploader::Get_a2 ()
```

8.36.2.2 Get_a4()

```
double Uploader::Get_a4 ()
```

8.36.2.3 Get_b2()

```
double Uploader::Get_b2 ()
```

8.36.2.4 Get_b4()

```
double Uploader::Get_b4 ()
```

8.36.2.5 Get_Model_Charge1D()

```
Model_Charge1D * Uploader::Get_Model_Charge1D ()
```

8.36.2.6 Get_Model_Electronics()

```
Model_Electronics * Uploader::Get_Model_Electronics ()
```

8.36.2.7 Get_Model_ReadOutGeometry()

```
Model_ReadOutGeometry * Uploader::Get_Model_ReadOutGeometry ()
```

8.36.2.8 Get_NberOfEvent()

```
int Uploader::Get_NberOfEvent ()
```

8.36.2.9 Get_Norm()

```
double Uploader::Get_Norm ()
```

8.36.2.10 Get_PRF_exist()

```
int Uploader::Get_PRF_exist ()
```

8.36.2.11 Get_SampleFile()

```
std::string Uploader::Get_SampleFile ()
```

8.36.2.12 GiveMe_Event()

```
virtual Event * Uploader::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use,
    const int & CloseWF = 1) [pure virtual]
```

Implemented in [Uploader_ERAM01](#), [Uploader_MockUp_V1](#), [Uploader_MockUp_V2](#), and [Uploader_Prototype](#).

8.36.3 Member Data Documentation

8.36.3.1 m_a2

```
double Uploader::m_a2 [protected]
```

8.36.3.2 m_a4

```
double Uploader::m_a4 [protected]
```

8.36.3.3 m_b2

```
double Uploader::m_b2 [protected]
```

8.36.3.4 m_b4

```
double Uploader::m_b4 [protected]
```

8.36.3.5 m_NberOfEvent

```
int Uploader::m_NberOfEvent [protected]
```

8.36.3.6 m_Norm

```
double Uploader::m_Norm [protected]
```

8.36.3.7 m_PRF_exist

```
short int Uploader::m_PRF_exist [protected]
```

8.36.3.8 m_SampleFile

```
std::string Uploader::m_SampleFile [protected]
```

8.36.3.9 p_Model_Charge1D

```
Model_Charge1D* Uploader::p_Model_Charge1D [protected]
```

8.36.3.10 p_Model_Electronics

```
Model_Electronics* Uploader::p_Model_Electronics [protected]
```

8.36.3.11 p_Model_ReadOutGeometry

```
Model_ReadOutGeometry* Uploader::p_Model_ReadOutGeometry [protected]
```

8.36.3.12 p_TFile

```
TFile* Uploader::p_TFile [protected]
```

8.36.3.13 p_TTree

```
TTree* Uploader::p_TTree [protected]
```

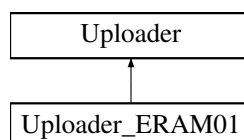
The documentation for this class was generated from the following files:

- [Uploader/inc/Uploader.h](#)
- [Uploader/src/Uploader.cxx](#)

8.37 Uploader_ERAM01 Class Reference

```
#include <Uploader_ERAM01.h>
```

Inheritance diagram for Uploader_ERAM01:



Public Member Functions

- [Uploader_ERAM01](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader_ERAM01](#) ()
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use, const int &CloseWF)
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use)

Public Member Functions inherited from [Uploader](#)

- [Uploader](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader](#) ()
- std::string [Get_SampleFile](#) ()
- int [Get_NberOfEvent](#) ()
- int [Get_PRF_exist](#) ()
- double [Get_Norm](#) ()
- double [Get_a2](#) ()
- double [Get_a4](#) ()
- double [Get_b2](#) ()
- double [Get_b4](#) ()
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_Charge1D](#) * [Get_Model_Charge1D](#) ()

Additional Inherited Members**Protected Attributes inherited from [Uploader](#)**

- std::string [m_SampleFile](#)
- int [m_NberOfEvent](#)
- TFile * [p_TFile](#)
- TTree * [p_TTree](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_Charge1D](#) * [p_Model_Charge1D](#)
- short int [m_PRF_exist](#)
- double [m_Norm](#)
- double [m_a2](#)
- double [m_a4](#)
- double [m_b2](#)
- double [m_b4](#)

8.37.1 Constructor & Destructor Documentation**8.37.1.1 Uploader_ERAM01()**

```
Uploader_ERAM01::Uploader_ERAM01 (
    const std::string & SampleFile,
    Model_ReadOutGeometry * pModel_ReadOutGeometry,
    Model_Electronics * pModel_Electronics,
    Model_Charge1D * pModel_Charge1D)
```

Constructor

8.37.1.2 ~Uploader_ERAM01()

```
Uploader_ERAM01::~~Uploader_ERAM01 () [virtual]
```

8.37.2 Member Function Documentation

8.37.2.1 GiveMe_Event() [1/2]

```
Event * Uploader_ERAM01::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use) [virtual]
```

8.37.2.2 GiveMe_Event() [2/2]

```
Event * Uploader_ERAM01::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use,
    const int & CloseWF) [virtual]
```

Implements [Uploader](#).

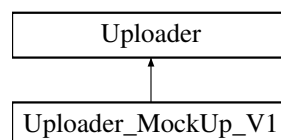
The documentation for this class was generated from the following files:

- [Uploader/inc/Uploader_ERAM01.h](#)
- [Uploader/src/Uploader_ERAM01.cxx](#)

8.38 Uploader_MockUp_V1 Class Reference

```
#include <Uploader_MockUp_V1.h>
```

Inheritance diagram for Uploader_MockUp_V1:



Public Member Functions

- [Uploader_MockUp_V1](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader_MockUp_V1](#) ()
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use, const int &CloseWF)
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use)

Public Member Functions inherited from Uploader

- [Uploader](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader](#) ()
- std::string [Get_SampleFile](#) ()
- int [Get_NberOfEvent](#) ()
- int [Get_PRF_exist](#) ()
- double [Get_Norm](#) ()
- double [Get_a2](#) ()
- double [Get_a4](#) ()
- double [Get_b2](#) ()
- double [Get_b4](#) ()
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_Charge1D](#) * [Get_Model_Charge1D](#) ()

Additional Inherited Members

Protected Attributes inherited from Uploader

- std::string [m_SampleFile](#)
- int [m_NberOfEvent](#)
- TFile * [p_TFile](#)
- TTree * [p_TTree](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_Charge1D](#) * [p_Model_Charge1D](#)
- short int [m_PRF_exist](#)
- double [m_Norm](#)
- double [m_a2](#)
- double [m_a4](#)
- double [m_b2](#)
- double [m_b4](#)

8.38.1 Constructor & Destructor Documentation

8.38.1.1 Uploader_MockUp_V1()

```
Uploader_MockUp_V1::Uploader_MockUp_V1 (
    const std::string & SampleFile,
    Model_ReadOutGeometry * pModel_ReadOutGeometry,
    Model_Electronics * pModel_Electronics,
    Model_Charge1D * pModel_Charge1D)
```

Constructor

8.38.1.2 ~Uploader_MockUp_V1()

```
Uploader_MockUp_V1::~~Uploader_MockUp_V1 () [virtual]
```

8.38.2 Member Function Documentation

8.38.2.1 GiveMe_Event() [1/2]

```
Event * Uploader_MockUp_V1::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use) [virtual]
```

8.38.2.2 GiveMe_Event() [2/2]

```
Event * Uploader_MockUp_V1::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use,
    const int & CloseWF) [virtual]
```

Implements [Uploader](#).

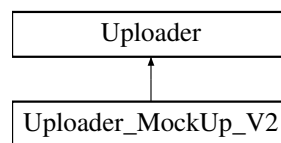
The documentation for this class was generated from the following files:

- [Uploader/inc/Uploader_MockUp_V1.h](#)
- [Uploader/src/Uploader_MockUp_V1.cxx](#)

8.39 Uploader_MockUp_V2 Class Reference

```
#include <Uploader_MockUp_V2.h>
```

Inheritance diagram for Uploader_MockUp_V2:



Public Member Functions

- [Uploader_MockUp_V2](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader_MockUp_V2](#) ()
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use, const int &CloseWF)
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use)
- void [SetBeforeMerging](#) (const int &i_SetBeforeMerging)
- void [Setwap_XY](#) (const int &i_Swap_XY)
- void [Init](#) ()

Public Member Functions inherited from Uploader

- [Uploader](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader](#) ()
- std::string [Get_SampleFile](#) ()
- int [Get_NberOfEvent](#) ()
- int [Get_PRF_exist](#) ()
- double [Get_Norm](#) ()
- double [Get_a2](#) ()
- double [Get_a4](#) ()
- double [Get_b2](#) ()
- double [Get_b4](#) ()
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_Charge1D](#) * [Get_Model_Charge1D](#) ()

Public Attributes

- Int_t [fCurrent](#)
- Int_t [ev](#)
- Int_t [track](#)
- ULong64_t [date](#)
- Bool_t [beforeMerging](#)
- Double_t [dEdx](#)
- Double_t [angle_yz](#)
- Double_t [angle_xy](#)
- Int_t [rob_clusters](#)
- Double_t [quality](#)
- Double_t [mom](#)
- Double_t [sina](#)
- Double_t [offset](#)
- Int_t [max_mult](#)
- Double_t [mean_mult](#)
- std::vector< int > * [multiplicity](#)
- std::vector< int > * [charge](#)
- std::vector< double > * [residual](#)
- std::vector< double > * [residual_corr](#)
- std::vector< std::vector< double > > * [dx](#)
- std::vector< std::vector< double > > * [qfrac](#)
- std::vector< std::vector< int > > * [time](#)
- std::vector< double > * [clust_pos](#)
- std::vector< double > * [clust_pos_err](#)
- std::vector< double > * [track_pos](#)
- std::vector< int > * [module](#)
- std::vector< std::vector< int > > * [pad_charge](#)
- std::vector< std::vector< int > > * [pad_time](#)
- std::vector< std::vector< int > > * [wf_width](#)
- std::vector< std::vector< int > > * [wf_fwhm](#)
- std::vector< std::vector< int > > * [pad_x](#)
- std::vector< std::vector< int > > * [pad_y](#)
- std::vector< std::vector< std::vector< int > > > * [pad_wf_q](#)
- TBranch * [b_ev](#)
- TBranch * [b_track](#)

- TBranch * [b_date](#)
- TBranch * [b_beforeMerging](#)
- TBranch * [b_dEdx](#)
- TBranch * [b_angle_yz](#)
- TBranch * [b_angle_xy](#)
- TBranch * [b_rob_clusters](#)
- TBranch * [b_quality](#)
- TBranch * [b_mom](#)
- TBranch * [b_sina](#)
- TBranch * [b_offset](#)
- TBranch * [b_max_mult](#)
- TBranch * [b_mean_mult](#)
- TBranch * [b_multiplicity](#)
- TBranch * [b_charge](#)
- TBranch * [b_residual](#)
- TBranch * [b_residual_corr](#)
- TBranch * [b_dx](#)
- TBranch * [b_qfrac](#)
- TBranch * [b_time](#)
- TBranch * [b_clust_pos](#)
- TBranch * [b_clust_pos_err](#)
- TBranch * [b_track_pos](#)
- TBranch * [b_module](#)
- TBranch * [b_pad_charge](#)
- TBranch * [b_pad_time](#)
- TBranch * [b_wf_width](#)
- TBranch * [b_wf_fwhm](#)
- TBranch * [b_pad_x](#)
- TBranch * [b_pad_y](#)
- TBranch * [b_pad_wf_q](#)

Additional Inherited Members

Protected Attributes inherited from [Uploader](#)

- std::string [m_SampleFile](#)
- int [m_NberOfEvent](#)
- TFile * [p_TFile](#)
- TTree * [p_TTree](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_Charge1D](#) * [p_Model_Charge1D](#)
- short int [m_PRF_exist](#)
- double [m_Norm](#)
- double [m_a2](#)
- double [m_a4](#)
- double [m_b2](#)
- double [m_b4](#)

8.39.1 Constructor & Destructor Documentation

8.39.1.1 Uploader_MockUp_V2()

```
Uploader_MockUp_V2::Uploader_MockUp_V2 (
    const std::string & SampleFile,
    Model_ReadOutGeometry * pModel_ReadOutGeometry,
    Model_Electronics * pModel_Electronics,
    Model_Charge1D * pModel_Charge1D)
```

Constructor

8.39.1.2 ~Uploader_MockUp_V2()

```
Uploader_MockUp_V2::~~Uploader_MockUp_V2 () [virtual]
```

8.39.2 Member Function Documentation

8.39.2.1 GiveMe_Event() [1/2]

```
Event * Uploader_MockUp_V2::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use) [virtual]
```

8.39.2.2 GiveMe_Event() [2/2]

```
Event * Uploader_MockUp_V2::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use,
    const int & CloseWF) [virtual]
```

Implements [Uploader](#).

8.39.2.3 Init()

```
void Uploader_MockUp_V2::Init ()
```

8.39.2.4 SetBeforeMerging()

```
void Uploader_MockUp_V2::SetBeforeMerging (
    const int & i_SetBeforeMerging)
```

8.39.2.5 Setwap_XY()

```
void Uploader_MockUp_V2::Setwap_XY (
    const int & i_Swap_XY)
```

8.39.3 Member Data Documentation

8.39.3.1 angle_xy

Double_t Uploader_MockUp_V2::angle_xy

8.39.3.2 angle_yz

Double_t Uploader_MockUp_V2::angle_yz

8.39.3.3 b_angle_xy

TBranch* Uploader_MockUp_V2::b_angle_xy

8.39.3.4 b_angle_yz

TBranch* Uploader_MockUp_V2::b_angle_yz

8.39.3.5 b_beforeMerging

TBranch* Uploader_MockUp_V2::b_beforeMerging

8.39.3.6 b_charge

TBranch* Uploader_MockUp_V2::b_charge

8.39.3.7 b_clust_pos

TBranch* Uploader_MockUp_V2::b_clust_pos

8.39.3.8 b_clust_pos_err

TBranch* Uploader_MockUp_V2::b_clust_pos_err

8.39.3.9 b_date

TBranch* Uploader_MockUp_V2::b_date

8.39.3.10 b_dEdx

TBranch* Uploader_MockUp_V2::b_dEdx

8.39.3.11 b_dx

TBranch* Uploader_MockUp_V2::b_dx

8.39.3.12 b_ev

TBranch* Uploader_MockUp_V2::b_ev

8.39.3.13 b_max_mult

TBranch* Uploader_MockUp_V2::b_max_mult

8.39.3.14 b_mean_mult

TBranch* Uploader_MockUp_V2::b_mean_mult

8.39.3.15 b_module

TBranch* Uploader_MockUp_V2::b_module

8.39.3.16 b_mom

TBranch* Uploader_MockUp_V2::b_mom

8.39.3.17 b_multiplicity

TBranch* Uploader_MockUp_V2::b_multiplicity

8.39.3.18 b_offset

TBranch* Uploader_MockUp_V2::b_offset

8.39.3.19 b_pad_charge

TBranch* Uploader_MockUp_V2::b_pad_charge

8.39.3.20 b_pad_time

TBranch* Uploader_MockUp_V2::b_pad_time

8.39.3.21 b_pad_wf_q

TBranch* Uploader_MockUp_V2::b_pad_wf_q

8.39.3.22 b_pad_x

TBranch* Uploader_MockUp_V2::b_pad_x

8.39.3.23 b_pad_y

TBranch* Uploader_MockUp_V2::b_pad_y

8.39.3.24 b_qfrac

TBranch* Uploader_MockUp_V2::b_qfrac

8.39.3.25 b_quality

TBranch* Uploader_MockUp_V2::b_quality

8.39.3.26 b_residual

TBranch* Uploader_MockUp_V2::b_residual

8.39.3.27 b_residual_corr

TBranch* Uploader_MockUp_V2::b_residual_corr

8.39.3.28 b_rob_clusters

TBranch* Uploader_MockUp_V2::b_rob_clusters

8.39.3.29 b_sina

TBranch* Uploader_MockUp_V2::b_sina

8.39.3.30 b_time

TBranch* Uploader_MockUp_V2::b_time

8.39.3.31 b_track

TBranch* Uploader_MockUp_V2::b_track

8.39.3.32 b_track_pos

TBranch* Uploader_MockUp_V2::b_track_pos

8.39.3.33 b_wf_fwhm

TBranch* Uploader_MockUp_V2::b_wf_fwhm

8.39.3.34 b_wf_width

TBranch* Uploader_MockUp_V2::b_wf_width

8.39.3.35 beforeMerging

Bool_t Uploader_MockUp_V2::beforeMerging

8.39.3.36 charge

std::vector<int>* Uploader_MockUp_V2::charge

8.39.3.37 clust_pos

std::vector<double>* Uploader_MockUp_V2::clust_pos

8.39.3.38 clust_pos_err

std::vector<double>* Uploader_MockUp_V2::clust_pos_err

8.39.3.39 date

ULong64_t Uploader_MockUp_V2::date

8.39.3.40 dEdx

Double_t Uploader_MockUp_V2::dEdx

8.39.3.41 dx

```
std::vector<std::vector<double> >* Uploader_MockUp_V2::dx
```

8.39.3.42 ev

```
Int_t Uploader_MockUp_V2::ev
```

8.39.3.43 fCurrent

```
Int_t Uploader_MockUp_V2::fCurrent
```

8.39.3.44 max_mult

```
Int_t Uploader_MockUp_V2::max_mult
```

8.39.3.45 mean_mult

```
Double_t Uploader_MockUp_V2::mean_mult
```

8.39.3.46 module

```
std::vector<int>* Uploader_MockUp_V2::module
```

8.39.3.47 mom

```
Double_t Uploader_MockUp_V2::mom
```

8.39.3.48 multiplicity

```
std::vector<int>* Uploader_MockUp_V2::multiplicity
```

8.39.3.49 offset

```
Double_t Uploader_MockUp_V2::offset
```

8.39.3.50 pad_charge

```
std::vector<std::vector<int> >* Uploader_MockUp_V2::pad_charge
```


8.39.3.51 pad_time

```
std::vector<std::vector<int> > * Uploader_MockUp_V2::pad_time
```

8.39.3.52 pad_wf_q

```
std::vector<std::vector<std::vector<int> > > * Uploader_MockUp_V2::pad_wf_q
```

8.39.3.53 pad_x

```
std::vector<std::vector<int> > * Uploader_MockUp_V2::pad_x
```

8.39.3.54 pad_y

```
std::vector<std::vector<int> > * Uploader_MockUp_V2::pad_y
```

8.39.3.55 qfrac

```
std::vector<std::vector<double> > * Uploader_MockUp_V2::qfrac
```

8.39.3.56 quality

```
Double_t Uploader_MockUp_V2::quality
```

8.39.3.57 residual

```
std::vector<double> * Uploader_MockUp_V2::residual
```

8.39.3.58 residual_corr

```
std::vector<double> * Uploader_MockUp_V2::residual_corr
```

8.39.3.59 rob_clusters

```
Int_t Uploader_MockUp_V2::rob_clusters
```

8.39.3.60 sina

```
Double_t Uploader_MockUp_V2::sina
```

8.39.3.61 time

```
std::vector<std::vector<int> >* Uploader_MockUp_V2::time
```

8.39.3.62 track

```
Int_t Uploader_MockUp_V2::track
```

8.39.3.63 track_pos

```
std::vector<double>* Uploader_MockUp_V2::track_pos
```

8.39.3.64 wf_fwhm

```
std::vector<std::vector<int> >* Uploader_MockUp_V2::wf_fwhm
```

8.39.3.65 wf_width

```
std::vector<std::vector<int> >* Uploader_MockUp_V2::wf_width
```

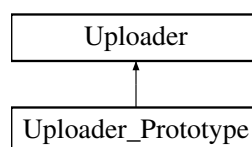
The documentation for this class was generated from the following files:

- [Uploader/inc/Uploader_MockUp_V2.h](#)
- [Uploader/src/Uploader_MockUp_V2.cxx](#)

8.40 Uploader_Prototype Class Reference

```
#include <Uploader_Prototype.h>
```

Inheritance diagram for Uploader_Prototype:

**Public Member Functions**

- [Uploader_Prototype](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader_Prototype](#) ()
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use, const int &CloseWF)
- virtual [Event](#) * [GiveMe_Event](#) (const int &iEvent, const int &ModuleNber_Input, const int &Data_to_Use)

Public Member Functions inherited from Uploader

- [Uploader](#) (const std::string &SampleFile, [Model_ReadOutGeometry](#) *pModel_ReadOutGeometry, [Model_Electronics](#) *pModel_Electronics, [Model_Charge1D](#) *pModel_Charge1D)
- virtual [~Uploader](#) ()
- std::string [Get_SampleFile](#) ()
- int [Get_NberOfEvent](#) ()
- int [Get_PRF_exist](#) ()
- double [Get_Norm](#) ()
- double [Get_a2](#) ()
- double [Get_a4](#) ()
- double [Get_b2](#) ()
- double [Get_b4](#) ()
- [Model_ReadOutGeometry](#) * [Get_Model_ReadOutGeometry](#) ()
- [Model_Electronics](#) * [Get_Model_Electronics](#) ()
- [Model_Charge1D](#) * [Get_Model_Charge1D](#) ()

Additional Inherited Members

Protected Attributes inherited from Uploader

- std::string [m_SampleFile](#)
- int [m_NberOfEvent](#)
- TFile * [p_TFile](#)
- TTree * [p_TTree](#)
- [Model_ReadOutGeometry](#) * [p_Model_ReadOutGeometry](#)
- [Model_Electronics](#) * [p_Model_Electronics](#)
- [Model_Charge1D](#) * [p_Model_Charge1D](#)
- short int [m_PRF_exist](#)
- double [m_Norm](#)
- double [m_a2](#)
- double [m_a4](#)
- double [m_b2](#)
- double [m_b4](#)

8.40.1 Constructor & Destructor Documentation

8.40.1.1 Uploader_Prototype()

```
Uploader_Prototype::Uploader_Prototype (
    const std::string & SampleFile,
    Model_ReadOutGeometry * pModel_ReadOutGeometry,
    Model_Electronics * pModel_Electronics,
    Model_Charge1D * pModel_Charge1D)
```

Constructor

8.40.1.2 ~Uploader_Prototype()

```
Uploader_Prototype::~Uploader_Prototype () [virtual]
```

8.40.2 Member Function Documentation

8.40.2.1 GiveMe_Event() [1/2]

```
Event * Uploader_Prototype::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use) [virtual]
```

8.40.2.2 GiveMe_Event() [2/2]

```
Event * Uploader_Prototype::GiveMe_Event (
    const int & iEvent,
    const int & ModuleNber_Input,
    const int & Data_to_Use,
    const int & CloseWF) [virtual]
```

Implements [Uploader](#).

The documentation for this class was generated from the following files:

- [Uploader/inc/Uploader_Prototype.h](#)
- [Uploader/src/Uploader_Prototype.cxx](#)

Chapter 9

File Documentation

9.1 Apps/Analysis.cxx File Reference

```
#include <iomanip>
#include <iostream>
#include "Monitoring.h"
```

Functions

- int [main](#) (int argc, char *argv[])

9.1.1 Function Documentation

9.1.1.1 main()

```
int main (
    int argc,
    char * argv[])
```

9.2 Apps/DrawOut.cxx File Reference

```
#include "DrawOuts.h"
```

Functions

- int [main](#) (int argc, char *argv[])

9.2.1 Function Documentation

9.2.1.1 main()

```
int main (
    int argc,
    char * argv[])
```

9.3 Fitters/inc/ClusterFitter.h File Reference

Declarations for cluster-level fitters used to fit pad-cluster charge distributions.

```
#include "Misc.h"
#include "Cluster.h"
#include "Event.h"
#include "Sample.h"
#include "TMath.h"
#include "TMatrixD.h"
#include "TMinuit.h"
#include "TVirtualFitter.h"
#include "TF1.h"
```

Classes

- class [ClusterFitter_Horizontal](#)
- class [ClusterFitter_Diagonal](#)

Functions

- void [ClusterFit_Horizontal](#) ([Sample](#) &aSample, const int &ModuleNber, TF1 *pTF1_ToBeUsed)
- void [ClusterFit_Horizontal_Event](#) ([Event](#) *pEvent, const int &ModuleNber, TF1 *pTF1_ToBeUsed, [ClusterFitter_Horizontal](#) &aClusterFitter_Horizontal)
- void [ClusterFit_Horizontal_Cluster](#) ([Cluster](#) *pCluster, const int &ModuleNber, TF1 *pTF1_ToBeUsed, [ClusterFitter_Horizontal](#) &aClusterFitter_Horizontal)
- void [ClusterFit_Diagonal](#) (const double &AngleRot, [Sample](#) &aSample, const int &ModuleNber, TF1 *pTF1_ToBeUsed)
- void [ClusterFit_Diagonal_Event](#) (const double &AngleRot, [Event](#) *pEvent, const int &ModuleNber, TF1 *pTF1_ToBeUsed, int &Kounter_Fit, int &Kounter_Failure, [ClusterFitter_Diagonal](#) &aClusterFitter_Diagonal)
- void [ClusterFit_Diagonal_Cluster](#) (const double &AngleRot, [Cluster](#) *pCluster, const int &ModuleNber, TF1 *pTF1_ToBeUsed, int &Kounter_Fit, int &Kounter_Failure, [ClusterFitter_Diagonal](#) &aClusterFitter_Diagonal)

9.3.1 Detailed Description

Declarations for cluster-level fitters used to fit pad-cluster charge distributions.

This header defines both horizontal and diagonal cluster fitter classes and related helper functions to run fits on Samples, Events and Clusters. Implementations live in [ClusterFitter.cxx](#).

The corresponding implementation uses ROOT's TVirtualFitter/TMinuit and registers file-local static bridge classes that forward Minuit callbacks to the instance methods (Chi2 evaluation). The source contains both the horizontal and diagonal fitter implementations and several helper functions to apply fitters to Samples, Events and individual Clusters.

9.3.2 Function Documentation

9.3.2.1 ClusterFit_Diagonal()

```
void ClusterFit_Diagonal (
    const double & AngleRot,
    Sample & aSample,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed)
```

9.3.2.2 ClusterFit_Diagonal_Cluster()

```
void ClusterFit_Diagonal_Cluster (
    const double & AngleRot,
    Cluster * pCluster,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    int & Kounter_Fit,
    int & Kounter_Failure,
    ClusterFitter_Diagonal & aClusterFitter_Diagonal)
```

9.3.2.3 ClusterFit_Diagonal_Event()

```
void ClusterFit_Diagonal_Event (
    const double & AngleRot,
    Event * pEvent,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    int & Kounter_Fit,
    int & Kounter_Failure,
    ClusterFitter_Diagonal & aClusterFitter_Diagonal)
```

9.3.2.4 ClusterFit_Horizontal()

```
void ClusterFit_Horizontal (
    Sample & aSample,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed)
```

9.3.2.5 ClusterFit_Horizontal_Cluster()

```
void ClusterFit_Horizontal_Cluster (
    Cluster * pCluster,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    ClusterFitter_Horizontal & aClusterFitter_Horizontal)
```

9.3.2.6 ClusterFit_Horizontal_Event()

```
void ClusterFit_Horizontal_Event (
    Event * pEvent,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    ClusterFitter_Horizontal & aClusterFitter_Horizontal)
```

9.4 ClusterFitter.h

[Go to the documentation of this file.](#)

```
00001
00017 #ifndef CLUSTER_FIT_H
00018 #define CLUSTER_FIT_H
00019
00020 #include "Misc.h"
00021
00022 #include "Cluster.h"
00023 #include "Event.h"
00024 #include "Sample.h"
00025
00026 #include "TMath.h"
00027 #include "TMatrixD.h"
00028 #include "TMinuit.h"
00029 #include "TVirtualFitter.h"
00030
00031 #include "TF1.h"
00032
00033 // HORIZONTAL FITTER
00034 // Fit Basic:   MIGRAD/MINOS
00035 //
00036 // Fit Rescues:
00037 //   1: MIGRAD->MINIMIZE/MIGRAD
00038 //   2: MIGRAD->SIMPLEX/MIGRAD
00039 //
00040 // Fit failure -> Failure procedure called
00041 //
00042 class ClusterFitter_Horizontal {
00043 public:
00044     ClusterFitter_Horizontal(const std::string &FitterName);
00045
00046     virtual ~ClusterFitter_Horizontal();
00047
00048 public:
00049     void Set_Cluster(Cluster *pCluster);
00050
00051     int DoMinimisation();
00052
00053     double Chi2(double par[]);
00054
00055 protected:
00056     std::string m_FitterName;
00057     Cluster *p_Cluster;
00058     TVirtualFitter *p_TVVirtualFitter;
00059 };
00060
00061 void ClusterFit_Horizontal(Sample &aSample, const int &ModuleNber,
00062                             TF1 *pTF1_ToBeUsed);
00063 void ClusterFit_Horizontal_Event(
00064     Event *pEvent, const int &ModuleNber, TF1 *pTF1_ToBeUsed,
00065     ClusterFitter_Horizontal &aClusterFitter_Horizontal);
00066 void ClusterFit_Horizontal_Cluster(
00067     Cluster *pCluster, const int &ModuleNber, TF1 *pTF1_ToBeUsed,
00068     ClusterFitter_Horizontal &aClusterFitter_Horizontal);
00069
00070 // DIAGONAL FITTER
00071 // Fit Basic:   MIGRAD/MINOS
00072 //
00073 // Fit Rescues:
00074 //   1: MIGRAD->MINIMIZE/MIGRAD
00075 //   2: MIGRAD->SIMPLEX/MIGRAD
00076 //
00077 // Fit failure -> Failure procedure called
00078 //
00079 class ClusterFitter_Diagonal {
00080 public:
```



```

00107   ClusterFitter_Diagonal(const std::string &FitterName);
00108
00112   virtual ~ClusterFitter_Diagonal();
00113
00114 public:
00119   void Set_Cluster(Cluster *pCluster);
00120
00125   int DoMinimisation();
00126
00132   double Chi2(double par[]);
00133
00134 protected:
00135   std::string m_FitterName;
00136   Cluster *p_Cluster;
00137   TVirtualFitter *p_TVVirtualFitter;
00138 };
00139
00140 //-----Cluster
00141 // Fits-----/
00142 // Cluster Fits
00143
00144 void ClusterFit_Diagonal(const double &AngleRot, Sample &aSample,
00145                          const int &ModuleNber, TF1 *pTF1_ToBeUsed);
00146 void ClusterFit_Diagonal_Event(const double &AngleRot, Event *pEvent,
00147                                const int &ModuleNber, TF1 *pTF1_ToBeUsed,
00148                                int &Kounter_Fit, int &Kounter_Failure,
00149                                ClusterFitter_Diagonal &aClusterFitter_Diagonal);
00150 void ClusterFit_Diagonal_Cluster(
00151     const double &AngleRot, Cluster *pCluster, const int &ModuleNber,
00152     TF1 *pTF1_ToBeUsed, int &Kounter_Fit, int &Kounter_Failure,
00153     ClusterFitter_Diagonal &aClusterFitter_Diagonal);
00154
00155 #endif

```

9.5 Fitters/inc/PRFParameters.h File Reference

Parameter container and evaluator for the [Pad](#) Response Function (PRF).

```
#include "Misc.h"
```

Classes

- class [PRFParameters](#)

9.5.1 Detailed Description

Parameter container and evaluator for the [Pad](#) Response Function (PRF).

Declares the [PRFParameters](#) class which stores polynomial coefficients used to evaluate a PRF model used by cluster/track fitting. Implementation is in [PRFParameters.cxx](#).

The implementation provides Eval, SetPRF and operator() so the object can be used directly as a functor with ROOT's TF1. It stores the polynomial coefficients and provides a small, stable interface for fitters and waveform utilities.

9.6 PRFParameters.h

[Go to the documentation of this file.](#)

```

00001 #
00015 #ifndef PRFParameters_H
00016 #define PRFParameters_H
00017
00018 #include "Misc.h"
00019
00021 class PRFParameters {
00022 public:
00026     PRFParameters();
00027
00031     virtual ~PRFParameters();
00032
00038     double Eval(const double &Xin);
00039
00043     double operator()(double *x, double *par);
00044
00053     void SetPRF(const double &Norm, const double &A2, const double &A4,
00054                const double &B2, const double &B4);
00055
00056 private:
00057     double m_Norm;
00058     double m_A2;
00059     double m_A4;
00060     double m_B2;
00061     double m_B4;
00062 };
00063
00064 #endif

```

9.7 Fitters/inc/TrackFitter.h File Reference

Declaration of the [TrackFitter](#) class used to perform track fits.

```

#include "Misc.h"
#include "Track.h"
#include "TMath.h"
#include "TMatrixD.h"
#include "TMinuit.h"
#include "TVirtualFitter.h"

```

Classes

- class [TrackFitter](#)

9.7.1 Detailed Description

Declaration of the [TrackFitter](#) class used to perform track fits.

This header defines the [TrackFitter](#) interface which wraps a minimiser (ROOT's TVirtualFitter/TMinuit) and exposes methods to set the track, run minimisation and compute the chi2. The implementation lives in [TrackFitter.cxx](#).

Implementation notes: the corresponding source file, [TrackFitter.cxx](#), contains the concrete interfacing code to ROOT's minimisers and the static bridge used by Minuit (a file-local helper class that forwards the minimiser callbacks to a [TrackFitter](#) instance). The Chi2 evaluation routine and Minuit callback registration are performed in the source implementation. Care must be taken not to change the global/static bridge semantics as Minuit requires a static callback wrapper.

9.8 TrackFitter.h

[Go to the documentation of this file.](#)

```

00001
00019
00020 #ifndef TrackFitter_H
00021 #define TrackFitter_H
00022
00023 #include "Misc.h"
00024
00025 #include "Track.h"
00026
00027 #include "TMath.h"
00028 #include "TMatrixD.h"
00029 #include "TMinuit.h"
00030 #include "TVirtualFitter.h"
00031
00032 //
00033 // Parameters of fit should be unconstrained
00034 //
00035 // Fit Basic:    MIGRAD/MINOS
00036 //
00037 // Fit Rescues:
00038 //   1: MIGRAD->MINIMIZE/MIGRAD
00039 //   2: MIGRAD->SIMPLEX/MIGRAD
00040 //
00041 // Fit failure -> abort
00042 //
00043 class TrackFitter {
00044 public:
00045     TrackFitter(const std::string &FitterName, const int &NberOfParameters = 2);
00051
00055     virtual ~TrackFitter();
00056
00057 public:
00059
00064     void Set_Track(Track *pTrack);
00065
00070     int DoMinimisation();
00071
00077     double Chi2(double par[]);
00078
00079 protected:
00081
00082     std::string m_FitterName;
00083
00084     int m_NberOfParameters;
00085
00086     Track *p_Track;
00087
00088     TVirtualFitter *p_TVirtualFitter;
00089 };
00090
00091 #endif

```

9.9 Fitters/inc/TrackRecon.h File Reference

Declarations for track reconstruction utilities and helpers.

```

#include "Misc.h"
#include "Sample.h"
#include "TrackFitter.h"

```

Functions

- void [TrackRecon](#) ([Sample](#) &aSample, const int &ModuleNber, const int &NberOfParameters=3)
Run track reconstruction over a sample.
- int [TrackRecon_Event](#) ([TrackFitter](#) &aTrackFitter, [Event](#) *pEvent, const int &ModuleNber, const int &NberOfParameters=3)
Run track reconstruction for a single event using a [TrackFitter](#).

9.9.1 Detailed Description

Declarations for track reconstruction utilities and helpers.

This header exposes the TrackRecon top-level functions that run reconstruction over a [Sample](#) or an [Event](#) using a [TrackFitter](#). Implementation is in [TrackRecon.cxx](#).

The implementation orchestrates fitting over Samples and Events and uses the [TrackFitter](#) API to run per-track minimisations. It contains the top-level control loops that increment fit/failure counters and report simple summaries after processing.

9.9.2 Function Documentation

9.9.2.1 TrackRecon()

```
void TrackRecon (
    Sample & aSample,
    const int & ModuleNber,
    const int & NberOfParameters = 3)
```

Run track reconstruction over a sample.

Parameters

<i>aSample</i>	reference to the input Sample
<i>ModuleNber</i>	module index
<i>NberOfParameters</i>	number of fit parameters (default: 3)

9.9.2.2 TrackRecon_Event()

```
int TrackRecon_Event (
    TrackFitter & aTrackFitter,
    Event * pEvent,
    const int & ModuleNber,
    const int & NberOfParameters = 3)
```

Run track reconstruction for a single event using a [TrackFitter](#).

Parameters

<i>aTrackFitter</i>	reference to an existing TrackFitter instance
<i>pEvent</i>	pointer to the Event to process
<i>ModuleNber</i>	module index
<i>NberOfParameters</i>	number of fit parameters (default: 3)

Returns

integer status (0 on success)

9.10 TrackRecon.h

[Go to the documentation of this file.](#)

```
00001 #
00015 #include "Misc.h"
00016
00017 #include "Sample.h"
00018
00019 #include "TrackFitter.h"
00020
00027 void TrackRecon(Sample &aSample, const int &ModuleNber,
00028                 const int &NberOfParameters = 3);
00029
00038 int TrackRecon_Event(TrackFitter &aTrackFitter, Event *pEvent,
00039                      const int &ModuleNber, const int &NberOfParameters = 3);
```

9.11 Fitters/src/ClusterFitter.cxx File Reference

```
#include "ClusterFitter.h"
#include "TFitter.h"
#include "Util.h"
```

Classes

- class [StaticClusterFitter_Horizontal](#)
- class [StaticClusterFitter_Diagonal](#)

Functions

- void [ClusterFit_Horizontal](#) (Sample &aSample, const int &ModuleNber, TF1 *pTF1_ToBeUsed)
- void [ClusterFit_Horizontal_Event](#) (Event *pEvent, const int &ModuleNber, TF1 *pTF1_ToBeUsed, [ClusterFitter_Horizontal](#) &aClusterFitter_Horizontal)
- void [ClusterFit_Horizontal_Cluster](#) (Cluster *pCluster, const int &ModuleNber, TF1 *pTF1_ToBeUsed, [ClusterFitter_Horizontal](#) &aClusterFitter_Horizontal)
- void [ClusterFitter_HorizontalFunction](#) (int &nDim, double *gout, double &result, double par[], int flg)
- void [ClusterFit_Diagonal](#) (const double &AngleRot, Sample &aSample, const int &ModuleNber, TF1 *pTF1_ToBeUsed)
- void [ClusterFit_Diagonal_Event](#) (const double &AngleRot, Event *pEvent, const int &ModuleNber, TF1 *pTF1_ToBeUsed, int &Kounter_Fit, int &Kounter_Failure, [ClusterFitter_Diagonal](#) &aClusterFitter_Diagonal)
- void [ClusterFit_Diagonal_Cluster](#) (const double &AngleRot, Cluster *pCluster, const int &ModuleNber, TF1 *pTF1_ToBeUsed, int &Kounter_Fit, int &Kounter_Failure, [ClusterFitter_Diagonal](#) &aClusterFitter_Diagonal)
- void [ClusterFitter_DiagonalFunction](#) (int &nDim, double *gout, double &result, double par[], int flg)

9.11.1 Function Documentation

9.11.1.1 ClusterFit_Diagonal()

```
void ClusterFit_Diagonal (
    const double & AngleRot,
    Sample & aSample,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed)
```

9.11.1.2 ClusterFit_Diagonal_Cluster()

```
void ClusterFit_Diagonal_Cluster (
    const double & AngleRot,
    Cluster * pCluster,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    int & Kounter_Fit,
    int & Kounter_Failure,
    ClusterFitter_Diagonal & aClusterFitter_Diagonal)
```

9.11.1.3 ClusterFit_Diagonal_Event()

```
void ClusterFit_Diagonal_Event (
    const double & AngleRot,
    Event * pEvent,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    int & Kounter_Fit,
    int & Kounter_Failure,
    ClusterFitter_Diagonal & aClusterFitter_Diagonal)
```

9.11.1.4 ClusterFit_Horizontal()

```
void ClusterFit_Horizontal (
    Sample & aSample,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed)
```

9.11.1.5 ClusterFit_Horizontal_Cluster()

```
void ClusterFit_Horizontal_Cluster (
    Cluster * pCluster,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    ClusterFitter_Horizontal & aClusterFitter_Horizontal)
```

9.11.1.6 ClusterFit_Horizontal_Event()

```
void ClusterFit_Horizontal_Event (
    Event * pEvent,
    const int & ModuleNber,
    TF1 * pTF1_ToBeUsed,
    ClusterFitter_Horizontal & aClusterFitter_Horizontal)
```

9.11.1.7 ClusterFitter_DiagonalFunction()

```
void ClusterFitter_DiagonalFunction (
    int & nDim,
    double * gout,
    double & result,
    double par[],
    int flg)
```

9.11.1.8 ClusterFitter_HorizontalFunction()

```
void ClusterFitter_HorizontalFunction (
    int & nDim,
    double * gout,
    double & result,
    double par[],
    int flg)
```

9.12 Fitters/src/PRFParameters.cxx File Reference

```
#include "PRFParameters.h"
```

9.13 Fitters/src/TrackFitter.cxx File Reference

```
#include "TrackFitter.h"
#include "TFitter.h"
```

Classes

- class [StaticTrackFitter](#)

Functions

- void [TrackFitterFunction](#) (int &nDim, double *gout, double &result, double par[], int flg)

9.13.1 Function Documentation

9.13.1.1 TrackFitterFunction()

```
void TrackFitterFunction (
    int & nDim,
    double * gout,
    double & result,
    double par[],
    int flg)
```

9.14 Fitters/src/TrackRecon.cxx File Reference

```
#include "TrackRecon.h"
#include "Cluster.h"
#include "Event.h"
#include "Track.h"
```

Functions

- void [TrackRecon](#) ([Sample](#) &aSample, const int &ModuleNber, const int &NberOfParameters)
Run track reconstruction over a sample.
- int [TrackRecon_Event](#) ([TrackFitter](#) &aTrackFitter, [Event](#) *pEvent, const int &ModuleNber, const int &NberOfParameters)
Run track reconstruction for a single event using a [TrackFitter](#).

9.14.1 Function Documentation

9.14.1.1 TrackRecon()

```
void TrackRecon (
    Sample & aSample,
    const int & ModuleNber,
    const int & NberOfParameters = 3)
```

Run track reconstruction over a sample.

Parameters

<i>aSample</i>	reference to the input Sample
<i>ModuleNber</i>	module index
<i>NberOfParameters</i>	number of fit parameters (default: 3)

9.14.1.2 TrackRecon_Event()

```
int TrackRecon_Event (
    TrackFitter & aTrackFitter,
    Event * pEvent,
    const int & ModuleNber,
    const int & NberOfParameters = 3)
```

Run track reconstruction for a single event using a [TrackFitter](#).

Parameters

<i>aTrackFitter</i>	reference to an existing TrackFitter instance
<i>pEvent</i>	pointer to the Event to process
<i>ModuleNber</i>	module index
<i>NberOfParameters</i>	number of fit parameters (default: 3)

Returns

integer status (0 on success)

9.15 ModelEvent/inc/AmplitudeError.h File Reference

Amplitude error model utilities.

```
#include "Misc.h"
#include "Pad.h"
```

Functions

- double [AmplitudeError](#) ([Pad](#) *pPad, [Pad](#) *pPad_Leading, [Pad](#) *pPad_NextLeading, [Pad](#) *pPad_NextNextLeading)

9.15.1 Detailed Description

Amplitude error model utilities.

Declares helpers to compute amplitude uncertainties for pads and clusters used during fitting and dE/dx estimation.

9.15.2 Function Documentation

9.15.2.1 AmplitudeError()

```
double AmplitudeError (
    Pad * pPad,
    Pad * pPad_Leading,
    Pad * pPad_NextLeading,
    Pad * pPad_NextNextLeading)
```

9.16 AmplitudeError.h

[Go to the documentation of this file.](#)

```
00001 #
00002 #ifndef AmplitudeError_H
00003 #define AmplitudeError_H
00004
00005 #include "Misc.h"
00006
00007 #include "Pad.h"
00008
00009 double AmplitudeError(Pad *pPad, Pad *pPad_Leading, Pad *pPad_NextLeading,
00010                      Pad *pPad_NextNextLeading);
00011
00012 #endif
```

9.17 ModelEvent/inc/Cluster.h File Reference

[Cluster](#) container representing a group of pads forming a detected charge.

```
#include "Misc.h"
#include "Pad.h"
#include "FitOutput.h"
#include "TF1.h"
#include "TMatrixD.h"
#include "TVirtualFitter.h"
```

Classes

- class [Cluster](#)

9.17.1 Detailed Description

[Cluster](#) container representing a group of pads forming a detected charge.

The [Cluster](#) class provides accessors and utilities used by fitting and reconstruction code.

9.18 Cluster.h

[Go to the documentation of this file.](#)

```

00001 #
00002 #ifndef Cluster_H
00003 #define Cluster_H
00004
00005 #include "Misc.h"
00006 #include "Pad.h"
00007
00008 #include "FitOutput.h"
00009
00010 #include "TF1.h"
00011 #include "TMatrixD.h"
00012 #include "TVirtualFitter.h"
00013
00014 class Cluster {
00015 public:
00016     Cluster(const int &EventNber, const int &EntryNber, const int &ModuleNber);
00017
00018     virtual ~Cluster();
00019
00020     //-----IDs-----//
00021     int Get_EventNber() const; // Get Event nber
00022     int Get_EntryNber() const; // Get Entry nber
00023     int Get_ModuleNber() const; // Get Module nber
00024
00025     //-----Prints-----//
00026     void WriteOut() const; // Big dump
00027
00028     //-----Cluster Validity-----//
00029     int IsValid() const; // Get validation status
00030     void Validate(); // Validate
00031     void Invalidate(); // Invalidate
00032
00033     //-----Clusters Data-----//
00034     double Get_Acluster() const; // Sum of Pads amplitude
00035     double Get_XWeight() const; // Averaged cluster position
00036     double Get_YWeight() const; // Averaged cluster position
00037
00038     //-----Pads-----//
00039     void Add_Pad(Pad *pPad); // Add Pad
00040     void DoClosure(); // Closure: Order pads, compute Leading pad stuff
00041
00042     int Get_NberOfPads() const; // Size of Pad set
00043     Pad *Get_Pad(const int &Index1D) const; // Get Pad
00044
00045     // Leading pad
00046     Pad *Get_LeadingPad() const; // Get Leading pad
00047     double Get_YLeading() const; // Get Leading pad Y position (m)
00048     double Get_TMaxLeading() const; // Get Leading pad Time at max (Time bin)
00049     double Get_AMaxLeading() const; // Get Leading pad Max amplitude (ADC)
00050
00051     Pad *Get_NextLeadingPad() const; // Get Next Leading pad, the hottest of the
00052                                     // nearest pads of the leading pad
00053     Pad *Get_NextNextLeadingPad() const; // Get NextNext Leading pad, the coldest
00054                                     // of the nearest pads of the leading pad
00055
00056     //-----Data Members-----//
00057 private:
00058     short int m_NberOfPads;
00059     std::vector<Pad *> V_Pad;
00060     Pad *Pad_Leading;
00061     Pad *Pad_NextLeading;

```

```

00076     Pad *Pad_NextNextLeading;
00077
00078     double m_Acluster;
00079     double m_XWeight;
00080     double m_YWeight;
00081
00082     int m_EventNber;
00083     int m_EntryNber;
00084     short int m_ModuleNber;
00085
00086     //-----Cluster Fit Stuff-----//
00087 private:
00088     double m_XTrack;
00089     double m_YTrack;
00090     double m_eXTrack;
00091     double m_eYTrack;
00092     bool m_StatusFit; // True: fit failed; False: Fit OK
00093
00094     double m_Chi2Min;
00095
00096     double m_XTrack_BeforeMinimisation;
00097     double m_YTrack_BeforeMinimisation;
00098
00099     short int m_isValid = 1;
00100
00101 public:
00102     void Set_XTrack(const double &XTrack);
00103     void Set_YTrack(const double &YTrack);
00104
00105     void Set_eXTrack(const double &eXTrack);
00106     void Set_eYTrack(const double &eYTrack);
00107
00108     int StatusFit(); // 0: OK; 1: Failed
00109
00110     double Get_XTrack() const;
00111     double Get_eXTrack() const;
00112     double Get_YTrack() const;
00113     double Get_eYTrack() const;
00114
00115     double Get_Chi2Min() const;
00116
00117     double Get_XTrack_BeforeMinimisation() const;
00118     double Get_YTrack_BeforeMinimisation() const;
00119
00120     //-----Horizontal-----//
00121 public:
00122     int StatusFit_Horizontal(); // 0: OK; 1: Failed
00123     void SetEval_Horizontal(TF1 *pTF1);
00124     double Eval_Horizontal(const double &Xin);
00125     int SetParameter_Horizontal(TVirtualFitter *pTVirtualFitter);
00126     void SetResults_Horizontal(TVirtualFitter *pTVirtualFitter);
00127     void SetResults_FailedFit_Horizontal(const int &Verbose);
00128     double Chi2_Horizontal(double par[]);
00129
00130     int FitRes_Horizontal_Get_NberOfTermsInChi2() const;
00131     Pad *FitRes_Horizontal_Get_Pad(const int &Index1D) const;
00132     double FitRes_Horizontal_Get_Residual(const int &Index1D) const;
00133     double FitRes_Horizontal_Get_Pull(const int &Index1D) const;
00134
00135 private:
00136     void Beg_Horizontal();
00137     void End_Horizontal();
00138     void SetParameters_Internal_Horizontal(double par[]);
00139
00140     TF1 *p_TF1_Horizontal;
00141     bool m_StatusFit_Horizontal; // True: fit failed; False: Fit OK
00142     short int m_NberOf_V_FitRes_Horizontal_Pad;
00143     std::vector<Pad> V_FitRes_Horizontal_Pad;
00144     std::vector<double> V_FitRes_Horizontal_Residual;
00145     std::vector<double> V_FitRes_Horizontal_Pull;
00146
00147     FitOutput *p_FitOutput_Horizontal;
00148
00149     //-----Diagonal-----//
00150 public:
00151     int StatusFit_Diagonal(); // 0: OK; 1: Failed
00152     void SetEval_Diagonal(TF1 *pTF1);
00153     double Eval_Diagonal(const double &Xin);
00154     int SetParameter_Diagonal(TVirtualFitter *pTVirtualFitter);
00155     void SetResults_Diagonal(TVirtualFitter *pTVirtualFitter);
00156     void SetResults_FailedFit_Diagonal(const int &Verbose);
00157     double Chi2_Diagonal(double par[]);
00158     ;
00159     double m_AngleRot;
00160
00161     int FitRes_Diagonal_Get_NberOfTermsInChi2() const;
00162     Pad *FitRes_Diagonal_Get_Pad(const int &Index1D) const;

```

```

00163     double FitRes_Diagonal_Get_Residual(const int &Index1D) const;
00164     double FitRes_Diagonal_Get_Pull(const int &Index1D) const;
00165
00166 private:
00167     double m_VTrack;
00168
00169     void Beg_Diagonal();
00170     void End_Diagonal();
00171     void SetParameters_Internal_Diagonal(double par[]);
00172
00173     TF1 *p_TF1_Diagonal;
00174     bool m_StatusFit_Diagonal; // True: fit failed; False: Fit OK
00175     short int m_NberOf_V_FitRes_Diagonal_Pad;
00176     std::vector<Pad *> V_FitRes_Diagonal_Pad;
00177     std::vector<double> V_FitRes_Diagonal_Residual;
00178     std::vector<double> V_FitRes_Diagonal_Pull;
00179
00180     FitOutput *p_FitOutput_Diagonal;
00181 };
00182
00183 #endif

```

9.19 ModelEvent/inc/Event.h File Reference

[Event](#) container holding modules, clusters and tracks.

```

#include "Misc.h"
#include "Cluster.h"
#include "Module.h"
#include "Pad.h"
#include "Track.h"
#include "Model_ChargeI.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"

```

Classes

- class [Event](#)

9.19.1 Detailed Description

[Event](#) container holding modules, clusters and tracks.

The [Event](#) class aggregates detector modules, clusters and track candidates for a single event. It also holds pointers to model objects (geometry, electronics, charge) used by simulation and reconstruction.

9.20 Event.h

[Go to the documentation of this file.](#)

```

00001 #
00009 #ifndef Event_H
00010 #define Event_H
00011
00012 #include "Misc.h"
00013
00014 #include "Cluster.h"
00015 #include "Module.h"
00016 #include "Pad.h"
00017 #include "Track.h"

```

```

00018
00019 #include "Model_ChargeI.h"
00020 #include "Model_Electronics.h"
00021 #include "Model_ReadOutGeometry.h"
00022
00024 class Event {
00025 public:
00027     Event(const int &EventNber, const int &EntryNber,
00028           Model_ReadOutGeometry *pModel_ReadOutGeometry,
00029           Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI);
00030     virtual ~Event();
00031
00032     //-----IDs-----//
00033     int Get_EventNber() const; // Get Event nber
00034     int Get_EntryNber() const; // Get Entry nber
00035
00036     //-----Print-----//
00037     void SmallDump() const; // Small dump
00038     void WriteOut() const; // Big dump
00039
00040     //-----Models-----//
00041     const Model_ReadOutGeometry *Get_Model_ReadOutGeometry();
00042     const Model_Electronics *Get_Model_Electronics();
00043     const Model_ChargeI *Get_Model_ChargeI();
00044
00045     //-----Event Validity-----//
00046     int IsValid() const; // Get validation status of the Event
00047     void Validate(); // Validate the Event
00048     void Invalidate(); // Invalidate the Event
00049
00050     //-----Module Addition-----//
00051     void Clear_Modules(); // Clear existing Module set
00052     void Add_Module(Module *pModule); // Add a Module
00053
00054     //-----Module Access-----//
00055     Module *Get_ThisModule(
00056         const int &ModuleNber); // Get Module by the Module Nber if exists
00057     const Module *Get_ThisModuleConst(const int &ModuleNber) const;
00058
00059     int Get_NberOfModule() const; // Size of Module set
00060     Module *Get_Module_InArray(const int &IndexID); // Get Module
00061
00062     //-----Module Validity-----//
00063     int Validity_ForThisModule(
00064         const int &ModuleNber) const; // Get validation status of the Modle
00065     void Validate_ThisModule(const int &ModuleNber); // Validate the Module
00066     void Invalidate_ThisModule(const int &ModuleNber); // Invalidate theModule
00067
00068     //-----Clusters Access-----//
00069     std::vector<Cluster *> GiveMe_Clusters_ForThisModule(const int &ModuleNber);
00070
00071     double GiveMe_CutSlopeXY_ForThisModule(const int &ModuleNber);
00072
00073     double GiveMe_CutSlopeXZ_ForThisModule(const int &ModuleNber);
00074     double GiveMe_CutInterCeptXZ_ForThisModule(const int &ModuleNber);
00075
00076     std::vector<double> GiveMe_CutSlopeXYZ_ForThisModule(const int &ModuleNber);
00077
00078     void Replace_Clusters_ForThisModule(
00079         std::vector<Cluster *> &VCluster,
00080         const int &ModuleNber); // Replace existing clusters set
00081
00082     Cluster *Get_Cluster_Copy(Cluster *pCluster); // Get copy of the input cluster
00083
00084     //-----Track Access-----//
00085     Track *GiveMe_AnUnfittedTrack_ForThisModule(
00086         const int &ModuleNber); // Ownership is passed to the user
00087     void Set_Track_ForThisModule(
00088         Track *pTrack,
00089         const int &ModuleNber); // Ownership is passed to the Module
00090     const Track *GiveMe_Track_ForThisModule(const int &ModuleNber);
00091
00092     //-----Data Members-----//
00093 private:
00094     short int m_IsValid = 1;
00095
00096     int m_EventNber;
00097     int m_EntryNber;
00098
00099     short int m_NberOfModules;
00100     std::vector<Module *> V_Module;
00101
00102     void Ini_Models(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00103                     Model_Electronics *pModel_Electronics,
00104                     Model_ChargeI *pModel_ChargeI);
00105
00106     Model_ReadOutGeometry *p_Model_ReadOutGeometry;

```

```

00107     Model_Electronics *p_Model_Electronics;
00108     Model_ChargeI *p_Model_ChargeI;
00109 };
00110
00111 #endif

```

9.21 ModelEvent/inc/FitOutput.h File Reference

Containers to hold fit results from cluster/track fitters.

```

#include "Misc.h"
#include "TCanvas.h"
#include "TMatrixD.h"
#include "TVirtualFitter.h"

```

Classes

- class [FitOutput](#)

9.21.1 Detailed Description

Containers to hold fit results from cluster/track fitters.

Declares [FitOutput](#) which stores parameter values, uncertainties and auxiliary quality flags produced by fitting routines.

9.22 FitOutput.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef FitOutput_H
00009 #define FitOutput_H
00010
00011 #include "Misc.h"
00012
00013 #include "TCanvas.h"
00014 #include "TMatrixD.h"
00015 #include "TVirtualFitter.h"
00016
00017 class FitOutput {
00018 public:
00019     FitOutput();
00020     virtual ~FitOutput();
00021
00022     FitOutput(const FitOutput &ToBeCopied);
00023     FitOutput &operator=(const FitOutput &ToBeCopied);
00024
00025 public:
00026     void Reset();
00027     void Set(const int &NberOfModelParameters);
00028
00029     void SetResults(TVirtualFitter *pTVirtualFitter);
00030     void SetResults(const std::vector<std::string> &V_PARname,
00031                    const std::vector<double> &V_PAR,
00032                    const std::vector<double> &V_ePAR);
00033
00034     void PrintFitOutput();
00035     void PrintFitOutputInCanvas(double Xstart, double Ystart, double Step);
00036
00037 public:

```

```

00042
00043     std::string m_NameOfTheModel;
00044
00045     int m_NberOfModelParameters;
00046
00047     int m_NberOfDataPoints;
00048
00049     double *p_par;
00050     std::string *p_parName;
00051     double *p_eparplus;
00052     double *p_eparminus;
00053     double *p_eparparab;
00054     double *p_CovMatrix;
00055     double m_MinnLL;
00056
00057     std::string m_Description;
00058 };
00059
00060 #endif

```

9.23 ModelEvent/inc/Module.h File Reference

[Module](#) container representing a detector module of pads and clusters.

```

#include "Misc.h"
#include "Cluster.h"
#include "Pad.h"
#include "Track.h"
#include "ROBoard.h"
#include "Model_ChargeI.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"

```

Classes

- class [Module](#)

9.23.1 Detailed Description

[Module](#) container representing a detector module of pads and clusters.

[Module](#) extends [ROBoard](#) and provides helpers to access and manipulate per-module collections used by the reconstruction pipeline.

9.24 Module.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef Module_H
00009 #define Module_H
00010
00011 #include "Misc.h"
00012
00013 #include "Cluster.h"
00014 #include "Pad.h"
00015 #include "Track.h"
00016
00017 #include "ROBoard.h"
00018

```

```

00019 #include "Model_ChargeI.h"
00020 #include "Model_Electronics.h"
00021 #include "Model_ReadOutGeometry.h"
00022
00024 class Module : public ROBoard {
00025 public:
00027     Module(const int &EventNber, const int &EntryNber, const int &ModuleNber,
00028           Model_ReadOutGeometry *pModel_ReadOutGeometry,
00029           Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI);
00030     virtual ~Module();
00031
00032     //-----IDs-----//
00033     int Get_EventNber() const; // Get Event nber
00034     int Get_EntryNber() const; // Get Entry nber
00035     int Get_ModuleNber() const; // Get Module nber
00036
00037     //-----Prints-----//
00038     void SmallDump() const; // Small dump
00039     void WriteOut() const; // Big dump
00040
00041     //-----Module Validity-----//
00042     int IsValid() const; // Get validation status of the Module
00043     void Validate(); // Validate the Module
00044     void Invalidate(); // Invalidate the Module
00045
00046     //-----Pad addition-----//
00047     virtual void Add_Pad(Pad *pPad); // Add a pad
00048
00049     //-----Clusters Addition-----//
00050     void Clear_Clusters(); // Clear existing clusters set
00051     void Add_Cluster(Cluster *pCluster); // Add a cluster
00052
00053     //-----Clusters Access-----//
00054     std::vector<Cluster *> GiveMe_Clusters_ForThisModule();
00055     int Get_NberOfCluster() const; // Size of Cluster set
00056     Cluster *Get_Cluster(const int &IndexID); // Get Cluster
00057
00058     void ReplaceClusters(
00059         std::vector<Cluster *> &V_Cluster); // Replace existing clusters set
00060
00061     Cluster *Get_Cluster_Copy(Cluster *pCluster); // Get copy of the input cluster
00062
00063     //-----Track-----//
00064     const Track *GiveMe_ModuleTrack();
00065     void Set_ModuleTrack(Track *pTrack); // Ownership is passed to the Module
00066     Track *GiveMe_AnUnfittedTrack(); // Ownership is passed to the user
00067
00068     //-----Data Members-----//
00069 private:
00070     short int m_IsValid = 1;
00071
00072     int m_EventNber;
00073     int m_EntryNber;
00074     short int m_ModuleNber;
00075
00076     short int m_NberOfClusters;
00077     std::vector<Cluster *> V_Cluster;
00078
00079     Track *p_TrackOfTheModule;
00080 };
00081
00082 #endif

```

9.25 ModelEvent/inc/Pad.h File Reference

[Pad](#) class representing a single readout pad and its waveform data.

```

#include "Misc.h"
#include "Model_ChargeI.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"

```

Classes

- class [Pad](#)

9.25.1 Detailed Description

[Pad](#) class representing a single readout pad and its waveform data.

Contains identifiers, waveform buffers and helpers used by clustering and fitting algorithms. Implementations live in [Pad.cxx](#).

9.26 Pad.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef Pad_H
00009 #define Pad_H
00010
00011 #include "Misc.h"
00012
00013 #include "Model_ChargeI.h"
00014 #include "Model_Electronics.h"
00015 #include "Model_ReadOutGeometry.h"
00016
00017 class Pad {
00018 public:
00019     Pad(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00020         Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI,
00021         std::string PadName, const int &EventNber, const int &EntryNber,
00022         const int &ModuleNber, const int &iX, const int &iY, const double &XL,
00023         const double &XH, const double &YL, const double &YH);
00024
00025     Pad(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00026         Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI,
00027         std::string PadName, const int &EventNber, const int &EntryNber,
00028         const int &ModuleNber, const int &iX, const int &iY);
00029
00030     virtual ~Pad();
00031
00032     //-----IDs-----//
00033     int Get_EventNber() const; // Get Event nber
00034     int Get_EntryNber() const; // Get Entry nber
00035     int Get_ModuleNber() const; // Get Module nber
00036     int Get_iX() const; // Get X index
00037     int Get_iY() const; // Get Y index
00038
00039     //-----Print-----//
00040     void WriteOut() const; // Big dump
00041
00042     //-----Pad Validity-----//
00043     int IsValid() const; // Get validation status
00044     void Validate(); // Validate
00045     void Invalidate(); // Invalidate
00046
00047     //-----Models-----//
00048     const Model_ReadOutGeometry *Get_Model_ReadOutGeometry() const;
00049     const Model_Electronics *Get_Model_Electronics() const;
00050     const Model_ChargeI *Get_Model_ChargeI() const;
00051
00052     //-----Pad Data-----//
00053     std::string Get_PadName() const; // Get Pad name
00054
00055     double Get_XPad() const; // Get X position of Pad center (m)
00056     double Get_YPad() const; // Get Y position of Pad center (m)
00057
00058     double Get_XL() const; // Get X position of Left Pad edge (m)
00059     double Get_XH() const; // Get X position of Right Pad edge (m)
00060     double Get_YL() const; // Get Y position of Bottom Pad edge (m)
00061     double Get_YH() const; // Get Y position of top Pad edge (m)
00062
00063     double Get_LX() const; // Get X Pad size (m)
00064     double Get_LY() const; // Get Y Pad size (m)
00065
00066     double Get_AMax() const; // Get max amplitude (ADC)
00067     double Get_TMax() const; // Get Time at max (Time bin)
00068
00069     void Set_AMax(const double &AMax); // Set max amplitude (ADC)
00070     void Set_TMax(const double &TMax); // Set Time at max (Time bin)
00071
00072     void
00073     Set_Data_2Use(const int &iOpt); // Data: switch for data type to use

```

```

00082                                     // iOpt = 0; Amax and Tmax from input ntuple
00083                                     //           = 1; Amax and Tmax from 1st max
00084                                     //of WF      = 2; Amax and Tmax from 1st clean max
00085                                     //of WF      = 3; Amax and Tmax from
00086                                     // fit of WF peak (Default)
00087
00088 //-----WFs-----//
00089 // Waveform stuff
00090 void Clear_ADC(); // Reset ADC set
00091 void Set_ADC(const int &iTimeb,
00092             const int &ADC); // Set ADC set
00093 void WF_DoClosure(); // Closure: compute max amplitude and time
00094
00095 std::vector<float> Get_vADC() const; // Get ADC as vector
00096
00097 // A and T max
00098 // A and T from last call to Set functions
00099 double Get_AMax_FromSet() const; // Get max amplitude (ADC)
00100 double Get_TMax_FromSet() const; // Get Time at max (Time bin)
00101
00102 // 1st maximum in WF
00103 double Get_AMax_WF() const; // Get max amplitude (ADC)
00104 double Get_TMax_WF() const; // Get Time at max (Time bin)
00105
00106 // Improved 1st maximum in WF
00107 double Get_AMax_WF_01() const; // Get max amplitude (ADC)
00108 double Get_TMax_WF_01() const; // Get Time at max (Time bin)
00109
00110 // Fit of peak
00111 double Get_AMax_FIT() const; // Get max amplitude (ADC)
00112 double Get_TMax_FIT() const; // Get Time at max (Time bin)
00113 int Get_FIT_Status() const; // 1: fit failed; 0: Fit OK
00114 double Get_FIT_AOP() const; //
00115 double Get_FIT_AOM() const; //
00116 double Get_FIT_X0() const; //
00117 double Get_FIT_Y0() const; //
00118 double Get_FIT_Xmin() const; //
00119 double Get_FIT_Xmax() const; //
00120
00121 // A and T from thruth
00122 double Get_AMax_True() const; // Get max amplitude (ADC)
00123 double Get_TMax_True() const; // Get Time at max (Time bin)
00124 void Set_AMax_True(const double &AMax); // Set max amplitude (ADC)
00125 void Set_TMax_True(const double &TMax); // Set Time at max (Time bin)
00126
00127 private:
00128 void Get_A_T_Max_WF(double &Amax, double &Tmax);
00129 // Get Amax and Tmax from WF in the time window [iTimeBin_min;iTimeBin_max]
00130 void Get_A_T_Max_WF_01(double &Amax, double &Tmax);
00131 // Get Amax and Tmax from WF in the time window [iTimeBin_min;iTimeBin_max]
00132 void Get_A_T_Max_FIT(double &Amax, double &Tmax);
00133 // Get Amax and Tmax from WF Fit in the time window
00134 // [iTimeBin_min;iTimeBin_max]
00135
00136 //-----Signal Simulation-----//
00137 public:
00138 // Set parameters of the simulation
00139 void SetSignalModel(const double &Time0, const double &XTrue,
00140                   const double &YTrue);
00141
00142 double Get_Time0() const;
00143 double Get_XTrue() const;
00144 double Get_YTrue() const;
00145
00146 double Get_Qpad(const double &Time); // charge
00147 double Get_APad(const double &Time); // amplitude
00148
00149 //-----Data Members-----//
00150 private:
00151 short int m_IsValid = 1;
00152
00153 void SetEdges(const double &XL, const double &XH, const double &YL,
00154             const double &YH);
00155
00156 void Ini_Models(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00157               Model_Electronics *pModel_Electronics,
00158               Model_ChargeI *pModel_ChargeI);
00159
00160 private:
00161 std::string m_PadName;
00162
00163 int m_EventNber;
00164 int m_EntryNber;
00165 short int m_ModuleNber;
00166 short int m_iX;
00167 short int m_iY;
00168

```

```

00169 // double m_XPad;
00170 // double m_YPad;
00171 // double m_LX;
00172 // double m_LY;
00173
00174 double m_XL;
00175 double m_XH;
00176 double m_YL;
00177 double m_YH;
00178
00179 double m_Time0;
00180 double m_XTrue;
00181 double m_YTrue;
00182
00183 double m_TimeConvoMin;
00184 double m_TimeConvoMax;
00185 int m_NberOfTimeConvoPoints;
00186 double m_TimeConvoStep;
00187
00188 double m_AMax;
00189 double m_TMax;
00190
00191 Model_ReadOutGeometry *p_Model_ReadOutGeometry;
00192 Model_Electronics *p_Model_Electronics;
00193 Model_ChargeI *p_Model_ChargeI;
00194
00195 std::vector<short int> v_ADC;
00196 std::vector<short int> v_iTimeb;
00197
00198 double m_AMax_FromSet;
00199 double m_TMax_FromSet;
00200
00201 double m_AMax_WF;
00202 double m_TMax_WF;
00203
00204 double m_AMax_WF_01;
00205 double m_TMax_WF_01;
00206
00207 double m_AMax_FIT;
00208 double m_TMax_FIT;
00209 bool m_FIT_Status; // True: fit failed; False: Fit OK
00210 double m_FIT_A0P;
00211 double m_FIT_A0M;
00212 double m_FIT_X0;
00213 double m_FIT_Y0;
00214 double m_FIT_Xmin;
00215 double m_FIT_Xmax;
00216
00217 double m_AMax_True;
00218 double m_TMax_True;
00219 };
00220
00221 #endif

```

9.27 ModelEvent/inc/ROBoard.h File Reference

Read-out board ([ROBoard](#)) abstraction and mapping helpers.

```

#include "Misc.h"
#include "Pad.h"
#include "Model_ChargeI.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"

```

Classes

- class [ROBoard](#)

Abstraction for a read-out board grouping pads and providing mapping.

Macros

- `#define ROBoard_H`

9.27.1 Detailed Description

Read-out board ([ROBoard](#)) abstraction and mapping helpers.

Models hardware-level groupings of pads and supports mapping between electronics channels and pad indices.

9.27.2 Macro Definition Documentation

9.27.2.1 ROBoard_H

```
#define ROBoard_H
```

9.28 ROBoard.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #ifndef ROBOARD_H
00009 #define ROBOARD_H
00010 #ifndef ROBoard_H
00011 #define ROBoard_H
00012
00013 #include "Misc.h"
00014
00015 #include "Pad.h"
00016
00017 #include "Model_ChargeI.h"
00018 #include "Model_Electronics.h"
00019 #include "Model_ReadOutGeometry.h"
00020
00022
00026 class ROBoard {
00027 public:
00029     ROBoard(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00030             Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI);
00031     virtual ~ROBoard();
00032
00033     // Models
00034     const Model_ReadOutGeometry *Get_Model_ReadOutGeometry();
00035     const Model_Electronics *Get_Model_Electronics();
00036     const Model_ChargeI *Get_Model_ChargeI();
00037
00038     // Pads addition
00039     virtual void Add_Pad(Pad *pPad); // Add a pad
00040
00041     // Pads Access
00042     int Get_NberOfPads() const; // Size of Pad set
00043     Pad *Get_Pad(const int &Index1D); // Get Pad
00044
00045     int Get_IsThisPadExisting(
00046         const int &iX,
00047         const int &iY) const; // return Pad (iX,iY) existence state
00048     Pad *Get_Pad(const int &iX, const int &iY); // return Pad (iX,iY) if it exists
00049
00050     Pad *Get_Pad(Pad *pPad); // return Pad (iX,iY) if it exists
00051
00052 protected:
00053     int GetLinearIndex(const int &iX, const int &iY) const;
00054
00055     void Ini_Models(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00056                    Model_Electronics *pModel_Electronics,
00057                    Model_ChargeI *pModel_ChargeI);
00058
00059 protected:
```

```

00060     short int  m_Nx;
00061     short int  m_Ny;
00062
00063     std::vector<int>  V_ExisFlag2D;
00064
00065     std::vector<Pad *>  V_Pad;
00066
00067     Model_ReadOutGeometry *p_Model_ReadOutGeometry;
00068     Model_Electronics *p_Model_Electronics;
00069     Model_ChargeI *p_Model_ChargeI;
00070 };
00071
00072 #endif

```

9.29 ModelEvent/inc/Sample.h File Reference

[Sample](#) container representing a dataset (collection of events).

```

#include "Misc.h"
#include "Model_ChargeI.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"
#include "Cluster.h"
#include "Event.h"
#include "Pad.h"
#include "FitOutput.h"
#include "SetOfTracks.h"
#include "Track.h"
#include "TF1.h"
#include "TMatrixD.h"
#include "TVirtualFitter.h"

```

Classes

- class [Sample](#)

9.29.1 Detailed Description

[Sample](#) container representing a dataset (collection of events).

The [Sample](#) class stores a set of [Event](#) objects and provides convenience methods for iteration, model association and PRF handling.

9.30 Sample.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef Sample_H
00009 #define Sample_H
00010
00011 #include "Misc.h"
00012
00013 #include "Model_ChargeI.h"
00014 #include "Model_Electronics.h"
00015 #include "Model_ReadOutGeometry.h"
00016

```

```

00017 #include "Cluster.h"
00018 #include "Event.h"
00019 #include "Pad.h"
00020
00021 #include "FitOutput.h"
00022
00023 #include "SetOfTracks.h"
00024 #include "Track.h"
00025
00026 #include "TFl.h"
00027 #include "TMatrixD.h"
00028 #include "TVirtualFitter.h"
00029
00031 class Sample {
00032 public:
00034     Sample();
00035     Sample(Model_ReadOutGeometry *pModel_ReadOutGeometry,
00036           Model_Electronics *pModel_Electronics, Model_ChargeI *pModel_ChargeI);
00037     virtual ~Sample();
00038
00039     //-----Prints-----//
00040     void SmallDump() const; // Small dump
00041     void WriteOut() const; // Big dump
00042
00043     //-----Models-----//
00044     // Set Models
00045     void Set_Model_ReadOutGeometry(Model_ReadOutGeometry *pModel_ReadOutGeometry);
00046     void Set_Model_Electronics(Model_Electronics *pModel_Electronics);
00047     void Set_Model_ChargeI(Model_ChargeI *pModel_ChargeI);
00048
00049     // Get Models
00050     Model_ReadOutGeometry *Get_Model_ReadOutGeometry();
00051     Model_Electronics *Get_Model_Electronics();
00052     Model_ChargeI *Get_Model_ChargeI();
00053
00054     //-----Event Addition-----//
00055     void Add_Event(Event *pEvent); // Add Event
00056
00057     //-----Event Access-----//
00058     int Get_NberOfEvents() const; // Size of Event set
00059     Event *Get_Event(int IndexID); // Get Event
00060
00061     //-----Track Access-----//
00062     SetOfTracks *Get_SetOfTracks_ForThisModule(
00063         const int &ModuleNber); // Ownership is passed to user
00064
00065     //-----PRF from input file-----//
00066     void SetFilePRF(const double &Norm, const double &a2, const double &a4,
00067                    const double &b2, const double &b4);
00068
00069     void GetFilePRF(int &FilePRF_Exist, double &Norm, double &a2, double &a4,
00070                    double &b2, double &b4);
00071
00072     //-----Data Members-----//
00073 private:
00074     // Copy constructor
00075     Sample(const Sample &obj) {}
00076
00077     // Copy assignment operator
00078     Sample &operator=(const Sample &tmp_obj) { return *this; }
00079
00080 private:
00081     Model_ReadOutGeometry *p_Model_ReadOutGeometry;
00082     Model_Electronics *p_Model_Electronics;
00083     Model_ChargeI *p_Model_ChargeI;
00084
00085     int m_NberOfEvents;
00086     std::vector<Event *> V_Event;
00087
00088     short int m_FilePRF_Exist;
00089     double m_FilePRF_Norm;
00090     double m_FilePRF_a2;
00091     double m_FilePRF_a4;
00092     double m_FilePRF_b2;
00093     double m_FilePRF_b4;
00094
00095     //-----RC and DD Fit Stuff-----//
00096 private:
00097     double m_RC;
00098     double m_eRC;
00099     double m_DD;
00100     double m_eDD;
00101     bool m_StatusFit; // True: fit failed; False: Fit OK
00102
00103     double m_Chi2Min;
00104
00105     double m_RC_BeforeMinimisation;

```

```

00106     double m_DD_BeforeMinimisation;
00107
00108 public:
00109     void Set_RC(const double &RC);
00110
00111     void Set_DD(const double &RC);
00112
00113     int StatusFit(); // 0: OK; 1: Failed
00114
00115     double Get_RC() const;
00116     double Get_eRC() const;
00117
00118     double Get_DD() const;
00119     double Get_eDD() const;
00120
00121     double Get_Chi2Min() const;
00122
00123     double Get_RC_BeforeMinimisation() const;
00124     double Get_DD_BeforeMinimisation() const;
00125 };
00126
00127 #endif

```

9.31 ModelEvent/inc/SetOfTracks.h File Reference

Container for collections of [Track](#) objects.

```

#include "Misc.h"
#include "Track.h"
#include "TH1F.h"

```

Classes

- class [SetOfTracks](#)

9.31.1 Detailed Description

Container for collections of [Track](#) objects.

Provides storage and plotting helpers for sets of tracks used in reconstruction and analysis.

9.32 SetOfTracks.h

[Go to the documentation of this file.](#)

```

00001 #
00002 #ifndef SetOfTracks_H
00003 #define SetOfTracks_H
00004
00005 #include "Misc.h"
00006 #include "Track.h"
00007 #include "TH1F.h"
00008
00009 class SetOfTracks {
00010 public:
00011     SetOfTracks();
00012     virtual ~SetOfTracks();
00013
00014     //-----Track Addition-----//
00015     void Add_Track(const Track *pTrack);
00016
00017     //-----Track Access-----//

```

```

00026 int Get_NberOfTrack() const;
00027 const Track *Get_Track(int Index1D) const;
00028
00029 //-----Prints-----//
00030 void DumpRec() const;
00031
00032 //-----Plots-----//
00033 int Get_MinimalNberOfEntries();
00034 void Set_MinimalNberOfEntries(const int &MinimalNberOfEntries);
00035
00036 TH1F *GiveMe_pTH1F_YTrackInTracks(const std::string &TAG, const int &iYBeam);
00037 TH1F *GiveMe_pTH1F_YTrackInTracks(const std::string &TAG, const int &Nbins,
00038                                   const double &Ymin, const double &Ymax);
00039 TH1F *GiveMe_pTH1F_YTrackInTracks(const std::string &TAG, const int &iYBeam,
00040                                   const int &iCol);
00041 TH1F *GiveMe_pTH1F_YTrackInTracks(const std::string &TAG, const int &Nbins,
00042                                   const double &Ymin, const double &Ymax,
00043                                   const int &iCol);
00044
00045 //
00046 TH1F *GiveMe_pTH1F_YFitCol(const std::string &TAG, const int &iYBeam);
00047 TH1F *GiveMe_pTH1F_YFitCol(const std::string &TAG, const int &Nbins,
00048                             const double &Ymin, const double &Ymax);
00049 TH1F *GiveMe_pTH1F_YFitCol(const std::string &TAG, const int &iYBeam,
00050                             const int &iCol);
00051 TH1F *GiveMe_pTH1F_YFitCol(const std::string &TAG, const int &Nbins,
00052                             const double &Ymin, const double &Ymax,
00053                             const int &iCol);
00054 //
00055 TH1F *GiveMe_pTH1F_YTrackYPadInTracks(const std::string &TAG,
00056                                       const int &iCol);
00057 TH1F *GiveMe_pTH1F_YTrackYPadInTracks(const std::string &TAG, const int &iCol,
00058                                       const int &Nbins, const double &Xmin,
00059                                       const double &Xmax);
00060 TH1F *GiveMe_pTH1F_YTrackYPadLeadingInTracks(const std::string &TAG,
00061                                              const int &iCol);
00062 TH1F *GiveMe_pTH1F_YTrackYPadLeadingInTracks(const std::string &TAG,
00063                                              const int &iCol,
00064                                              const int &Nbins,
00065                                              const double &Xmin,
00066                                              const double &Xmax);
00067 //
00068 TH1F *GiveMe_pTH1F_TrackDeltaT(const std::string &TAG, const int &iCol);
00069 //
00070 TH1F *GiveMe_pTH1F_Ch2MinPerNODF(const std::string &TAGFinal,
00071                                   const double &Xmax);
00072 TH1F *GiveMe_pTH1F_Ch2Min(const std::string &TAGFinal, const double &Xmax);
00073 TH1F *GiveMe_pTH1F_Residual(const std::string &TAGFinal, double &Mean,
00074                             double &eMean, double &Sigma, double &eSigma);
00075 TH1F *GiveMe_pTH1F_Residual(const std::string &TAGFinal, const int &iX,
00076                             double &Mean, double &eMean, double &Sigma,
00077                             double &eSigma);
00078
00079 TH1F *GiveMe_pTH1F_Residual(const std::string &TAGFinal, const int &iX,
00080                             double YL, double YH, double YL_Rescaled,
00081                             double YH_Rescaled, double &Mean, double &eMean,
00082                             double &Sigma, double &eSigma);
00083
00084 TH1F *GiveMe_pTH1F_Pull(const std::string &TAGFinal);
00085 TH1F *GiveMe_pTH1F_Pull(const std::string &TAGFinal, double &Mean,
00086                         double &eMean, double &Sigma, double &eSigma);
00087 TH1F *GiveMe_pTH1F_Pull(const std::string &TAGFinal, double &Mean,
00088                         double &eMean, double &Sigma, double &eSigma,
00089                         const double &XminH, const double &XmaxH);
00090 TH1F *GiveMe_pTH1F_Pull(const std::string &TAGFinal, const int &iX,
00091                         double &Mean, double &eMean, double &Sigma,
00092                         double &eSigma);
00093 TH1F *GiveMe_pTH1F_Pull(const std::string &TAGFinal, const int &iX,
00094                         double &Mean, double &eMean, double &Sigma,
00095                         double &eSigma, const double &XminH,
00096                         const double &XmaxH);
00097
00098 private:
00099     int m_MinimalNberOfEntries;
00100
00101     int m_NberOfTracks;
00102     std::vector<const Track *> V_Track;
00103 };
00104
00105 #endif

```


9.33 ModelEvent/inc/TimeError.h File Reference

Time error model utilities.

```
#include "Misc.h"
#include "Pad.h"
```

Functions

- double [TimeError](#) (const double &DeltaT_in)
- double [TimeError](#) ([Pad](#) *pPad, [Pad](#) *pPad_Leading, [Pad](#) *pPad_NextLeading, [Pad](#) *pPad_NextNextLeading)

9.33.1 Detailed Description

Time error model utilities.

Declares helpers to compute temporal uncertainties used during signal processing and fitting.

9.33.2 Function Documentation

9.33.2.1 TimeError() [1/2]

```
double TimeError (
    const double & DeltaT_in)
```

9.33.2.2 TimeError() [2/2]

```
double TimeError (
    Pad * pPad,
    Pad * pPad_Leading,
    Pad * pPad_NextLeading,
    Pad * pPad_NextNextLeading)
```

9.34 TimeError.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #ifndef TimeError_H
00009 #define TimeError_H
00010
00011 #include "Misc.h"
00012
00013 #include "Pad.h"
00014
00015 double TimeError(const double &DeltaT_in);
00016
00017 double TimeError(Pad *pPad, Pad *pPad_Leading, Pad *pPad_NextLeading,
00018                 Pad *pPad_NextNextLeading);
00019
00020 #endif
```

9.35 ModelEvent/inc/Track.h File Reference

[Track](#) class representing a reconstructed particle trajectory.

```
#include "Cluster.h"
#include "Misc.h"
#include "FitOutput.h"
```

Classes

- class [Track](#)

9.35.1 Detailed Description

[Track](#) class representing a reconstructed particle trajectory.

The [Track](#) class stores fit parameters, associated clusters and provides utilities for fitting and evaluating the reconstructed trajectory.

9.36 Track.h

[Go to the documentation of this file.](#)

```
00001 #
00002 #ifndef Track_H
00003 #define Track_H
00004
00005 #include "Cluster.h"
00006 #include "Misc.h"
00007 #include "FitOutput.h"
00008
00009 // Track equation : Y = Sum_(i=0,Npar-1) par_i * X^i
00010
00011 class Track {
00012 public:
00013     Track(const int &EventNber, const int &EntryNber, const int &ModuleNber);
00014     virtual ~Track();
00015
00016     // IDs
00017     int Get_EventNber() const;
00018     int Get_EntryNber() const;
00019     int Get_ModuleNber() const;
00020
00021     //-----Track Data-----//
00022     void SetNberOfParameters(const int &NberOfParam);
00023     int GetNberOfParameters() const;
00024
00025     std::string Get_ParameterName(const int &iPar) const;
00026     double Get_ParameterValue(const int &iPar) const;
00027     double Get_ParameterError(const int &iPar) const;
00028
00029     double Get_ParameterValue_BeforeMinimisation(const int &iPar) const;
00030
00031     //-----Cluster Addition-----//
00032     void Add_Cluster(Cluster *pCluster);
00033
00034     //-----Cluster Access-----//
00035     int Get_NberOfCluster() const;
00036     const Cluster *Get_Cluster(int Index1D) const;
00037     double Get_Residual(int Index1D) const;
00038     double Get_Pull(int Index1D) const;
00039
00040     void DoClosure();
00041     void DumpRec() const;
```

```

00058
00059 //-----According to Fit Y position for given
00060 // X-----//
00061 double Y_Position(const double &X) const;
00062
00063 //-----Data Members-----//
00064 private:
00065     int m_EventNber;
00066     int m_EntryNber;
00067     short int m_ModuleNber;
00068
00069     int m_NberOfParam;
00070
00071     std::vector<double> m_Parameter;
00072     std::vector<double> m_eParameter;
00073     std::vector<std::string> m_ParameterName;
00074
00075     std::vector<double> m_Parameter_BeforeMinimisation;
00076
00077 public:
00078
00079     int m_NberOfClusters;
00080     std::vector<Cluster *> V_Cluster;
00081     std::vector<double> V_Residual;
00082     std::vector<double> V_Pull;
00083
00084 //-----Track Fit Stuff-----//
00085 private:
00086     double m_Chi2Min;
00087     TMatrixD m_covmatrix;
00088
00089 public:
00090     double Get_Chi2Min() const;
00091     int SetParameter(TVirtualFitter *pTVirtualFitter);
00092     void SetResults(TVirtualFitter *pTVirtualFitter);
00093     double Chi2(double par[]);
00094     void SetParameters_Internal(double par[]);
00095     TMatrixD Get_CovMatrix() const;
00096
00097 private:
00098     FitOutput *p_FitOutput;
00099 };
00100
00101 #endif

```

9.37 ModelEvent/src/AmplitudeError.cxx File Reference

```
#include "AmplitudeError.h"
```

Functions

- double [AmplitudeError_Leading](#) ()
- double [AmplitudeError_NextLeading](#) ()
- double [AmplitudeError_NextNextLeading](#) ()
- double [AmplitudeError](#) (Pad *pPad, Pad *pPad_Leading, Pad *pPad_NextLeading, Pad *pPad_NextNextLeading)

9.37.1 Function Documentation

9.37.1.1 AmplitudeError()

```

double AmplitudeError (
    Pad * pPad,
    Pad * pPad_Leading,
    Pad * pPad_NextLeading,
    Pad * pPad_NextNextLeading)

```

9.37.1.2 AmplitudeError_Leading()

```
double AmplitudeError_Leading ()
```

9.37.1.3 AmplitudeError_NextLeading()

```
double AmplitudeError_NextLeading ()
```

9.37.1.4 AmplitudeError_NextNextLeading()

```
double AmplitudeError_NextNextLeading ()
```

9.38 ModelEvent/src/Cluster.cxx File Reference

```
#include "Cluster.h"  
#include "AmplitudeError.h"  
#include "TimeError.h"  
#include "Util.h"
```

9.39 ModelEvent/src/Event.cxx File Reference

```
#include "Event.h"  
#include "TGraph.h"
```

9.40 ModelEvent/src/FitOutput.cxx File Reference

```
#include "FitOutput.h"  
#include "TLatex.h"  
#include "TMatrixD.h"
```

9.41 ModelEvent/src/Module.cxx File Reference

```
#include "Module.h"
```

9.42 ModelEvent/src/Pad.cxx File Reference

```
#include "Pad.h"  
#include "ParabolaFunction.h"  
#include "ParabolaFunctionNG.h"  
#include "TF1.h"  
#include "TH1F.h"
```

9.43 ModelEvent/src/ROBoard.cxx File Reference

```
#include "ROBoard.h"
```

9.44 ModelEvent/src/Sample.cxx File Reference

```
#include "Sample.h"  
#include "AmplitudeError.h"  
#include "TimeError.h"
```

9.45 ModelEvent/src/SetOfTracks.cxx File Reference

```
#include "SetOfTracks.h"  
#include "GaussFunction.h"  
#include "TAxis.h"  
#include "TCanvas.h"  
#include "TF1.h"  
#include "TGraph.h"  
#include "TH1F.h"  
#include "TLegend.h"  
#include "TLine.h"  
#include "TMultiGraph.h"  
#include "TPaveStats.h"  
#include "TProfile.h"  
#include "TStyle.h"
```

9.46 ModelEvent/src/TimeError.cxx File Reference

```
#include "TimeError.h"
```

Functions

- double [TimeError_Leading](#) ()
- double [TimeError_NextLeading](#) ()
- double [TimeError_NextNextLeading](#) ()
- double [TimeError_BASE](#) (const double &DeltaT_in)
- double [TimeError](#) (Pad *pPad, Pad *pPad_Leading, Pad *pPad_NextLeading, Pad *pPad_NextNextLeading)
- double [TimeError](#) (const double &DeltaT_in)

9.46.1 Function Documentation

9.46.1.1 TimeError() [1/2]

```
double TimeError (  
    const double & DeltaT_in)
```

9.46.1.2 TimeError() [2/2]

```
double TimeError (  
    Pad * pPad,  
    Pad * pPad_Leading,  
    Pad * pPad_NextLeading,  
    Pad * pPad_NextNextLeading)
```

9.46.1.3 TimeError_BASE()

```
double TimeError_BASE (  
    const double & DeltaT_in)
```

9.46.1.4 TimeError_Leading()

```
double TimeError_Leading ()
```

9.46.1.5 TimeError_NextLeading()

```
double TimeError_NextLeading ()
```

9.46.1.6 TimeError_NextNextLeading()

```
double TimeError_NextNextLeading ()
```

9.47 ModelEvent/src/Track.cxx File Reference

```
#include "Track.h"
#include "TAxis.h"
#include "TCanvas.h"
#include "TF1.h"
#include "TFile.h"
#include "TGraph.h"
#include "TGraphErrors.h"
#include "TH1F.h"
#include "TH2F.h"
#include "TLegend.h"
#include "TLine.h"
#include "TMultiGraph.h"
#include "TPaveStats.h"
#include "TProfile.h"
#include "TStyle.h"
```

9.48 ModelSignal/inc/Model_Charge0D.h File Reference

0D charge model declaration (inherits from [Model_ChargeI](#)).

```
#include "Misc.h"
#include "Model_ChargeI.h"
```

Classes

- class [Model_Charge0D](#)

9.48.1 Detailed Description

0D charge model declaration (inherits from [Model_ChargeI](#)).

Declares [Model_Charge0D](#) which estimates integrated charge produced by an ionising particle in a pad or collection region. Implementation is in [Model_Charge0D.cxx](#).

The 0D model returns integrated pad charges and can be used for quick analytic studies or as a baseline reference in tests. It provides configuration for ion contributions and normalization used by fitter utilities.

9.49 Model_Charge0D.h

[Go to the documentation of this file.](#)

```

00001 #
00015 #ifndef Model_Charge0D_H
00016 #define Model_Charge0D_H
00017
00018 #include "Misc.h"
00019 #include "Model_ChargeI.h"
00020
00022 class Model_Charge0D : public Model_ChargeI {
00023 public:
00025     Model_Charge0D();
00026     virtual ~Model_Charge0D();
00027
00028     // Get charge spreading parameters
00029     double Get_Qprim() const;
00030
00031     // Set charge spreading parameters
00032     void Set_Qprim(const double &Qprim);
00033
00034     // Get Charge
00035     double Get_Qpad(const double &Time, const double &Time0, const double &XTrue,
00036                    const double &YTrue, const double &XL, const double &XH,
00037                    const double &YL, const double &YH) const;
00038
00039     // Big Dump
00040     void WriteOut() const;
00041
00042     // Ion Effect: Set charge spreading parameters
00043     void Set_Ion(const int &DoIons, const double &Tion, const double &RTrue,
00044                const double &RFactor);
00045
00046 protected:
00047     void SetSecondaries();
00048
00049     double m_Qprim;
00050
00051     int m_DoIons;
00052     double m_Tion;
00053     double m_RTrue;
00054     double m_RFactor;
00055 };
00056
00057 #endif

```

9.50 ModelSignal/inc/Model_Charge1D.h File Reference

1D charge model declaration (inherits from [Model_ChargeI](#)).

```

#include "Misc.h"
#include "Model_ChargeI.h"

```

Classes

- class [Model_Charge1D](#)

9.50.1 Detailed Description

1D charge model declaration (inherits from [Model_ChargeI](#)).

Declares [Model_Charge1D](#) which models charge spreading along a single axis (e.g. time/drift). Concrete [Get_Qpad](#) and related helpers are provided in [Model_Charge1D.cxx](#).

The implementation computes pad-integrated charge for longitudinal spreading-dominated scenarios and exposes helpers to configure lambda and normalization used in simulations and fits.

9.51 Model_Charge1D.h

[Go to the documentation of this file.](#)

```

00001 #
00014 #ifndef Model_Charge1D_H
00015 #define Model_Charge1D_H
00016
00017 #include "Misc.h"
00018 #include "Model_ChargeI.h"
00019
00021 class Model_Charge1D : public Model_ChargeI {
00022 public:
00024     Model_Charge1D();
00025     virtual ~Model_Charge1D();
00026
00027     // Get charge spreading parameters
00028     double Get_Lambda() const;
00029
00030     // Set charge spreading parameters
00031     void Set_Lambda(const double &Lambda);
00032
00033     // Get Charge
00034     double Get_Qpad(const double &Time, const double &Time0, const double &XTrue,
00035                     const double &YTrue, const double &XL, const double &XH,
00036                     const double &YL, const double &YH) const;
00037
00038     // Big Dump
00039     void WriteOut() const;
00040
00041 protected:
00042     void SetSecondaries();
00043
00044     double m_Lambda;
00045 };
00046
00047 #endif

```

9.52 ModelSignal/inc/Model_ChargeI.h File Reference

Abstract base class for charge models.

```
#include "Misc.h"
```

Classes

- class [Model_ChargeI](#)

9.52.1 Detailed Description

Abstract base class for charge models.

Defines the interface used by concrete charge model implementations (0D, 1D, etc.). Provides common parameter accessors and utility helpers.

Implementations (Model_Charge0D/1D) provide concrete Get_Qpad and SetSecondaries logic; this base class implements shared helpers used by concrete models, such as width-from-drift calculations and normalization helpers.

9.53 Model_ChargeI.h

[Go to the documentation of this file.](#)

```

00001 #
00014 #ifndef Model_ChargeI_H
00015 #define Model_ChargeI_H
00016
00017 #include "Misc.h"
00018
00020 class Model_ChargeI {
00021 public:
00023     Model_ChargeI();
00024     virtual ~Model_ChargeI();
00025
00026     // Get charge spreading parameters
00027     double Get_RC() const;
00028     double Get_Width() const;
00029     double Get_Gain() const;
00030
00031     // Set charge spreading parameters
00032     void Set_RC(const double &RC);
00033     void Set_Width(const double &Width);
00034     void Set_Gain(const double &Gain);
00035
00036     // Get width from Drift Distance
00037     void Set_WidthFromDriftDistance(const double &DriftDistance_cm);
00038
00039     // Get Charge
00040     virtual double Get_Qpad(const double &Time, const double &Time0,
00041                             const double &XTrue, const double &YTrue,
00042                             const double &XL, const double &XH, const double &YL,
00043                             const double &YH) const = 0;
00044
00045     // Big Dump
00046     virtual void WriteOut() const = 0;
00047
00048 protected:
00049     void WidthFromDriftDistance(const double &DriftDistance_cm);
00050     virtual void SetSecondaries() = 0;
00051
00052     double m_RC;
00053     double m_Width;
00054     double m_Gain;
00055
00056     double m_2RCinv;
00057     double m_Width2;
00058     double m_NormQPad;
00059 };
00060
00061 #endif

```

9.54 ModelSignal/inc/Model_Electronics.h File Reference

Electronics response model declaration.

```
#include "Misc.h"
```

Classes

- class [Model_Electronics](#)

9.54.1 Detailed Description

Electronics response model declaration.

Declares [Model_Electronics](#) which provides methods to configure impulse response parameters and evaluate the electronics time-shape and derivative. Implementation is in [Model_Electronics.cxx](#).

The implementation models the readout shaping and provides both the base impulse response and its derivative. These helpers are used by waveform simulation and fitting code and should match the digitiser settings used by the experiment.

9.55 Model_Electronics.h

[Go to the documentation of this file.](#)

```

00001 #
00015 #ifndef Model_Electronics_H
00016 #define Model_Electronics_H
00017
00018 #include "Misc.h"
00019
00021 class Model_Electronics {
00022 public:
00024     Model_Electronics();
00025     virtual ~Model_Electronics();
00026
00027     // Get electronics parameters
00028     double Get_QValue() const;
00029     double Get_ws() const;
00030     double Get_Amplitude() const;
00031
00032     // Set electronics parameters
00033     void Set_TimeShape(const double &QValue, const double &ws);
00034     void Set_Amplitude(const double &Amplitude);
00035
00036     // Impulse response
00037     double Response_Base(const double &Time) const;
00038
00039     // Derivative of Impulse response
00040     double Derive_Response_Base(const double &Time) const;
00041
00042     // Big Dump
00043     void WriteOut() const;
00044
00045 private:
00046 private:
00047     void SetSecondaries();
00048     void GetExtremum();
00049
00050     double m_QValue;
00051     double m_ws;
00052     double m_Amplitude;
00053
00054     double m_Qfactor1;
00055     double m_Qfactor2;
00056     double m_Prefactor;
00057
00058     double m_AcurMax;
00059     double m_TcurMax;
00060 };
00061
00062 #endif

```

9.56 ModelSignal/inc/Model_ReadOutGeometry.h File Reference

Readout geometry model declaration.

```
#include "Misc.h"
```

Classes

- class [Model_ReadOutGeometry](#)

9.56.1 Detailed Description

Readout geometry model declaration.

Declares [Model_ReadOutGeometry](#) which describes pad layout, sizes and indexing. Provides utilities to query pad centre coordinates and edges.

The implementation contains utility functions to query pad centres and edges and supports swapping/squaring the geometry for different board layouts. Geometry parameters are used by simulation and reconstruction modules.

9.57 Model_ReadOutGeometry.h

[Go to the documentation of this file.](#)

```

00001 #
00014 #ifndef Model_ReadOutGeometry_H
00015 #define Model_ReadOutGeometry_H
00016
00017 #include "Misc.h"
00018
00020 class Model_ReadOutGeometry {
00021 public:
00023     Model_ReadOutGeometry();
00024     virtual ~Model_ReadOutGeometry();
00025
00026     // Get Pad board data
00027     double Get_LX() const; // Get X Pad size (m)
00028     double Get_LY() const; // Get Y Pad size (m)
00029
00030     double Get_Xpad_min() const; // Get Lower left corner X position (m)
00031     double Get_Ypad_min() const; // Get Lower left corner Y position (m)
00032
00033     int Get_Nx() const; // Get Nber of pads along X
00034     int Get_Ny() const; // Get Nber of pads along Y
00035
00036     // Swap Geometry
00037     void SwapGeometry(); // Swap Nx/Ny and Lx/Ly
00038
00039     // Square Geometry
00040     void SquareGeometry(); // Set Nx=Ny to the highest of the originals
00041
00042     // Set Pad board data
00043     void Set_LX(const double &LX); // Set X Pad size (m)
00044     void Set_LY(const double &LY); // Set Y Pad size (m)
00045     void
00046     Set_Xpad_min(const double &Xpad_min); // Set Lower left corner X position (m)
00047     void
00048     Set_Ypad_min(const double &Ypad_min); // Set Lower left corner Y position (m)
00049
00050     void Set_Nx(const int &Nx); // Set Nber of pads along X
00051     void Set_Ny(const int &Ny); // Set Nber of pads along Y
00052
00053     // Pad Parameters
00054     double Get_XcPad(const int &iX, const int &iY,
00055                     const int &ModuleNber)
00056         const; // Get Pad(iX,iY) X position (m) of the center
00057     double Get_YcPad(const int &iX, const int &iY,
00058                     const int &ModuleNber)
00059         const; // Get Pad(iX,iY) Y position (m) of the center
00060
00061     double Get_XLPad(const int &iX, const int &iY,
00062                     const int &ModuleNber)
00063         const; // Get Pad(iX,iY) X position (m) of the Left edge
00064     double Get_YLPad(const int &iX, const int &iY,
00065                     const int &ModuleNber)
00066         const; // Get Pad(iX,iY) Y position (m) of the Bottom edge
00067
00068     double Get_XHPad(const int &iX, const int &iY,
00069                     const int &ModuleNber)
00070         const; // Get Pad(iX,iY) X position (m) of the Right edge
00071     double Get_YHPad(const int &iX, const int &iY,
00072                     const int &ModuleNber)
00073         const; // Get Pad(iX,iY) Y position (m) of the Top edge
00074
00075     void GetPadEdges(const int &iX, const int &iY, const int &ModuleNber,
00076                     double &XL, double &XH, double &YL,
00077                     double &YH) const; // Get Pad(iX,iY) X sides position (m)
00078
00079     // Big Dump
00080     void WriteOut() const;
00081
00082 private:
00083 private:
00084     double m_LX;
00085     double m_LY;
00086     double m_Xpad_min;
00087     double m_Ypad_min;
00088     double m_Nx;
00089     double m_Ny;
00090 };
00091
00092 #endif

```

9.58 ModelSignal/src/Model_Charge0D.cxx File Reference

```
#include "Model_Charge0D.h"
```

9.59 ModelSignal/src/Model_Charge1D.cxx File Reference

```
#include "Model_Charge1D.h"
```

9.60 ModelSignal/src/Model_ChargeI.cxx File Reference

```
#include "Model_ChargeI.h"
```

9.61 ModelSignal/src/Model_Electronics.cxx File Reference

```
#include "Model_Electronics.h"
```

9.62 ModelSignal/src/Model_ReadOutGeometry.cxx File Reference

```
#include "Model_ReadOutGeometry.h"
```

9.63 Reconstruction/inc/CombinedFit.h File Reference

Combined fitting utilities declaration.

```
#include <Fit/BinData.h>
#include <Fit/Chi2FCN.h>
#include <Fit/Fitter.h>
#include <HFitInterface.h>
#include <Math/WrappedMultiTF1.h>
#include <TCanvas.h>
#include <TH1.h>
#include <TStyle.h>
```

Functions

- void [combinedFit](#) (std::vector< TGraphErrors * > &v_tge, std::vector< TF1 * > &v_tf1)

9.63.1 Detailed Description

Combined fitting utilities declaration.

Declares the combinedFit helper used to fit multiple TGraphErrors/TF1 series together (e.g., high-level fits like Bethe-Bloch curve fits).

Implementation coordinates multiple TF1 instances and ROOT fit helpers to perform simultaneous fits across different data series (for example, fitting Bethe-Bloch parameters across particle species). It uses ROOT's fitting framework including WrappedMultiTF1 and the ROOT::Fit::Fitter interface and exposes a single helper function `combinedFit` which takes vectors of TGraphErrors and TF1 pointers and runs a global chi2 fit.

9.63.2 Function Documentation

9.63.2.1 combinedFit()

```
void combinedFit (
    std::vector< TGraphErrors * > & v_tge,
    std::vector< TF1 * > & v_tf1)
```

9.64 CombinedFit.h

[Go to the documentation of this file.](#)

```
00001 #
00016 #ifndef COMBINEDFIT_H
00017 #define COMBINEDFIT_H
00018
00019 #include <Fit/BinData.h>
00020 #include <Fit/Chi2FCN.h>
00021 #include <Fit/Fitter.h>
00022 #include <HFitInterface.h>
00023 #include <Math/WrappedMultiTF1.h>
00024 #include <TCanvas.h>
00025 #include <TH1.h>
00026 #include <TStyle.h>
00027
00028 void combinedFit(std::vector<TGraphErrors *> &v_tge, std::vector<TF1 *> &v_tf1);
00029
00030 #endif // COMBINEDFIT_H
```

9.65 Reconstruction/inc/Control.h File Reference

High-level orchestration function declaration.

```
#include "Misc.h"
#include "GiveMe_Uploader.h"
#include "Uploader.h"
```

Functions

- void `Control` (const std::string &OutDir, std::string const &Tag, std::string const &Comment, std::string const &EventFile, std::string const &SelectionSet, `Uploader` *pUploader, int const &NbrOfMod, int const &Data_↵ to_Use, int const &PT, int const &TB, const std::string &particle)

9.65.1 Detailed Description

High-level orchestration function declaration.

Declares the `Control` function used by top-level applications to set up runs and invoke reconstruction/analysis steps.

9.65.2 Function Documentation

9.65.2.1 Control()

```
void Control (
    const std::string & OutDir,
    std::string const & Tag,
    std::string const & Comment,
    std::string const & EventFile,
    std::string const & SelectionSet,
    Uploader * pUploader,
    int const & NbrOfMod,
    int const & Data_to_Use,
    int const & PT,
    int const & TB,
    const std::string & particle)
```

9.66 Control.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #ifndef CONTROL_H
00009 #define CONTROL_H
00010
00011 #include "Misc.h"
00012
00013 #include "GiveMe_Uploader.h"
00014 #include "Uploader.h"
00015
00016 void Control(const std::string &OutDir, std::string const &Tag,
00017             std::string const &Comment, std::string const &EventFile,
00018             std::string const &SelectionSet, Uploader *pUploader,
00019             int const &NbrOfMod, int const &Data_to_Use, int const &PT,
00020             int const &TB, const std::string &particle);
00021
00022 #endif // CONTROL_H
```

9.67 Reconstruction/inc/dEdx.h File Reference

```
#include "Misc.h"
#include "LUTs.h"
#include "Variables.h"
#include <TBranch.h>
#include <TFile.h>
#include <TH1F.h>
#include <TObject.h>
#include <TROOT.h>
#include <TTree.h>
#include "Uploader.h"
```

Classes

- class [Reconstruction::RecoPad](#)
- class [Reconstruction::RecoCluster](#)
- class [Reconstruction::RecoModule](#)
- class [Reconstruction::RecoEvent](#)
- class [Reconstruction::dEdx](#)

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

9.68 dEdx.h

[Go to the documentation of this file.](#)

```

00001 #
00016 #ifndef DEDX_H
00017 #define DEDX_H
00018
00019 #include "Misc.h"
00020
00021 #include "LUTs.h"
00022 #include "Variables.h"
00023
00024 #include <TBranch.h>
00025 #include <TFile.h>
00026 #include <TH1F.h>
00027 #include <TObject.h>
00028 #include <TROOT.h>
00029 #include <TTree.h>
00030
00031 #include "Uploader.h"
00032
00033 namespace Reconstruction {
00034
00035 class RecoPad : public TObject {
00036 public:
00037     virtual ~RecoPad();
00038
00039     bool leading = false;
00040     int ix = 0;
00041     int iy = 0;
00042     float xPad = 0; // in cm
00043     float yPad = 0; // in cm
00044     float ADCmax = 0;
00045     float ADCmax_base = 0;
00046     float charge = 0;
00047     float dEdxXP = 0;
00048     float RC = 0;
00049     float gain = 0;
00050     float GainCorrection = 0;
00051     float phi = 0;
00052     float d = 0;
00053     float dd = 0;
00054     float length = 0;
00055     int TMax = 0;
00056     int T0 = 0;
00057     float driftDistance = 0;
00058     float ratioDrift = 0;
00059     float ratioFile = 0;
00060     float ratio = 0;
00061     float dy = 0; // distance to the track in y
00062
00063     ClassDef(RecoPad, 1);
00064 };
00065
00066 class RecoCluster : public TObject {
00067 public:
00068     virtual ~RecoCluster();
00069
00070     std::vector<RecoPad *> v_pads;
00071     float length = 0;

```



```

00072 float charge = 0;
00073 float ADCmax_base = 0;
00074 float ALead_base = 0;
00075 float ALead_GCorr = 0;
00076 int TLead = 0;
00077 float dEdxWF = 0;
00078 int NPads = 0;
00079 float ratioCorr = 0;
00080 float yCluster = 0;
00081 float yWeight = 0;
00082 float LUTrhoLead = 0;
00083
00084 ClassDef(RecoCluster, 1);
00085 };
00086
00087 class RecoModule : public TObject {
00088 public:
00089     virtual ~RecoModule();
00090
00091     std::vector<RecoCluster *> v_clusters;
00092     bool selected = false;
00093     int ID = 0;
00094     int position = 0;
00095     float dEdxXP = 0;
00096     float dEdxWF = 0;
00097     float dEdxXPnoTrunc = 0;
00098     float dEdxWFnoTrunc = 0;
00099     int NCrossedPads = 0;
00100     int NClusters = 0;
00101     int NPads = 0;
00102     float lengthXP = 0;
00103     float lengthWF = 0;
00104     float phi = 0;
00105     float avg_pad_mult = 0;
00106     TF1 *Track = new TF1("pTrackFit", "[0]*x+[1]+[2]*x*x", 0, 2000);
00107
00108     ClassDef(RecoModule, 1);
00109 };
00110
00111 class RecoEvent : public TObject {
00112 public:
00113     RecoEvent();
00114     virtual ~RecoEvent();
00115     void Clear();
00116
00117     std::vector<RecoModule *> v_modules;
00118     std::vector<int> v_modules_position;
00119     bool selected = false;
00120     int eventNbr = 0;
00121     float dEdxXP = 0;
00122     float dEdxWF = 0;
00123     float dEdxGP1 = 0;
00124     float dEdxGP2 = 0;
00125     float dEdxGP3 = 0;
00126     float dEdxGP4 = 0;
00127     float dEdxGP5 = 0;
00128     float dEdxXPnoTrunc = 0;
00129     float dEdxWFnoTrunc = 0;
00130     int NCrossedPads = 0;
00131     int NPads = 0;
00132     int NClusters = 0;
00133     float lengthXP = 0;
00134     float lengthWF = 0;
00135     int numberOfModules = 0;
00136     float avg_pad_mult = 0;
00137
00138     // Giga Pad variables
00139     TH1F *GWF = nullptr;
00140     TH1F *GWFtruncatedGP1 = nullptr;
00141     int peakingTime = 0; // in ns
00142     int timeBinSize = 0; // in ns
00143
00144     ClassDef(RecoEvent, 1);
00145 };
00146
00147 class dEdx {
00148 public:
00149     dEdx();
00150     virtual ~dEdx();
00151     void Reconstruction();
00152     float ComputedEdxWF(std::vector<float> v_dEdxWF, const int &NClusters,
00153                         const float &alpha);
00154     float ComputedEdxXP(const std::vector<float> &v_dEdx,
00155                         const std::vector<float> &v_dE,
00156                         const std::vector<float> &v_dx, const int &nCrossedPads,
00157                         const float &alpha);
00158

```

```

00159 // GP1: sum waveforms of bottom 70% clusters
00160 float ComputedEdxGP1(const std::vector<TH1F> &vClusWF,
00161                     const std::vector<float> &v_dEdx,
00162                     const std::vector<float> &v_Aclus,
00163                     const std::vector<float> &v_Lclus, const int &nClusters,
00164                     const float &alpha);
00165
00166 // GP2: Remove from total GWF the ETF of the top 30% clusters
00167 // GP3: Remove from total GWF the ETF of the top 30% clusters computed as
00168 // Alead*ratio(y_barycenter)
00169 // GP4: Remove from total GWF the ETF of the top 30% clusters computed with
00170 // LUT GP5: Remove from total GWF the ETF of the top 30% crossed pads computed
00171 // with LUT
00172 float ComputedEdxGP(const TH1F *GWF, const std::vector<TH1F> &vWF,
00173                     const std::vector<float> &v_dEdx,
00174                     const std::vector<float> &v_Amax,
00175                     const float &eventLength,
00176                     const std::vector<float> &v_Length, const int &nElements,
00177                     const float &alpha);
00178
00179 TH1F *GetGigaWaveform(const std::vector<TH1F> &vClusWF);
00180 TH1F *GetTruncatedGigaWaveformGP1(const std::vector<TH1F> &vClusWF,
00181                                    const std::vector<float> &v_dEdx,
00182                                    const int &nClusters);
00183
00184 void DiscardedModule();
00185
00186 private:
00187 // Output file variables
00188 TFile *fpFile_dEdx;
00189 TTree *fpTree_dEdx;
00190
00191 // Setup variables
00192 static constexpr float AVG_GAIN =
00193     1947.72; // average gain of the 32 mounted ERAMs
00194 static constexpr float PHIMAX = 42.10; // std::atan(10.19/11.28)*180/M_PI;
00195 static constexpr float falpha = 0.7;
00196 static constexpr float fnParamsTrack = 3;
00197 static constexpr float fminLength = 0.002;
00198 static constexpr float XPADLENGTH = 11.28; // mm
00199 static constexpr float YPADLENGTH = 10.19; // mm
00200
00201 // Input classes
00202 Event *pEvent;
00203 Module *pModule;
00204 const Track *pTrack;
00205 Cluster *pCluster;
00206 Pad *pPad;
00207
00208 // Reconstruction classes
00209 Reconstruction::RecoEvent *p_recoevent;
00210 Reconstruction::RecoModule *p_recomodule;
00211 Reconstruction::RecoCluster *p_recocluster;
00212 Reconstruction::RecoPad *p_recopad;
00213
00214 // ERAM mapping
00215 Reconstruction::ERAMMaps *pERAMMaps;
00216 std::vector<int> fERAMs_id;
00217 std::vector<int> fERAMs_pos;
00218
00219 // Diagonal variables
00220 bool diag;
00221 float costheta;
00222 std::vector<int> v_theta;
00223
00224 // WF correction variables
00225 TF1 *pcorrFunctionWF;
00226 float fAref;
00227
00228 // Fitting variables
00229 TF1 *ptf1PRF;
00230 int fcounterFit;
00231 int fcounterFail;
00232
00233 // Analysis variables //
00234 // Iterators
00235 int NEvents;
00236 int iEvent;
00237 float fmodID;
00238 int NMod;
00239 int iMod;
00240 int NClusters;
00241 int iC;
00242 int NPads;
00243 int iP;
00244 // Modules
00245 std::vector<float> v_mod_dx;

```

```

00246     std::vector<float> v_mod_dE;
00247     std::vector<float> v_mod_dEdxXP;
00248     std::vector<float> v_mod_dEdxWF;
00249     // Events
00250     std::vector<float> v_evt_dx;
00251     std::vector<float> v_evt_dE;
00252     std::vector<float> v_evt_dEdxXP;
00253     std::vector<float> v_evt_dEdxWF;
00254     // Waveforms
00255     std::vector<float> waveform_cluster;
00256     std::vector<float> waveform_pad;
00257     // histograms
00258     TH1F *ph1f_WF;
00259     TH1F *ph1f_XP;
00260     TH1F *ph1f_GP1;
00261     TH1F *ph1f_GP2;
00262     TH1F *ph1f_GP3;
00263     TH1F *ph1f_GP4;
00264     TH1F *ph1f_GP5;
00265 };
00266 } // namespace Reconstruction
00267
00268 #endif

```

9.69 Reconstruction/inc/Displays.h File Reference

High-level display utilities and plotting helpers.

```

#include "Misc.h"
#include "Event.h"
#include "Module.h"
#include "Pad.h"
#include "Sample.h"
#include "TH1F.h"
#include "TH2D.h"

```

Functions

- void [DrawOut_EventDisplay](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &OUTDIR, const std::string &TAG)
Output an event display for a given event.
- void [DrawOut_EventDisplay](#) ([Module](#) *pModule, const std::string &OUTDIR, const std::string &TAG, const std::string &type, const double ¶bola, const double &slope, const double &intercept)
Output an event display for a module.
- TH2D * [GiveMe_EvtDisplay](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &TAG)
Get an event display TH2D for an event.
- TH2D * [GiveMe_EvtDisplay](#) ([Module](#) *pModule, const std::string &TAG)
Get an event display TH2D for a module.
- TH2D * [GiveMe_TimeDisplay](#) ([Module](#) *pModule, const std::string &TAG)
- void [DrawOut_WaveFormDisplay](#) ([Pad](#) *pPad, const std::string &OUTDIR, const std::string &TAG)
- TH1F * [GiveMe_WaveFormDisplay](#) ([Pad](#) *pPad, const std::string &TAG)
- void [DrawOut_ClusterWFDisplay](#) ([Cluster](#) *pCluster, const std::string &OUTDIR, const std::string &TAG)
- void [DrawOut_ClusterWFDisplay](#) ([Cluster](#) *pCluster, const std::string &OUTDIR, const std::string &TAG, const int &Option, const int &PT, const int &TB)
- void [DrawOut_GWF](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &OUTDIR, const std::string &TAG, const int &PT, const int &TB, const float &phi_rad)
- void [NewClusterDisplay](#) ([Event](#) *pEvent, const std::string &OUTDIR, const std::string &TAG, const int &PT, const int &TB)
- void [NewClusterDisplayMinimal](#) ([Event](#) *pEvent, const std::string &OUTDIR, const std::string &TAG)

9.69.1 Detailed Description

High-level display utilities and plotting helpers.

Declares functions and helpers used by the GUI and plotting components of the reconstruction pipeline (event displays, waveform displays, cluster visualisations, etc.).

The implementation in [Displays.cxx](#) contains high-level presentation code that constructs ROOT-based canvases, histograms and graphical summaries. This is primarily display code that depends on ROOT and should remain separate from core reconstruction algorithms.

9.69.2 Function Documentation

9.69.2.1 DrawOut_ClusterWFDisplay() [1/2]

```
void DrawOut_ClusterWFDisplay (
    Cluster * pCluster,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.69.2.2 DrawOut_ClusterWFDisplay() [2/2]

```
void DrawOut_ClusterWFDisplay (
    Cluster * pCluster,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & Option,
    const int & PT,
    const int & TB)
```

9.69.2.3 DrawOut_EventDisplay() [1/2]

```
void DrawOut_EventDisplay (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & OUTDIR,
    const std::string & TAG)
```

Output an event display for a given event.

Parameters

<i>pEvent</i>	pointer to the Event
<i>ModuleNber</i>	module index
<i>OUTDIR</i>	output directory path
<i>TAG</i>	tagging string used in output filenames

9.69.2.4 DrawOut_EventDisplay() [2/2]

```
void DrawOut_EventDisplay (
    Module * pModule,
    const std::string & OUTDIR,
    const std::string & TAG,
    const std::string & type,
    const double & parabola,
    const double & slope,
    const double & intercept)
```

Output an event display for a module.

9.69.2.5 DrawOut_GWF()

```
void DrawOut_GWF (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & PT,
    const int & TB,
    const float & phi_rad)
```

9.69.2.6 DrawOut_WaveFormDisplay()

```
void DrawOut_WaveFormDisplay (
    Pad * pPad,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.69.2.7 GiveMe_EvtDisplay() [1/2]

```
TH2D * GiveMe_EvtDisplay (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & TAG)
```

Get an event display TH2D for an event.

9.69.2.8 GiveMe_EvtDisplay() [2/2]

```
TH2D * GiveMe_EvtDisplay (
    Module * pModule,
    const std::string & TAG)
```

Get an event display TH2D for a module.

9.69.2.9 GiveMe_TimeDisplay()

```
TH2D * GiveMe_TimeDisplay (
    Module * pModule,
    const std::string & TAG)
```

9.69.2.10 GiveMe_WaveFormDisplay()

```
TH1F * GiveMe_WaveFormDisplay (
    Pad * pPad,
    const std::string & TAG)
```

9.69.2.11 NewClusterDisplay()

```
void NewClusterDisplay (
    Event * pEvent,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & PT,
    const int & TB)
```

9.69.2.12 NewClusterDisplayMinimal()

```
void NewClusterDisplayMinimal (
    Event * pEvent,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.70 Displays.h

[Go to the documentation of this file.](#)

```
00001
00015
00016 #ifndef DISPLAYS_H
00017 #define DISPLAYS_H
00018 #include "Misc.h"
00019
00020 #include "Event.h"
00021 #include "Module.h"
00022 #include "Pad.h"
00023 #include "Sample.h"
00024
00025 #include "TH1F.h"
00026 #include "TH2D.h"
00027
00028 // Event display
00036 void DrawOut_EventDisplay(Event *pEvent, const int &ModuleNber,
00037                             const std::string &OUTDIR, const std::string &TAG);
00038
00042 void DrawOut_EventDisplay(Module *pModule, const std::string &OUTDIR,
00043                             const std::string &TAG, const std::string &type,
00044                             const double &parabola, const double &slope,
00045                             const double &intercept);
00046
00048 TH2D *GiveMe_EvtDisplay(Event *pEvent, const int &ModuleNber,
00049                             const std::string &TAG);
00051 TH2D *GiveMe_EvtDisplay(Module *pModule, const std::string &TAG);
00052
00053 // Get Timing Event display
```

```

00054 TH2D *GiveMe_TimeDisplay(Module *pModule, const std::string &TAG);
00055
00056 //-----WF pad Display
00057 // Output waveform of a pad with tagging string TAG, placed in OUTDIR dir
00058 void DrawOut_WaveFormDisplay(Pad *pPad, const std::string &OUTDIR,
00059                             const std::string &TAG);
00060
00061 // Get waveform histo of pad with tagging string TAG
00062 TH1F *GiveMe_WaveFormDisplay(Pad *pPad, const std::string &TAG);
00063
00064 //-----WFs cluster Display
00065 // TD: Draw Waveforms of all Pads in a Cluster
00066 void DrawOut_ClusterWFDisplay(Cluster *pCluster, const std::string &OUTDIR,
00067                               const std::string &TAG);
00068 void DrawOut_ClusterWFDisplay(Cluster *pCluster, const std::string &OUTDIR,
00069                               const std::string &TAG, const int &Option,
00070                               const int &PT, const int &TB);
00071
00072 // Draw Event waveform
00073 void DrawOut_GWF(Event *pEvent, const int &ModuleNber,
00074                 const std::string &OUTDIR, const std::string &TAG,
00075                 const int &PT, const int &TB, const float &phi_rad);
00076
00077 // Redo Cluster display
00078 void NewClusterDisplay(Event *pEvent, const std::string &OUTDIR,
00079                       const std::string &TAG, const int &PT, const int &TB);
00080
00081 void NewClusterDisplayMinimal(Event *pEvent, const std::string &OUTDIR,
00082                              const std::string &TAG);

```

9.71 Reconstruction/inc/DrawOuts.h File Reference

Declaration of the DrawOuts helper class for plotting and summaries.

```

#include "Misc.h"
#include "SetStyle.h"
#include "TLegend.h"
#include "dEdx.h"

```

Classes

- class [Reconstruction::DrawOuts](#)
Plotting helper for reconstruction results.

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

9.71.1 Detailed Description

Declaration of the DrawOuts helper class for plotting and summaries.

The DrawOuts class provides routines for creating plots and visual summaries of reconstruction results (scan drawing, energy loss plots, comparisons, etc.). Implementation and plotting logic live in [DrawOuts.cxx](#).

A small top-level executable DrawOut exists ([Apps/DrawOut.cxx](#)) which calls into [Reconstruction::DrawOuts](#) as the runner for generating visual outputs. The class itself provides fine-grained control functions used by the executable and by any other consumer of plotting helpers.

9.72 DrawOuts.h

[Go to the documentation of this file.](#)

```

00001
00016
00017 #ifndef DRAWOUTS_H
00018 #define DRAWOUTS_H
00019
00020 #include "Misc.h"
00021 #include "SetStyle.h"
00022 #include "TLegend.h"
00023 #include "dEdx.h"
00024 namespace Reconstruction {
00025
00033 class DrawOuts {
00034 public:
00036     DrawOuts();
00037
00042     DrawOuts(const std::string &inputFile);
00043
00048     DrawOuts(const std::vector<std::string> &v_inputFiles);
00049
00051     virtual ~DrawOuts();
00052
00054     void SetStyle();
00055
00057     void DESY21ScanFill();
00058
00060     void DESY21ScanDraw();
00061
00063     void CERN22ScanFill();
00064
00066     void CERN22ScanDraw();
00067
00069     void Control();
00070
00075     void EnergyLoss(const int &methods = 0);
00076
00078     void FileComparison();
00079
00084     void DESY21SingleScan(const int &methods = 0);
00085
00090     void DESY21MultiScan(const int &methods = 0);
00091
00093     void CERN22Scan();
00094
00096     void AmplitudeVSLength();
00097
00098 private:
00099     // Files
00100     std::string finputFile;
00101     std::string foutputDir;
00102     std::string foutputFile;
00103     std::string foutputFileWF;
00104     std::string foutputFileXP;
00105
00106     // Data file
00107     std::vector<TFile *> v_fFiles;
00108     std::vector<TTree *> v_fTrees;
00109     std::vector<RecoEvent *> v_fEvents;
00110     std::vector<int> v_fnentries;
00111
00112     // Reconstruction classes
00113     Reconstruction::RecoEvent *p_recoevent;
00114     Reconstruction::RecoModule *p_recomodule;
00115     Reconstruction::RecoCluster *p_recocluster;
00116     Reconstruction::RecoPad *p_recopad;
00117
00118     // Settings
00119     std::string fparticleType;
00120     TCanvas *fpCanvas;
00121     int drawMultiScans = 0; // 0: normal scan | 1: multi scan
00122     int fwhichMethods = 0; // 0: both methods | 1: only WF | 2: only XP
00123     int fnMethods = 2; // Number of methods: 2 (WF and XP) or 1 (WF or XP)
00124
00125     // Shared variables
00126     int NMod = 0;
00127     int NClusters = 0;
00128     int NPads = 0;
00129     int ix = 0;
00130     int iy = 0;
00131     int position = 0;
00132
00133     constexpr static float YRESOMAX = 11;
00134     constexpr static float YRESOMIN = 6.5;

```



```

00135 constexpr static float YMEANMAX = 1000;
00136 constexpr static float YMEANMIN = 550;
00137 constexpr static float YSTDMAX = 90;
00138 constexpr static float YSTDMIN = 40;
00139
00140 constexpr static float YRESOMAXCERN = 7;
00141 constexpr static float YRESOMINCERN = 3;
00142 constexpr static float YMEANMAXCERN = 3;
00143 constexpr static float YMEANMINCERN = 0.5;
00144 constexpr static float YSTDMAXCERN = 0.15;
00145 constexpr static float YSTDMINCERN = 0;
00146 float keV = 5.9 / (224 * 1703.74 /
00147                  183); // 5.9 Fe peak energy | 1703 mean MockUp gain | 224
00148                      // e- created with 5.9keV | 183 e- for 1 ADC
00149
00150 // Single scan pointers
00151 TF1 *fptf1_WF;
00152 TF1 *fptf1_XP;
00153 TGraphErrors *fpTGE_reso_WF;
00154 TGraphErrors *fpTGE_reso_XP;
00155 TGraphErrors *fpTGE_mean_WF;
00156 TGraphErrors *fpTGE_mean_XP;
00157 TGraphErrors *fpTGE_std_WF;
00158 TGraphErrors *fpTGE_std_XP;
00159
00160 // Multiple scan pointers
00161 int nScans = 0;
00162 int nRuns = 0;
00163 std::vector<int> markers = {22, 34, 23, 47, 33, 43};
00164 std::vector<int> colors = {kCyan - 6, kMagenta - 6, kCyan + 2,
00165                          kMagenta + 2, kCyan + 3, kMagenta + 3};
00166 std::vector<int> markersCERN = {20, 47, 34, 21};
00167 std::vector<int> colorsCERN = {kOrange + 7, kAzure - 6, kSpring - 6,
00168                              kRed + 1};
00169 std::vector<TF1 *> v_fptf1_WF;
00170 std::vector<TF1 *> v_fptf1_XP;
00171 std::vector<TGraphErrors *> v_fpTGE_mean_WF;
00172 std::vector<TGraphErrors *> v_fpTGE_mean_XP;
00173 std::vector<TGraphErrors *> v_fpTGE_std_WF;
00174 std::vector<TGraphErrors *> v_fpTGE_std_XP;
00175 std::vector<TGraphErrors *> v_fpTGE_reso_WF;
00176 std::vector<TGraphErrors *> v_fpTGE_reso_XP;
00177
00178 // Bethe-Bloch fitting
00179 std::vector<TF1 *> v_fptf1_BB;
00180 };
00181 } // namespace Reconstruction
00182
00183 #endif

```

9.73 Reconstruction/inc/DrawOuts_old.h File Reference

Legacy plotting helpers (kept for reference).

```

#include "Misc.h"
#include "SetStyle.h"
#include "dEdx.h"

```

Functions

- void [DrawOut_Methods](#) (const std::string &OutDir, const std::string &Tag, const std::string &Comment, const int &nMod)
- void [DrawOut_Versions](#) (const std::string &inputDir, const std::string &Method, const std::string &Comment1, const std::string &Comment2)
- void [DrawOut_Separation](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Separation_Reduced](#) (const std::string &inputDir, const std::string &Comment, std::string Energy)
- void [DrawOut_Scans](#) (const std::string &inputDir, const std::string &Comment, const std::string &WFversion)
- void [DrawOut_Zscan](#) (const std::string &inputDir, const std::string &Comment, const int &PT)

- void [DrawOut_Yscan](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Phiscan](#) (const std::string &inputDir, const std::string &Comment, const std::string &WFversion, const std::string &zdrift)
- void [DrawOut_Thetascan](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Zscan_PT](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Phiscan_Z](#) (const std::string &inputDir, const std::string &Comment, const std::string &WFversion)
- void [DrawOut_Escan](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Systematics](#) (const std::string &inputDir, const std::string &Comment, const std::string &scan)

9.73.1 Detailed Description

Legacy plotting helpers (kept for reference).

Contains an older variant of the DrawOuts plotting helper kept for compatibility and reference. Prefer `DrawOuts` for new code.

9.73.2 Function Documentation

9.73.2.1 DrawOut_Escan()

```
void DrawOut_Escan (
    const std::string & inputDir,
    const std::string & Comment)
```

9.73.2.2 DrawOut_Methods()

```
void DrawOut_Methods (
    const std::string & OutDir,
    const std::string & Tag,
    const std::string & Comment,
    const int & nMod)
```

9.73.2.3 DrawOut_Phiscan()

```
void DrawOut_Phiscan (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & WFversion,
    const std::string & zdrift)
```

9.73.2.4 DrawOut_Phiscan_Z()

```
void DrawOut_Phiscan_Z (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & WFversion)
```

9.73.2.5 DrawOut_Scans()

```
void DrawOut_Scans (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & WFversion)
```

9.73.2.6 DrawOut_Separation()

```
void DrawOut_Separation (
    const std::string & inputDir,
    const std::string & Comment)
```

9.73.2.7 DrawOut_Separation_Reduced()

```
void DrawOut_Separation_Reduced (
    const std::string & inputDir,
    const std::string & Comment,
    std::string Energy)
```

9.73.2.8 DrawOut_Systematics()

```
void DrawOut_Systematics (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & scan)
```

9.73.2.9 DrawOut_Thetascan()

```
void DrawOut_Thetascan (
    const std::string & inputDir,
    const std::string & Comment)
```

9.73.2.10 DrawOut_Versions()

```
void DrawOut_Versions (
    const std::string & inputDir,
    const std::string & Method,
    const std::string & Comment1,
    const std::string & Comment2)
```

9.73.2.11 DrawOut_Yscan()

```
void DrawOut_Yscan (
    const std::string & inputDir,
    const std::string & Comment)
```

9.73.2.12 DrawOut_Zscan()

```
void DrawOut_Zscan (
    const std::string & inputDir,
    const std::string & Comment,
    const int & PT)
```

9.73.2.13 DrawOut_Zscan_PT()

```
void DrawOut_Zscan_PT (
    const std::string & inputDir,
    const std::string & Comment)
```

9.74 DrawOuts_old.h

[Go to the documentation of this file.](#)

```
00001
00008
00009 #ifndef DRAWOUTSOLD_H
00010 #define DRAWOUTSOLD_H
00011
00012 #include "Misc.h"
00013 #include "SetStyle.h"
00014 #include "dEdx.h"
00015
00016 // TH2 comparisons of the different methods
00017 void DrawOut_Methods(const std::string &OutDir, const std::string &Tag,
00018                     const std::string &Comment, const int &nMod);
00019
00020 // Draw resolution of 2 different procedures
00021 void DrawOut_Versions(const std::string &inputDir, const std::string &Method,
00022                     const std::string &Comment1, const std::string &Comment2);
00023
00024 // Draw separation power histograms for all methods and particles
00025 void DrawOut_Separation(const std::string &inputDir,
00026                         const std::string &Comment);
00027
00028 // Draw separation power histograms for all methods and particles only for WF &
00029 // XP
00030 void DrawOut_Separation_Reduced(const std::string &inputDir,
00031                                const std::string &Comment, std::string Energy);
00032
00033 // Draw all scans together
00034 void DrawOut_Scans(const std::string &inputDir, const std::string &Comment,
00035                   const std::string &WFversion);
00036
00037 // Draw resolution as function of Z scan
00038 void DrawOut_Zscan(const std::string &inputDir, const std::string &Comment,
00039                   const int &PT);
00040
00041 // Draw resolution as function of Y scan
00042 void DrawOut_Yscan(const std::string &inputDir, const std::string &Comment);
00043
00044 // Draw resolution as function of phi scan
00045 void DrawOut_Phiscan(const std::string &inputDir, const std::string &Comment,
00046                     const std::string &WFversion, const std::string &zdrift);
00047
00048 // Draw resolution as function of theta scan
00049 void DrawOut_Thetascan(const std::string &inputDir, const std::string &Comment);
00050
00051 // Transverse diffusion coefficient effect on Z scan
00052 void DrawOut_Zscan_PT(const std::string &inputDir, const std::string &Comment);
00053
00054 // Draw resolution as function of phi scan for different drift distances
00055 void DrawOut_Phiscan_Z(const std::string &inputDir, const std::string &Comment,
00056                       const std::string &WFversion);
00057
00058 // Draw Energy scan
00059 void DrawOut_Escan(const std::string &inputDir, const std::string &Comment);
00060
00061 // DrawOut dE/dx systematics with Z scan
00062 void DrawOut_Systematics(const std::string &inputDir,
```

```

00063             const std::string &Comment, const std::string &scan);
00064
00065 #endif
00066 #/*****
00067  * File: DrawOuts_old.h
00068  * Project: dEdxRecon
00069  *
00070  * Brief: Legacy/older drawout interfaces kept for backward compatibility.
00071  *        Declares older drawing utilities that may be used by legacy
00072  *        workflows or for regression comparisons.
00073  *
00074  * Contents: legacy drawing class/function declarations.
00075  *
00076  * Notes: Prefer the newer DrawOuts API; this header is retained for
00077  *        compatibility.
00078  *****/
00079
00080 #ifndef DRAWOUTSOLD_H
00081 #define DRAWOUTSOLD_H
00082
00083 #include "Misc.h"
00084 #include "SetStyle.h"
00085 #include "dEdx.h"
00086
00087 // TH2 comparisons of the different methods
00088 void DrawOut_Methods(const std::string &OutDir, const std::string &Tag,
00089                     const std::string &Comment, const int &nMod);
00090
00091 // Draw resolution of 2 different procedures
00092 void DrawOut_Versions(const std::string &inputDir, const std::string &Method,
00093                     const std::string &Comment1, const std::string &Comment2);
00094
00095 // Draw separation power histograms for all methods and particles
00096 void DrawOut_Separation(const std::string &inputDir,
00097                         const std::string &Comment);
00098
00099 // Draw separation power histograms for all methods and particles only for WF &
00100 // XP
00101 void DrawOut_Separation_Reduced(const std::string &inputDir,
00102                                const std::string &Comment, std::string Energy);
00103
00104 // Draw all scans together
00105 void DrawOut_Scans(const std::string &inputDir, const std::string &Comment,
00106                  const std::string &WFversion);
00107
00108 // Draw resolution as function of Z scan
00109 void DrawOut_Zscan(const std::string &inputDir, const std::string &Comment,
00110                   const int &PT);
00111
00112 // Draw resolution as function of Y scan
00113 void DrawOut_Yscan(const std::string &inputDir, const std::string &Comment);
00114
00115 // Draw resolution as function of phi scan
00116 void DrawOut_Phiscan(const std::string &inputDir, const std::string &Comment,
00117                     const std::string &WFversion, const std::string &zdrift);
00118
00119 // Draw resolution as function of theta scan
00120 void DrawOut_Thetascan(const std::string &inputDir, const std::string &Comment);
00121
00122 // Transverse diffusion coefficient effect on Z scan
00123 void DrawOut_Zscan_PT(const std::string &inputDir, const std::string &Comment);
00124
00125 // Draw resolution as function of phi scan for different drift distances
00126 void DrawOut_Phiscan_Z(const std::string &inputDir, const std::string &Comment,
00127                       const std::string &WFversion);
00128
00129 // Draw Energy scan
00130 void DrawOut_Escan(const std::string &inputDir, const std::string &Comment);
00131
00132 // DrawOut dE/dx systematics with Z scan
00133 void DrawOut_Systematics(const std::string &inputDir,
00134                         const std::string &Comment, const std::string &scan);
00135
00136 #endif

```

9.75 Reconstruction/inc/LUTs.h File Reference

```

#include <TBranch.h>
#include <TFile.h>
#include <TTree.h>

```

```
#include <string>
```

Classes

- class [EramInfo](#)
Lookup table utilities used by reconstruction algorithms.
- class [Reconstruction::ERAMMaps](#)
- class [Reconstruction::LUT](#)

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

9.76 LUTs.h

[Go to the documentation of this file.](#)

```
00001 #
00015 #ifndef LUT_H
00016 #define LUT_H
00017
00018 #include <TBranch.h>
00019 #include <TFile.h>
00020 #include <TTree.h>
00021 #include <string>
00022
00023 class EramInfo : public TObject {
00024 public:
00025     int Id;
00026     int Position;
00027     int XX;
00028     int YY;
00029     float RC;
00030     float Gain;
00031     float Resolution;
00032
00033     int Endplate;
00034     bool InbTPC;
00035     bool IntTPC;
00036
00037     EramInfo() {}
00038     virtual ~EramInfo() {}
00039
00040     ClassDef(EramInfo, 2)
00041 };
00042
00043 namespace Reconstruction {
00044
00045     /* ERAM MAPS READING
00046     *
00047     */
00048     class ERAMMaps {
00049     public:
00050         /* Constructor */
00051         ERAMMaps(
00052             const std::string &file = "$HOME/Documents/Code/ERAMInfo/ERAMInfo.root");
00053         virtual ~ERAMMaps();
00054
00055         int ID(const int &position);
00056         float RC(const int &position, const int &iX, const int &iY);
00057         float Gain(const int &position, const int &iX, const int &iY);
00058         float Resolution(const int &position, const int &iX, const int &iY);
00059         float MeanGain(const int &position);
00060         float MeanRC(const int &position);
00061
00062     private:
00063         bool verbose = false;
00064         std::string fFile;
```

```

00065     std::vector<int> fID;
00066     std::vector<float> v_sides;
00067
00068     float fGain[34][36][32]; // [position][iX][iY]
00069     float fRC[34][36][32];
00070     float fResolution[34][36][32];
00071     std::vector<float> fmean_gain;
00072     std::vector<float> fmean_RC;
00073
00074     void Load();
00075     void setGain(const int &position, const int &iX, const int &iY,
00076                 const float &gain);
00077     void setRC(const int &position, const int &iX, const int &iY,
00078                const float &RC);
00079     void setResolution(const int &position, const int &iX, const int &iY,
00080                        const float &resolution);
00081     void setMeanGain(const int &position, const float &meanGain);
00082     void setMeanRC(const int &position, const float &meanRC);
00083     void FillHoles();
00084
00085     std::vector<int> channel2iD = {24, 30, 28, 19, 21, 13, 9, 2, 26,
00086                                   17, 23, 29, 1, 10, 11, 3, /*bottom HATPC*/
00087                                   47, 16, 14, 15, 42, 45, 37, 36, 20,
00088                                   38, 7, 44, 43, 39, 41, 46, /*top HATPC*/
00089                                   12, 18}; // CERN22 MockUp and prototype
00090
00091     //-----Data Members-----//
00092     TFile *pFile;
00093     TTree *pTree;
00094     TBranch *pBranch;
00095
00096     // Leaves
00097     int fid;
00098     int fpos;
00099     int fx;
00100     int fy;
00101     float frc;
00102     float fgain;
00103     float fres;
00104 };
00105
00106 /* Look Up Tables for XP method
00107 *
00108 */
00109 class LUT {
00110 public:
00111     /* Constructor */
00112     LUT(const int &transDiffCoeffB, const int &transDiffCoeffnoB,
00113          const int &peakingTime);
00114     LUT(const std::string &file);
00115
00116     virtual ~LUT();
00117
00118     float getRatio(const int &Dt, const int &RC, const float &drift,
00119                    const float &impact, const float &angle);
00120 private:
00121     std::string fFile_LUT;
00122
00123     static constexpr float PAD_DIAG = 15.20; // sqrt(pow(11.28,2) + pow(10.19, 2))
00124
00125     static constexpr int RCmin = 80;
00126     static constexpr int RCmax = 160;
00127
00128     // Number of discrete steps in each dimension of the Look Up Table
00129     static const int SNSTEPS_TRANS = 2;
00130     static const int SNSTEPS_RC = 17;
00131     static const int SNSTEPS_DRIFT = 21;
00132     static const int SNSTEPS_IMPACT = 250;
00133     static const int SNSTEPS_PHI = 250;
00134
00135     static float LUTValues[SNSTEPS_TRANS][SNSTEPS_RC][SNSTEPS_DRIFT]
00136                    [SNSTEPS_IMPACT][SNSTEPS_PHI];
00137
00138     float stepSizeTrans = 37; // 286 -> 323 or 310->350
00139     static constexpr float sSTEP_RC = 5;
00140     static constexpr float sSTEP_PHI = 90. / (SNSTEPS_PHI - 1);
00141     static constexpr float sSTEP_IMPACT = (PAD_DIAG / 2) / (SNSTEPS_IMPACT - 1);
00142     static constexpr float sSTEP_DRIFT = 1000. / (SNSTEPS_DRIFT - 1);
00143
00144     void Load();
00145
00146     //-----Data Members-----//
00147     TFile *pFile_LUT;
00148     TTree *pTree_LUT;

```

```

00151
00152 // Branches
00153 float fweight;
00154 float fDt;
00155 float fRC;
00156 float fdrift;
00157 double fd;
00158 double fphi;
00159
00160 int DtwithB;
00161 int DtwwithoutB;
00162 };
00163
00164 } // namespace Reconstruction
00165
00166 #endif

```

9.77 Reconstruction/inc/Monitoring.h File Reference

Monitoring utilities and entry points for analysis workflows.

```

#include "GiveMe_Uploader.h"
#include "Uploader.h"
#include "DrawOuts.h"
#include "dEdx.h"

```

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

Functions

- void [Reconstruction::Monitoring](#) ()
- void [Reconstruction::Correction](#) (const int &corrRC=1, const int &corrGain=1, const int &corrWF=1, const int &corrDrift=1, const int &saveSelectOnly=1)
- void [Reconstruction::Settings](#) (const std::string &testbeam, const std::string &multiScanName, const std::string &scanName, const std::string &scanspec, const std::string &runvarstr_name, const int &uploader, const int &modules, const int &peaking_time, const int &diffusion, const int &drift_dist, const int &timbin)
- void [Reconstruction::ClearVectors](#) ()
- void [Reconstruction::DefaultAnalysis](#) ()
- void [Reconstruction::DrawSingleScan](#) (const int &methods=0)
- void [Reconstruction::DrawMultipleScan](#) (const int &methods=0)
- void [Reconstruction::DrawCERN22Scan](#) ()

Variables

- [Reconstruction::dEdx](#) * [Reconstruction::p_dEdx](#)
- [Reconstruction::DrawOuts](#) * [Reconstruction::p_DrawOuts](#)
- int [Reconstruction::prototype](#) = 0
- int [Reconstruction::CERN_Escan](#) = 1
- int [Reconstruction::CERN_drift](#) = 0
- int [Reconstruction::DESY_zscan](#)
- int [Reconstruction::DESY_yscan](#)
- int [Reconstruction::DESY_phi](#) = 0
- int [Reconstruction::DESY_theta](#) = 0
- int [Reconstruction::dedx](#) = 1
- int [Reconstruction::DO_Control](#)
- int [Reconstruction::DO_dEdx](#)
- int [Reconstruction::DO_Comparison](#)

9.77.1 Detailed Description

Monitoring utilities and entry points for analysis workflows.

Declares functions used to run monitoring, produce diagnostic summaries (histograms, performance numbers) and control analysis settings.

A small executable `Apps/Analysis.cxx` exists which calls `Reconstruction::Monitoring()` as a top-level entry point to run analysis workflows; the implementation of `Monitoring` lives in `Reconstruction/src/Monitoring.cxx`.

The source file contains routines that assemble diagnostic histograms, run monitoring workflows and produce summaries for inspection. It is the primary entry point used by the `Analysis` executable to run automated monitoring and analysis sequences; configuration and selection setup live in the header-level declarations and other helper modules.

9.78 Monitoring.h

[Go to the documentation of this file.](#)

```

00001 #
00021 #ifndef MONITORING_H
00022 #define MONITORING_H
00023
00024 #include "GiveMe_Uploader.h"
00025 #include "Uploader.h"
00026
00027 #include "DrawOuts.h"
00028 #include "dEdx.h"
00029
00030 namespace Reconstruction {
00031
00032 extern Reconstruction::dEdx *p_dEdx;
00033 extern Reconstruction::DrawOuts *p_DrawOuts;
00034
00035 void Monitoring();
00036 void Correction(const int &corrRC = 1, const int &corrGain = 1,
00037               const int &corrWF = 1, const int &corrDrift = 1,
00038               const int &saveSelectOnly = 1);
00039 void Settings(const std::string &testbeam, const std::string &multiScanName,
00040              const std::string &scanName, const std::string &scanspec,
00041              const std::string &runvarstr_name, const int &uploader,
00042              const int &modules, const int &peaking_time, const int &diffusion,
00043              const int &drift_dist, const int &timbin);
00044 void ClearVectors();
00045 void DefaultAnalysis();
00046 void DrawSingleScan(const int &methods = 0);
00047 void DrawMultipleScan(const int &methods = 0);
00048 void DrawCERN22Scan();
00049
00050 // Run selection
00051 // Files to use
00052 extern int prototype;
00053 extern int CERN_Escan;
00054 extern int CERN_drift;
00055
00056 extern int DESY_zscan;
00057 extern int DESY_yscan;
00058 extern int DESY_phi;
00059 extern int DESY_theta;
00060
00061 // Computations
00062 extern int dedx;
00063
00064 // DrawOuts
00065 extern int DO_Control;
00066 extern int DO_dEdx;
00067 extern int DO_Comparison;
00068 } // namespace Reconstruction
00069
00070 #endif

```

9.79 Reconstruction/inc/Recon_LinkDef.h File Reference

ROOT linkdef file for [Reconstruction](#) module classes.

```
#include "dEdx.h"
#include <vector>
```

9.79.1 Detailed Description

ROOT linkdef file for [Reconstruction](#) module classes.

Contains #pragma link directives used by rootcling to generate dictionaries for I/O and interactive ROOT usage.

9.80 Recon_LinkDef.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #include "dEdx.h"
00009 #include <vector>
00010 #ifdef __ROOTCLING__
00011
00012 #pragma link off all globals;
00013 #pragma link off all classes;
00014 #pragma link off all functions;
00015
00016 // For dEdx output
00017 #pragma link C++ namespace Reconstruction;
00018
00019 #pragma link C++ namespace Reconstruction;
00020 #pragma link C++ class Reconstruction::RecoPad + ;
00021 #pragma link C++ class std::vector < Reconstruction::RecoPad *> + ;
00022 #pragma link C++ class Reconstruction::RecoCluster + ;
00023 #pragma link C++ class std::vector < Reconstruction::RecoCluster *> + ;
00024 #pragma link C++ class Reconstruction::RecoModule + ;
00025 #pragma link C++ class std::vector < Reconstruction::RecoModule *> + ;
00026 #pragma link C++ class Reconstruction::RecoEvent + ;
00027
00028 // For ERAM maps reading
00029 #pragma link C++ class EramInfo + ;
00030 #endif
```

9.81 Reconstruction/inc/ReconTools.h File Reference

Miscellaneous reconstruction helper functions and utilities.

```
#include <vector>
#include "TF1.h"
#include "TH1F.h"
#include "Misc.h"
#include "Util.h"
#include "Module.h"
#include "Pad.h"
#include "Track.h"
#include "GiveMe_Uploader.h"
#include "Selector.h"
#include "Uploader.h"
```

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

Functions

- bool [FourModulesInLine](#) (const std::vector< int > &vec)
- void [Reconstruction::WFCorrection](#) (const std::string &OutCorr)
- TF1 * [corr_func](#) (const std::string &EventFile, const std::string &Tag, const int &correctWF)
- void [Init_selection](#) (const std::string &SelectionSet, [Selector](#) &aSelector, const std::string &Tag, [Uploader](#) *pUploader, const int &NbrOfMod, const int &Data_to_Use)
- std::vector< std::vector< float > > [readCSV](#) (std::string filename)
- std::vector< int > [ComputeCutStage3_Cut](#) ([Uploader](#) *pUploader, const int &NbrOfMod, const int &Data_to_Use)
- bool [GetStage3Cut_CSV](#) (const std::string &filename, const std::string &targetWord, int &value1, int &value2)
- void [SetStage3Cut_CSV](#) (const std::string &filename, const std::string &targetWord, int value1, int value2)
- TF1 * [BetheBloch](#) (const float &Emin, const float &Emax, const double &m, const std::string &particle)
- TF1 * [BetheBlochBhabha](#) (const float &Pmin, const float &Pmax, const double &m, const std::string &particle)
- TF1 * [BetheBlochExp](#) (const float &Pmin, const float &Pmax, const double &M, const std::string &particle)
- TF1 * [Fit2Gauss](#) (TH1F *h1F)
- TF1 * [Fit2Gauss](#) (TH1F *h1F, const float &x1min, const float &x1max, const float &x2min, const float &x2max)
- void [local_params](#) ([Pad](#) *pPad, const [Track](#) *pTrack, float &d, float &dd, float &phi, float &trk_len_pad)
- float [trk_len](#) ([Module](#) *pModule, const [Track](#) *pTrack)
- TGraph * [hist_to_graph](#) (TH1 *h1)
- TGraph * [Swapped_graph](#) (TH1 *h1)
- void [DrawTH2](#) (const std::string &OutDir, TH2 *h2)

9.81.1 Detailed Description

Miscellaneous reconstruction helper functions and utilities.

Small helpers and adapters used across reconstruction, plotting and fitting code (linspace equivalents, I/O helpers, Bethe-Bloch wrappers, etc.).

The implementation file [ReconTools.cxx](#) contains a collection of lightweight utilities relied upon by higher-level modules (correction functions, selection initialization, CSV helpers and physics wrappers).

9.81.2 Function Documentation

9.81.2.1 BetheBloch()

```
TF1 * BetheBloch (
    const float & Emin,
    const float & Emax,
    const double & m,
    const std::string & particle)
```

9.81.2.2 BetheBlochBhabha()

```
TF1 * BetheBlochBhabha (
    const float & Pmin,
    const float & Pmax,
    const double & m,
    const std::string & particle)
```

9.81.2.3 BetheBlochExp()

```
TF1 * BetheBlochExp (
    const float & Pmin,
    const float & Pmax,
    const double & M,
    const std::string & particle)
```

9.81.2.4 ComputeCutStage3_Cut()

```
std::vector< int > ComputeCutStage3_Cut (
    Uploader * pUploader,
    const int & NbrOfMod,
    const int & Data_to_Use)
```

9.81.2.5 corr_func()

```
TF1 * corr_func (
    const std::string & EventFile,
    const std::string & Tag,
    const int & correctWF)
```

9.81.2.6 DrawTH2()

```
void DrawTH2 (
    const std::string & OutDir,
    TH2 * h2)
```

9.81.2.7 Fit2Gauss() [1/2]

```
TF1 * Fit2Gauss (
    TH1F * h1F)
```

9.81.2.8 Fit2Gauss() [2/2]

```
TF1 * Fit2Gauss (
    TH1F * h1F,
    const float & x1min,
    const float & x1max,
    const float & x2min,
    const float & x2max)
```

9.81.2.9 FourModulesInLine()

```
bool FourModulesInLine (
    const std::vector< int > & vec)
```

9.81.2.10 GetStage3Cut_CSV()

```
bool GetStage3Cut_CSV (
    const std::string & filename,
    const std::string & targetWord,
    int & value1,
    int & value2)
```

9.81.2.11 hist_to_graph()

```
TGraph * hist_to_graph (
    TH1 * h1)
```

9.81.2.12 Init_selection()

```
void Init_selection (
    const std::string & SelectionSet,
    Selector & aSelector,
    const std::string & Tag,
    Uploader * pUploader,
    const int & NbrOfMod,
    const int & Data_to_Use)
```

9.81.2.13 local_params()

```
void local_params (
    Pad * pPad,
    const Track * pTrack,
    float & d,
    float & dd,
    float & phi,
    float & trk_len_pad)
```

9.81.2.14 readCSV()

```
std::vector< std::vector< float > > readCSV (
    std::string filename)
```

9.81.2.15 SetStage3Cut_CSV()

```
void SetStage3Cut_CSV (
    const std::string & filename,
    const std::string & targetWord,
    int value1,
    int value2)
```

9.81.2.16 Swapped_graph()

```
TGraph * Swapped_graph (
    TH1 * h1)
```

9.81.2.17 trk_len()

```
float trk_len (
    Module * pModule,
    const Track * pTrack)
```

9.82 ReconTools.h

[Go to the documentation of this file.](#)

```
00001 #
00013 #ifndef Reconstruction_TOOLS_H
00014 #define Reconstruction_TOOLS_H
00015
00016 #include <vector>
00017
00018 #include "TFl.h"
00019 #include "TH1F.h"
00020
00021 #include "Misc.h"
00022 #include "Util.h"
00023
00024 #include "Module.h"
00025 #include "Pad.h"
00026 #include "Track.h"
00027
00028 #include "GiveMeUploader.h"
00029 #include "Selector.h"
00030 #include "Uploader.h"
00031
00032 /* Python's numpy equivalent of linspace
00033  * -----
00034  */
00035
00036 bool FourModulesInLine(const std::vector<int> &vec);
00037
00038 namespace Reconstruction {
00039 void WFCorrection(const std::string &OutCorr);
00040 }
00041
00042 /* Call the correction function of WF method
00043  * -----*/
00044 TF1 *corr_func(const std::string &EventFile, const std::string &Tag,
00045               const int &correctWF);
00046
00047 /* Initialize selection stages
00048  * -----*/
00049 void Init_selection(const std::string &SelectionSet, Selector &aSelector,
00050                  const std::string &Tag, Uploader *pUploader,
00051                  const int &NbrOfMod, const int &Data_to_Use);
00052
00053 /* FILE HANDLING */
00054 // Read CSV file
00055 std::vector<std::vector<float>> readCSV(std::string filename);
00056
00057 // Determine the time cut
00058 std::vector<int> ComputeCutStage3_Cut(Uploader *pUploader, const int &NbrOfMod,
00059                                     const int &Data_to_Use);
00060
00061 // Function to search for a word in a CSV file
00062 bool GetStage3Cut_CSV(const std::string &filename,
00063                      const std::string &targetWord, int &value1, int &value2);
00064
00065 // Function to update a CSV file
00066 void SetStage3Cut_CSV(const std::string &filename,
00067                      const std::string &targetWord, int value1, int value2);
00068
00069 /* GENERAL PHYSICS */
00070 // Bethe-Bloch function
```

```

00071 TF1 *BetheBloch(const float &Emin, const float &Emax, const double &m,
00072                  const std::string &particle);
00073
00074 // Bethe-Bloch relativistic for positrons with Bhabha scattering
00075 TF1 *BetheBlochBhabha(const float &Pmin, const float &Pmax, const double &m,
00076                       const std::string &particle);
00077
00078 // Bethe-Bloch with experimental parametrisation
00079 TF1 *BetheBlochExp(const float &Pmin, const float &Pmax, const double &M,
00080                   const std::string &particle);
00081
00082 /* GENERAL MATH*/
00083
00084 // Fit with 2 gaussians
00085 TF1 *Fit2Gauss(TH1F *h1F);
00086 TF1 *Fit2Gauss(TH1F *h1F, const float &xlmin, const float &xlmax,
00087               const float &x2min, const float &x2max);
00088
00089 /* SPECIFIC MATH*/
00090 // impact parameter d (in m) & track angle phi (in degrees) computed locally at
00091 // the level of the pad
00092 void local_params(Pad *pPad, const Track *pTrack, float &d, float &dd,
00093                  float &phi, float &trk_len_pad);
00094
00095 // Track length
00096 float trk_len(Module *pModule, const Track *pTrack);
00097
00098 // From TH1 get TGraph
00099 TGraph *hist_to_graph(TH1 *h1);
00100
00101 // From TH1 get swapped TGraph (transpose x and y)
00102 TGraph *Swapped_graph(TH1 *h1);
00103
00104 /* ROOT */
00105
00106 // Draw TH2
00107 void DrawTH2(const std::string &OutDir, TH2 *h2);
00108 #endif

```

9.83 Reconstruction/inc/Selector.h File Reference

Selection utilities to filter events, modules and clusters.

```

#include "Misc.h"
#include "Sample.h"

```

Classes

- class [Selector](#)
Encapsulates event/module/cluster selection logic.

Macros

- #define [Selector_H](#)

9.83.1 Detailed Description

Selection utilities to filter events, modules and clusters.

The [Selector](#) class encapsulates selection stages and criteria and provides methods to apply selections to samples and events.

Implementation in [Selector.cxx](#) contains the selection-stage definitions and concrete logic for known selection presets (DESY21, CERN22, etc.). Changing selection logic can affect downstream analyses; keep tests updated when criteria change.

9.83.2 Macro Definition Documentation

9.83.2.1 Selector_H

```
#define Selector_H
```

9.84 Selector.h

[Go to the documentation of this file.](#)

```
00001
00014 #ifndef SELECTOR_H
00015 #define SELECTOR_H
00016 #ifndef Selector_H
00017 #define Selector_H
00018
00019 #include "Misc.h"
00020
00021 #include "Sample.h"
00022
00023
00024
00028 class Selector {
00029 public:
00031     Selector(const std::string DefSelection);
00033     Selector();
00035     virtual ~Selector();
00036
00038     void Reset_Selection();
00039
00041     void Add_Selection(const std::string &SelectionName);
00042
00044     int NberOfSelections();
00045
00047     std::string Get_SelectionName(const int &iTem);
00048
00050     void Tell_Selection();
00051
00057     void ApplySelection(Sample &aSample, const int &ModuleNber);
00058
00060     void Apply_ASelection(Sample &aSample, const int &ModuleNber,
00061                          const int &iTem);
00062
00064     void ApplySelection(Event *pEvent);
00066     void Apply_ASelection(Event *pEvent, const int &ModuleNber, const int &iTem);
00067
00069     void Reset_StatCounters();
00070     void PrintStat();
00071
00072     double Get_Cut_StageFinal_NCluster_Low();
00073     void Set_Cut_StageFinal_NCluster_Low(double Cut_StageFinal_NCluster_Low);
00074
00075     double Get_Cut_Stage5_Npads_Hig();
00076     void Set_Cut_Stage5_Npads_Hig(double Cut_Stage5_Npads_Hig);
00077
00078     double Get_Cut_Stage2_EventBased();
00079     void Set_Cut_Stage2_EventBased(double Cut_Stage2_EventBased);
00080
00081     double Get_Cut_Stage3_TLow();
00082     double Get_Cut_Stage3_THigh();
00083     void Set_Cut_Stage3_TLow(double Cut_Stage3_TLow);
00084     void Set_Cut_Stage3_THigh(double Cut_Stage3_THigh);
00085
00086     double Get_Cut_Stage6_Amax_Low();
00087     void Set_Cut_Stage6_Amax_Low(double Cut_Stage6_Amax_Low);
00088     double Get_Cut_Stage6_Amax_Hig();
00089     void Set_Cut_Stage6_Amax_Hig(double Cut_Stage6_Amax_Hig);
00090
00091     double Get_Cut_Stage4_APM_Low();
00092     void Set_Cut_Stage4_APM_Low(double Cut_Stage4_APM_Low);
00093     double Get_Cut_Stage4_APM_High();
00094     void Set_Cut_Stage4_APM_High(double Cut_Stage4_APM_High);
00095
00096 private:
00097     // Stage 1: Remove clusters in first and last columns
00098     void Stage1_Def();
00099     void Stage1(Sample &aSample, const int &ModuleNber);
00100     void Stage1(Event *pEvent, const int &ModuleNber);
00101
```



```

00102 // Stage 2: Remove clusters out of time (Event Based)
00103 void Stage2_Def();
00104 void Stage2(Sample &aSample, const int &ModuleNber);
00105 void Stage2(Event *pEvent, const int &ModuleNber);
00106
00107 // Stage 3: Remove clusters out of time
00108 void Stage3_Def();
00109 void Stage3(Sample &aSample, const int &ModuleNber);
00110 void Stage3(Event *pEvent, const int &ModuleNber);
00111
00112 // Stage 4: Remove Events with an average pad multiplicity too high or too low
00113 void Stage4_Def();
00114 void Stage4(Sample &aSample, const int &ModuleNber);
00115 void Stage4(Event *pEvent, const int &ModuleNber);
00116
00117 // Stage 5: Remove clusters with too many pads
00118 void Stage5_Def();
00119 void Stage5(Sample &aSample, const int &ModuleNber);
00120 void Stage5(Event *pEvent, const int &ModuleNber);
00121
00122 // Stage 6: Remove Clusters with a too high APad
00123 void Stage6_Def();
00124 void Stage6(Sample &aSample, const int &ModuleNber);
00125 void Stage6(Event *pEvent, const int &ModuleNber);
00126
00127 // Stage Final: Reject Events with too few clusters
00128 void StageFinal_Def();
00129 void StageFinal(Sample &aSample, const int &ModuleNber);
00130 void StageFinal(Event *pEvent, const int &ModuleNber);
00131
00132 // Defaults
00133 void Set_DESY21_Event(); // 1+5+11
00134 void Set_DESY21theta_Event();
00135 void Set_T2_CERN22_Event(); // 1+11+120+15+5+20
00136 void Set_TMC_CERN22_Event(); // 1+5
00137
00138 //
00139 void SetStat_Before(Sample &aSample, const int &ModuleNber, const int &iTem);
00140 void SetStat_After(Sample &aSample, const int &ModuleNber, const int &iTem);
00141
00142 void SetStat_Before(Event *pEvent, const int &iTem);
00143 void SetStat_After(Event *pEvent, const int &iTem);
00144
00145 std::vector<std::string> ListOfSelectionName;
00146 std::vector<int> ListOfNberOfEvents_Before;
00147 std::vector<int> ListOfNberOfEvents_After;
00148 std::vector<int> ListOfNberOfModules_Before;
00149 std::vector<int> ListOfNberOfModules_After;
00150 std::vector<int> ListOfNberOfClusters_Before;
00151 std::vector<int> ListOfNberOfClusters_After;
00152 std::vector<int> ListOfNberOfPads_Before;
00153 std::vector<int> ListOfNberOfPads_After;
00154
00155 //
00156 void Set_Cuts();
00157
00158 double m_Cut_StageFinal_NCluster_Low;
00159
00160 double m_Cut_Stage5_Npads_Hig;
00161
00162 double m_Cut_Stage2_EventBased;
00163
00164 double m_Cut_Stage3_TLow;
00165 double m_Cut_Stage3_THigh;
00166
00167 double m_Cut_Stage6_Amax_Low;
00168 double m_Cut_Stage6_Amax_Hig;
00169
00170 double m_Cut_Stage4_APM_Low;
00171 double m_Cut_Stage4_APM_High;
00172 };
00173
00174 #endif

```

9.85 Reconstruction/inc/Variables.h File Reference

Central place to declare reconstruction-wide variables and helpers.

```

#include "LUTs.h"
#include "Misc.h"

```

```
#include "Uploader.h"
```

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

Variables

- [Uploader](#) * [Reconstruction::p_uploader](#)
- [Reconstruction::LUT](#) * [Reconstruction::p_lut](#)
- const std::string [Reconstruction::dEdxPath](#) = "../"
- const std::string [Reconstruction::dataPath](#) = [dEdxPath](#) + "Data/"
- std::string [Reconstruction::dataScanPath](#) = ""
- const std::string [Reconstruction::drawoutPath](#) = [dEdxPath](#) + "OUT_Reconstruction_GP/"
- std::string [Reconstruction::drawoutMultiScanPath](#) = ""
- std::string [Reconstruction::drawoutScanPath](#) = ""
- std::string [Reconstruction::drawoutRunPath](#) = ""
- std::string [Reconstruction::drawout_file](#) = ""
- std::string [Reconstruction::rootout_file](#) = ""
- std::string [Reconstruction::log_file](#) = ""
- std::string [Reconstruction::comment](#)
- std::string [Reconstruction::selectionSet](#)
- std::string [Reconstruction::inputDir](#)
- int [Reconstruction::drawWhichMethods](#) = 0
- std::string [Reconstruction::corrFuncPath](#) = ""
- std::vector< std::string > [Reconstruction::vcorrFuncPaths](#)
- std::vector< float > [Reconstruction::vScanVals](#)
- std::vector< std::string > [Reconstruction::vScanLabels](#)
- std::vector< std::string > [Reconstruction::v_scanspec](#)
- std::vector< std::string > [Reconstruction::v_comments](#)
- std::vector< std::string > [Reconstruction::vTags](#)
- std::vector< std::string > [Reconstruction::v_datafiles](#)
- std::vector< std::string > [Reconstruction::v_rootout_files](#)
- std::string [Reconstruction::tag](#)
- std::string [Reconstruction::testbeam](#)
- std::string [Reconstruction::multiScanName](#)
- std::string [Reconstruction::scanName](#)
- std::string [Reconstruction::runvarstr](#)
- int [Reconstruction::scanIndex](#) = 0
- int [Reconstruction::intUploader](#)
- int [Reconstruction::moduleCase](#)
- int [Reconstruction::PT](#)
- int [Reconstruction::Dt](#)
- int [Reconstruction::DtB](#)
- int [Reconstruction::DtnoB](#)
- int [Reconstruction::driftDist](#)
- int [Reconstruction::TB](#)
- int [Reconstruction::fcorrectGain](#)
- int [Reconstruction::fcorrectRC](#)
- int [Reconstruction::fcorrectWF](#)
- int [Reconstruction::fcorrectDrift](#)
- int [Reconstruction::fsaveSelectOnly](#)

9.85.1 Detailed Description

Central place to declare reconstruction-wide variables and helpers.

This header exposes shared data structures, constants and light helper utilities used by drawing, monitoring and fitting code. Definitions and initialisation (if any) should live in [Variables.cxx](#).

The implementation file [Variables.cxx](#) defines module-global configuration strings, pointers and run parameters used across reconstruction and plotting code. Keep definitions minimal: only shared state should be declared here and initialised in the source file.

9.86 Variables.h

[Go to the documentation of this file.](#)

```

00001 #ifndef Reconstruction_VARIABLES_H
00002 #define Reconstruction_VARIABLES_H
00003
00004 #include "LUTs.h"
00005 #include "Misc.h"
00006 #include "Uploader.h"
00007
00008 namespace Reconstruction {
00009
00010 extern Uploader *p_uploader;
00011
00012
00013
00014
00015
00016
00017 extern Reconstruction::LUT *p_lut;
00018
00019
00020 // Output file variables
00021 extern const std::string dEdxPath;
00022 extern const std::string dataPath;
00023 extern std::string dataScanPath;
00024 extern const std::string drawoutPath;
00025 extern std::string drawoutMultiScanPath;
00026 extern std::string drawoutScanPath;
00027 extern std::string drawoutRunPath;
00028 extern std::string drawout_file;
00029 extern std::string rootout_file;
00030 extern std::string log_file;
00031 extern std::string comment;
00032 extern std::string selectionSet;
00033 extern std::string inputDir;
00034 extern int drawWhichMethods; // 0: both methods | 1: only WF | 2: only XP
00035 extern std::string corrFuncPath;
00036 extern std::vector<std::string> vcorrFuncPaths;
00037
00038 // Run variables
00039 extern std::vector<float> vScanVals;
00040 extern std::vector<std::string> vScanLabels;
00041 extern std::vector<std::string> v_scanspec;
00042 extern std::vector<std::string> v_comments;
00043 extern std::vector<std::string> vTags;
00044 extern std::vector<std::string> v_datafiles;
00045 extern std::vector<std::string> v_rootout_files;
00046 extern std::string tag;
00047 extern std::string testbeam;
00048 extern std::string multiScanName;
00049 extern std::string scanName;
00050 extern std::string runvarstr;
00051 extern int scanIndex;
00052 extern int intUploader;
00053 extern int moduleCase; // DESY21:0 | CERN22:-1
00054 extern int PT; // Peaking time (ns)
00055 extern int Dt; // Transverse diffusion coefficient ( $\mu\text{m}/\sqrt{\text{cm}}$ )
00056 extern int DtB; // Transverse diffusion coefficient with B ( $\mu\text{m}/\sqrt{\text{cm}}$ )
00057 extern int DtnoB; // Transverse diffusion coefficient without B ( $\mu\text{m}/\sqrt{\text{cm}}$ )
00058 extern int driftDist; // drift distance (mm)
00059 extern int TB; // timebin length (ns)
00060 extern int fcorrectGain; // 0: no correction | 1: correct pad per pad | 2:
00061 // correct ERAM per ERAM
00062
00063 extern int fcorrectRC;
00064 extern int fcorrectWF;
00065 extern int fcorrectDrift;
00066 extern int fsaveSelectOnly;
00067 } // namespace Reconstruction
00068
00069 #endif

```

9.87 Reconstruction/src/CombinedFit.cxx File Reference

```
#include "CombinedFit.h"  
#include "ReconTools.h"  
#include "SetStyle.h"
```

Classes

- struct [GlobalChi2_4](#)

Macros

- #define [COMBINEDFIT_H](#)

Variables

- int [npar](#) = 6
- int [iparpositron](#) [] = {0, 1, 2, 3, 4, 5}
- int [iparmuon](#) [] = {0, 1, 2, 3, 4, 6}
- int [iparpion](#) [] = {0, 1, 2, 3, 4, 7}
- int [iparproton](#) [] = {0, 1, 2, 3, 4, 8}

9.87.1 Macro Definition Documentation

9.87.1.1 COMBINEDFIT_H

```
#define COMBINEDFIT_H
```

9.87.2 Variable Documentation

9.87.2.1 iparmuon

```
int iparmuon[] = {0, 1, 2, 3, 4, 6}
```

9.87.2.2 iparpion

```
int iparpion[] = {0, 1, 2, 3, 4, 7}
```

9.87.2.3 iparpositron

```
int iparpositron[] = {0, 1, 2, 3, 4, 5}
```

9.87.2.4 iparproton

```
int iparproton[] = {0, 1, 2, 3, 4, 8}
```

9.87.2.5 npar

```
int npar = 6
```

9.88 Reconstruction/src/Control.cxx File Reference

```
#include "Control.h"  
#include "ReconTools.h"  
#include "Util.h"  
#include "Displays.h"  
#include "Selector.h"
```

Functions

- void [Control](#) (const std::string &OutDir, std::string const &Tag, std::string const &Comment, std::string const &EventFile, std::string const &SelectionSet, [Uploader](#) *pUploader, int const &NbrOfMod, int const &Data__{to}_Use, int const &PT, int const &TB, const std::string &particle)

9.88.1 Function Documentation

9.88.1.1 Control()

```
void Control (  
    const std::string & OutDir,  
    std::string const & Tag,  
    std::string const & Comment,  
    std::string const & EventFile,  
    std::string const & SelectionSet,  
    Uploader * pUploader,  
    int const & NbrOfMod,  
    int const & Data_to_Use,  
    int const & PT,  
    int const & TB,  
    const std::string & particle)
```

9.89 Reconstruction/src/dEdx.cxx File Reference

```
#include "dEdx.h"
#include "LUTs.h"
#include "Misc_Functions.h"
#include "ReconTools.h"
#include "SignalTools.h"
#include "Variables.h"
#include "Util.h"
#include <cmath>
#include <fstream>
#include <numeric>
#include <random>
#include <string>
#include "ClusterFitter.h"
#include "Displays.h"
#include "GiveMe_Uploader.h"
#include "PRFParameters.h"
#include "Selector.h"
#include "TrackFitter.h"
#include "TrackRecon.h"
#include <chrono>
```

Functions

- [ClassImp \(Reconstruction::RecoPad\)](#)
- [ClassImp \(Reconstruction::RecoCluster\)](#)
- [ClassImp \(Reconstruction::RecoModule\)](#)
- [ClassImp \(Reconstruction::RecoEvent\)](#)

9.89.1 Function Documentation

9.89.1.1 ClassImp() [1/4]

```
ClassImp (
    Reconstruction::RecoCluster )
```

9.89.1.2 ClassImp() [2/4]

```
ClassImp (
    Reconstruction::RecoEvent )
```

9.89.1.3 ClassImp() [3/4]

```
ClassImp (
    Reconstruction::RecoModule )
```

9.89.1.4 ClassImp() [4/4]

```
ClassImp (
    Reconstruction::RecoPad )
```

9.90 Reconstruction/src/Displays.cxx File Reference

```
#include "Displays.h"
#include "ParabolaFunction.h"
#include "ParabolaFunctionNG.h"
#include "SetStyle.h"
#include "SignalTools.h"
#include "Util.h"
#include <typeinfo>
#include "TAxis.h"
#include "TCanvas.h"
#include "TF1.h"
#include "TFile.h"
#include "TGraph.h"
#include "TGraphErrors.h"
#include "TLatex.h"
#include "TLegend.h"
#include "TLegendEntry.h"
#include "TLine.h"
#include "TMultiGraph.h"
#include "TPaveStats.h"
#include "TProfile.h"
#include "TROOT.h"
#include "TStyle.h"
```

Functions

- void [DrawOut_EventDisplay](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &OUTDIR, const std::string &TAG)
 - Output an event display for a given event.*
- void [DrawOut_EventDisplay](#) ([Module](#) *pModule, const std::string &OUTDIR, const std::string &TAG, const std::string &type, const double ¶bola, const double &slope, const double &intercept)
 - Output an event display for a module.*
- TH2D * [GiveMe_EvtDisplay](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &TAG)
 - Get an event display TH2D for an event.*
- TH2D * [GiveMe_EvtDisplay](#) ([Module](#) *pModule, const std::string &TAG)
 - Get an event display TH2D for a module.*
- TH2D * [GiveMe_TimeDisplay](#) ([Module](#) *pModule, const std::string &TAG)
- void [DrawOut_WaveFormDisplay](#) ([Pad](#) *pPad, const std::string &OUTDIR, const std::string &TAG)
- TH1F * [GiveMe_WaveFormDisplay](#) ([Pad](#) *pPad, const std::string &TAG)
- void [DrawOut_ClusterWFDisplay](#) ([Cluster](#) *pCluster, const std::string &OUTDIR, const std::string &TAG)
- void [DrawOut_ClusterWFDisplay](#) ([Cluster](#) *pCluster, const std::string &OUTDIR, const std::string &TAG, const int &Option, const int &PT, const int &TB)
- void [DrawOut_GWF](#) ([Event](#) *pEvent, const int &ModuleNber, const std::string &OUTDIR, const std::string &TAG, const int &PT, const int &TB, const float &phi_rad)
- void [NewClusterDisplay](#) ([Event](#) *pEvent, const std::string &OUTDIR, const std::string &TAG, const int &PT, const int &TB)
- void [NewClusterDisplayMinimal](#) ([Event](#) *pEvent, const std::string &OUTDIR, const std::string &TAG)

9.90.1 Function Documentation

9.90.1.1 DrawOut_ClusterWFDisplay() [1/2]

```
void DrawOut_ClusterWFDisplay (
    Cluster * pCluster,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.90.1.2 DrawOut_ClusterWFDisplay() [2/2]

```
void DrawOut_ClusterWFDisplay (
    Cluster * pCluster,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & Option,
    const int & PT,
    const int & TB)
```

9.90.1.3 DrawOut_EventDisplay() [1/2]

```
void DrawOut_EventDisplay (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & OUTDIR,
    const std::string & TAG)
```

Output an event display for a given event.

Parameters

<i>pEvent</i>	pointer to the Event
<i>ModuleNber</i>	module index
<i>OUTDIR</i>	output directory path
<i>TAG</i>	tagging string used in output filenames

9.90.1.4 DrawOut_EventDisplay() [2/2]

```
void DrawOut_EventDisplay (
    Module * pModule,
    const std::string & OUTDIR,
    const std::string & TAG,
    const std::string & type,
    const double & parabola,
    const double & slope,
    const double & intercept)
```

Output an event display for a module.

9.90.1.5 DrawOut_GWF()

```
void DrawOut_GWF (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & PT,
    const int & TB,
    const float & phi_rad)
```

9.90.1.6 DrawOut_WaveFormDisplay()

```
void DrawOut_WaveFormDisplay (
    Pad * pPad,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.90.1.7 GiveMe_EvtDisplay() [1/2]

```
TH2D * GiveMe_EvtDisplay (
    Event * pEvent,
    const int & ModuleNber,
    const std::string & TAG)
```

Get an event display TH2D for an event.

9.90.1.8 GiveMe_EvtDisplay() [2/2]

```
TH2D * GiveMe_EvtDisplay (
    Module * pModule,
    const std::string & TAG)
```

Get an event display TH2D for a module.

9.90.1.9 GiveMe_TimeDisplay()

```
TH2D * GiveMe_TimeDisplay (
    Module * pModule,
    const std::string & TAG)
```

9.90.1.10 GiveMe_WaveFormDisplay()

```
TH1F * GiveMe_WaveFormDisplay (
    Pad * pPad,
    const std::string & TAG)
```

9.90.1.11 NewClusterDisplay()

```
void NewClusterDisplay (
    Event * pEvent,
    const std::string & OUTDIR,
    const std::string & TAG,
    const int & PT,
    const int & TB)
```

9.90.1.12 NewClusterDisplayMinimal()

```
void NewClusterDisplayMinimal (
    Event * pEvent,
    const std::string & OUTDIR,
    const std::string & TAG)
```

9.91 Reconstruction/src/DrawOuts.cxx File Reference

```
#include "DrawOuts.h"
#include "CombinedFit.h"
#include "Misc_Functions.h"
#include "ReconTools.h"
#include "SignalTools.h"
#include "dEdx.h"
#include "Util.h"
#include <cmath>
#include <numeric>
#include "TF1.h"
#include "TFile.h"
#include "TLatex.h"
#include "TLegend.h"
#include "TLegendEntry.h"
#include "TLine.h"
#include "TPaveStats.h"
#include "TROOT.h"
```

Functions

- void [DrawOut_corrections](#) ()

9.91.1 Function Documentation

9.91.1.1 DrawOut_corrections()

```
void DrawOut_corrections ()
```

9.92 Reconstruction/src/DrawOuts_old.cxx File Reference

```
#include "DrawOuts_old.h"
#include "CombinedFit.h"
#include "Misc_Functions.h"
#include "ReconTools.h"
#include "dEdx.h"
#include "Util.h"
#include <cmath>
#include <numeric>
#include "TF1.h"
#include "TFile.h"
#include "TLatex.h"
#include "TLegend.h"
#include "TLegendEntry.h"
#include "TLine.h"
#include "TPaveStats.h"
#include "TROOT.h"
```

Functions

- void [DrawOut_Versions](#) (const std::string &inputDir, const std::string &Method, const std::string &Comment1, const std::string &Comment2)
- void [DrawOut_Separation](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Separation_Reduced](#) (const std::string &inputDir, const std::string &Comment, std::string Energy)
- void [DrawOut_Scans](#) (const std::string &inputDir, const std::string &Comment, const std::string &WFversion)
- void [DrawOut_Zscan_PT](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Phiscan_Z](#) (const std::string &inputDir, const std::string &Comment, const std::string &WFversion)
- void [DrawOut_Escan](#) (const std::string &inputDir, const std::string &Comment)
- void [DrawOut_Systematics](#) (const std::string &inputDir, const std::string &Comment, const std::string &scan)

9.92.1 Function Documentation

9.92.1.1 DrawOut_Escan()

```
void DrawOut_Escan (
    const std::string & inputDir,
    const std::string & Comment)
```

9.92.1.2 DrawOut_Phiscan_Z()

```
void DrawOut_Phiscan_Z (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & WFversion)
```

9.92.1.3 DrawOut_Scans()

```
void DrawOut_Scans (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & WFversion)
```

9.92.1.4 DrawOut_Separation()

```
void DrawOut_Separation (
    const std::string & inputDir,
    const std::string & Comment)
```

9.92.1.5 DrawOut_Separation_Reduced()

```
void DrawOut_Separation_Reduced (
    const std::string & inputDir,
    const std::string & Comment,
    std::string Energy)
```

9.92.1.6 DrawOut_Systematics()

```
void DrawOut_Systematics (
    const std::string & inputDir,
    const std::string & Comment,
    const std::string & scan)
```

9.92.1.7 DrawOut_Versions()

```
void DrawOut_Versions (
    const std::string & inputDir,
    const std::string & Method,
    const std::string & Comment1,
    const std::string & Comment2)
```

9.92.1.8 DrawOut_Zscan_PT()

```
void DrawOut_Zscan_PT (
    const std::string & inputDir,
    const std::string & Comment)
```

9.93 Reconstruction/src/LUTs.cxx File Reference

```
#include "LUTs.h"
#include <algorithm>
#include <iomanip>
#include <iostream>
#include <iterator>
#include <sstream>
```

Functions

- [ClassImp](#) ([EramInfo](#)) [Reconstruction](#)

9.93.1 Function Documentation

9.93.1.1 ClassImp()

```
ClassImp (
    EramInfo )
```

9.94 Reconstruction/src/Monitoring.cxx File Reference

```
#include "Misc.h"
#include "Util.h"
#include "Monitoring.h"
#include "ReconTools.h"
#include "Variables.h"
#include "Control.h"
#include "Selector.h"
```

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

Variables

- int [Reconstruction::DESY_drift](#) = 0
- int [Reconstruction::DESY_row](#) = 0
- int [Reconstruction::correction_wf](#) = 0
- int [Reconstruction::Draw_Control](#) = 0
- int [Reconstruction::Draw_dEdx](#) = 0
- int [Reconstruction::Draw_Comparison](#) = 0
- int [Reconstruction::Draw_Corrections](#) = 0
- int [Reconstruction::Draw_DESY21SingleScan](#) = 0
- int [Reconstruction::Draw_DESY21MultScan](#) = 0
- int [Reconstruction::Draw_CERN22Scan](#) = 0
- int [Reconstruction::DtwithBhere](#) = 286
- int [Reconstruction::DtwithoutBhere](#) = 323

9.95 Reconstruction/src/ReconTools.cxx File Reference

```
#include "ReconTools.h"
#include "Displays.h"
#include "LUTs.h"
#include "ClusterFitter.h"
#include "PRFParameters.h"
#include "TrackFitter.h"
#include "TrackRecon.h"
#include "TPaveText.h"
#include "Variables.h"
```

Functions

- bool [FourModulesInLine](#) (const std::vector< int > &vec)
- TF1 * [corr_func](#) (const std::string &EventFile, const std::string &Tag, const int &correctWF)
- void [Init_selection](#) (const std::string &SelectionSet, [Selector](#) &aSelector, const std::string &Tag, [Uploader](#) *pUploader, const int &NbrOfMod, const int &Data_to_Use)
- std::vector< std::vector< float > > [readCSV](#) (std::string filename)
- std::vector< int > [ComputeCutStage3_Cut](#) ([Uploader](#) *pUploader, const int &NbrOfMod, const int &Data_to_Use)
- bool [GetStage3Cut_CSV](#) (const std::string &filename, const std::string &targetWord, int &value1, int &value2)
- void [SetStage3Cut_CSV](#) (const std::string &filename, const std::string &targetWord, int value1, int value2)
- TF1 * [Fit2Gauss](#) (TH1F *h1F)
- TF1 * [Fit2Gauss](#) (TH1F *h1F, const float &x1min, const float &x1max, const float &x2min, const float &x2max)
- TF1 * [BetheBloch](#) (const float &Pmin, const float &Pmax, const double &M, const std::string &particle)
- TF1 * [BetheBlochBhabha](#) (const float &Pmin, const float &Pmax, const double &m, const std::string &particle)
- TF1 * [BetheBlochExp](#) (const float &Pmin, const float &Pmax, const double &M, const std::string &particle)
- void [local_params](#) ([Pad](#) *pPad, const [Track](#) *pTrack, float &d, float &dd, float &phi, float &trk_len_pad)
- float [trk_len](#) ([Module](#) *pModule, const [Track](#) *pTrack)
- void [DrawTH2](#) (const std::string &OutDir, TH2 *h2)
- TGraph * [hist_to_graph](#) (TH1 *h1)
- TGraph * [Swapped_graph](#) (TH1 *h1)

9.95.1 Function Documentation

9.95.1.1 BetheBloch()

```
TF1 * BetheBloch (
    const float & Pmin,
    const float & Pmax,
    const double & M,
    const std::string & particle)
```

9.95.1.2 BetheBlochBhabha()

```
TF1 * BetheBlochBhabha (
    const float & Pmin,
    const float & Pmax,
    const double & m,
    const std::string & particle)
```

9.95.1.3 BetheBlochExp()

```
TF1 * BetheBlochExp (
    const float & Pmin,
    const float & Pmax,
    const double & M,
    const std::string & particle)
```

9.95.1.4 ComputeCutStage3_Cut()

```
std::vector< int > ComputeCutStage3_Cut (
    Uploader * pUploader,
    const int & NbrOfMod,
    const int & Data_to_Use)
```

9.95.1.5 corr_func()

```
TF1 * corr_func (
    const std::string & EventFile,
    const std::string & Tag,
    const int & correctWF)
```

9.95.1.6 DrawTH2()

```
void DrawTH2 (
    const std::string & OutDir,
    TH2 * h2)
```

9.95.1.7 Fit2Gauss() [1/2]

```
TF1 * Fit2Gauss (
    TH1F * h1F)
```

9.95.1.8 Fit2Gauss() [2/2]

```
TF1 * Fit2Gauss (
    TH1F * h1F,
    const float & x1min,
    const float & x1max,
    const float & x2min,
    const float & x2max)
```

9.95.1.9 FourModulesInLine()

```
bool FourModulesInLine (
    const std::vector< int > & vec)
```

9.95.1.10 GetStage3Cut_CSV()

```
bool GetStage3Cut_CSV (
    const std::string & filename,
    const std::string & targetWord,
    int & value1,
    int & value2)
```

9.95.1.11 hist_to_graph()

```
TGraph * hist_to_graph (
    TH1 * h1)
```

9.95.1.12 Init_selection()

```
void Init_selection (
    const std::string & SelectionSet,
    Selector & aSelector,
    const std::string & Tag,
    Uploader * pUploader,
    const int & NbrOfMod,
    const int & Data_to_Use)
```

9.95.1.13 local_params()

```
void local_params (
    Pad * pPad,
    const Track * pTrack,
    float & d,
    float & dd,
    float & phi,
    float & trk_len_pad)
```

9.95.1.14 readCSV()

```
std::vector< std::vector< float > > readCSV (
    std::string filename)
```

9.95.1.15 SetStage3Cut_CSV()

```
void SetStage3Cut_CSV (
    const std::string & filename,
    const std::string & targetWord,
    int value1,
    int value2)
```


9.95.1.16 Swapped_graph()

```
TGraph * Swapped_graph (  
    TH1 * h1)
```

9.95.1.17 trk_len()

```
float trk_len (  
    Module * pModule,  
    const Track * pTrack)
```

9.96 Reconstruction/src/Selector.cxx File Reference

```
#include "Selector.h"  
#include "Event.h"  
#include "Pad.h"  
#include "TAxis.h"  
#include "TCanvas.h"  
#include "TF1.h"  
#include "TGraph.h"  
#include "TGraphErrors.h"  
#include "TLegend.h"  
#include "TLine.h"  
#include "TMultiGraph.h"  
#include "TPaveStats.h"  
#include "TProfile.h"  
#include "TStyle.h"
```

9.97 Reconstruction/src/Variables.cxx File Reference

```
#include "Variables.h"
```

Namespaces

- namespace [Reconstruction](#)
dE/dx estimation and particle identification declarations.

Variables

- [Uploader](#) * [Reconstruction::pUploader](#)

9.98 Uploader/inc/GiveMe_Uploader.h File Reference

Factory that constructs a concrete [Uploader](#) instance.

```
#include "Misc.h"
#include "Uploader.h"
```

Functions

- [Uploader](#) * [GiveMe_Uploader](#) (const int &intUploader, const std::string &SampleFile)

9.98.1 Detailed Description

Factory that constructs a concrete [Uploader](#) instance.

Helper that returns a configured [Uploader](#) pointer based on an integer selector. The caller receives ownership of the returned pointer.

9.98.2 Function Documentation

9.98.2.1 GiveMe_Uploader()

```
Uploader * GiveMe_Uploader (
    const int & intUploader,
    const std::string & SampleFile)
```

9.99 GiveMe_Uploader.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #include "Misc.h"
00009 #include "Uploader.h"
00010
00011 Uploader *GiveMe_Uploader(const int &intUploader,
00012                          const std::string &SampleFile);
```

9.100 Uploader/inc/Uploader.h File Reference

Abstract base class for data uploaders.

```
#include "Event.h"
#include "Misc.h"
#include "Model_Charge1D.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"
#include "TFile.h"
#include "TTree.h"
```

Classes

- class [Uploader](#)

9.100.1 Detailed Description

Abstract base class for data uploaders.

Declares the [Uploader](#) interface used to read input samples and produce [Event](#) objects for the reconstruction pipeline. Concrete uploaders implement format-specific logic.

9.101 Uploader.h

[Go to the documentation of this file.](#)

```

00001 #
00009 #ifndef Uploader_H
00010 #define Uploader_H
00011
00012 #include "Event.h"
00013 #include "Misc.h"
00014
00015 #include "Model_ChargeID.h"
00016 #include "Model_Electronics.h"
00017 #include "Model_ReadOutGeometry.h"
00018
00019 #include "TFile.h"
00020 #include "TTree.h"
00021
00023 class Uploader {
00024 public:
00026     Uploader(const std::string &SampleFile,
00027             Model_ReadOutGeometry *pModel_ReadOutGeometry,
00028             Model_Electronics *pModel_Electronics,
00029             Model_ChargeID *pModel_ChargeID);
00030     virtual ~Uploader();
00031
00032     std::string Get_SampleFile();
00033
00034     int Get_NberOfEvent();
00035
00036     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00037                                const int &Data_to_Use,
00038                                const int &CloseWF = 1) = 0;
00039
00040     int Get_PRFF_exist();
00041     double Get_Norm();
00042     double Get_a2();
00043     double Get_a4();
00044     double Get_b2();
00045     double Get_b4();
00046
00047     Model_ReadOutGeometry *Get_Model_ReadOutGeometry();
00048     Model_Electronics *Get_Model_Electronics();
00049     Model_ChargeID *Get_Model_ChargeID();
00050
00051 //-----Data Members-----//
00052 protected:
00053     std::string m_SampleFile;
00054     int m_NberOfEvent;
00055
00056     TFile *p_TFile;
00057
00058     TTree *p_TTree;
00059
00060     Model_ReadOutGeometry *p_Model_ReadOutGeometry;
00061     Model_Electronics *p_Model_Electronics;
00062     Model_ChargeID *p_Model_ChargeID;
00063
00064     short int m_PRFF_exist;
00065     double m_Norm;
00066     double m_a2;
00067     double m_a4;
00068     double m_b2;
00069     double m_b4;
00070 };
00071 #endif

```

9.102 Uploader/inc/Uploader_ERAM01.h File Reference

[Uploader](#) for ERAM01-format data files.

```
#include "Misc.h"
#include "Uploader.h"
```

Classes

- class [Uploader_ERAM01](#)

9.102.1 Detailed Description

[Uploader](#) for ERAM01-format data files.

Declares [Uploader_ERAM01](#) which converts ERAM01-format data into [Event](#) objects for use by the reconstruction pipeline.

9.103 Uploader_ERAM01.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #ifndef Uploader_ERAM1_H
00009 #define Uploader_ERAM1_H
00010
00011 #include "Misc.h"
00012 #include "Uploader.h"
00013
00015 class Uploader_ERAM01 : public Uploader {
00016 public:
00018     Uploader_ERAM01(const std::string &SampleFile,
00019                     Model_ReadOutGeometry *pModel_ReadOutGeometry,
00020                     Model_Electronics *pModel_Electronics,
00021                     Model_ChargeID *pModel_ChargeID);
00022     virtual ~Uploader_ERAM01();
00023
00024     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00025                                 const int &Data_to_Use, const int &CloseWF);
00026
00027     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00028                                 const int &Data_to_Use);
00029
00030     //-----Data Members-----//
00031 private:
00032 };
00033
00034 #endif
```

9.104 Uploader/inc/Uploader_MockUp_V1.h File Reference

Mock-up uploader (version 1) declaration for testing.

```
#include "Misc.h"
#include "Uploader.h"
```

Classes

- class [Uploader_MockUp_V1](#)

9.104.1 Detailed Description

Mock-up uploader (version 1) declaration for testing.

Reads simplified datasets and fills [Event](#) structures for development and testing of reconstruction code.

9.105 Uploader_MockUp_V1.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef Uploader MOCKUP_V1_H
00009 #define Uploader MOCKUP_V1_H
00010
00011 #include "Misc.h"
00012 #include "Uploader.h"
00013
00015 class Uploader_MockUp_V1 : public Uploader {
00016 public:
00018     Uploader_MockUp_V1(const std::string &SampleFile,
00019                       Model_ReadOutGeometry *pModel_ReadOutGeometry,
00020                       Model_Electronics *pModel_Electronics,
00021                       Model_Charge1D *pModel_Charge1D);
00022     virtual ~Uploader_MockUp_V1();
00023
00024     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00025                                const int &Data_to_Use, const int &CloseWF);
00026
00027     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00028                                const int &Data_to_Use);
00029
00030     //-----Data Members-----//
00031 private:
00032 };
00033
00034 #endif

```

9.106 Uploader/inc/Uploader_MockUp_V2.h File Reference

Mock-up uploader (version 2) declaration for richer test datasets.

```

#include "Misc.h"
#include "Uploader.h"

```

Classes

- class [Uploader_MockUp_V2](#)

9.106.1 Detailed Description

Mock-up uploader (version 2) declaration for richer test datasets.

Version 2 exposes additional branches and fields commonly found in newer test datasets and provides branch pointers used to populate vectors and waveform arrays.

9.107 Uploader_MockUp_V2.h

[Go to the documentation of this file.](#)

```

00001 #
00009 #ifndef Uploader__V2_H
00010 #define Uploader__V2_H
00011
00012 #include "Misc.h"
00013 #include "Uploader.h"
00014
00016 class Uploader_MockUp_V2 : public Uploader {
00017 public:
00019     Uploader_MockUp_V2(const std::string &SampleFile,
00020                       Model_ReadOutGeometry *pModel_ReadOutGeometry,
00021                       Model_Electronics *pModel_Electronics,
00022                       Model_ChargeID *pModel_ChargeID);
00023     virtual ~Uploader_MockUp_V2();
00024
00025     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00026                                const int &Data_to_Use, const int &CloseWF);
00027
00028     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00029                                const int &Data_to_Use);
00030
00031     void SetBeforeMerging(const int &i_SetBeforeMerging);
00032     void Setwap_XY(const int &i_Swap_XY);
00033
00034     //-----Data Members-----//
00035 public:
00036     Int_t fCurrent;
00037
00038     Int_t ev;
00039     Int_t track;
00040     ULong64_t date; // Added since code update contains the date of the events !
00041     Bool_t beforeMerging; // Added since code update tells if this track has been
00042                          // saved before or after merging algorithm
00043     Double_t dEdx;
00044     Double_t angle_yz;
00045     Double_t angle_xy;
00046     Int_t rob_clusters;
00047     Double_t quality;
00048     Double_t mom;
00049     Double_t sina;
00050     Double_t offset;
00051     Int_t max_mult;
00052     Double_t mean_mult;
00053     std::vector<int> *multiplicity;
00054     std::vector<int> *charge;
00055     std::vector<double> *residual;
00056     std::vector<double> *residual_corr;
00057     std::vector<std::vector<double>> *dx;
00058     std::vector<std::vector<double>> *qfrac;
00059     std::vector<std::vector<int>> *time;
00060     std::vector<double> *clust_pos;
00061     std::vector<double> *clust_pos_err;
00062     std::vector<double> *track_pos;
00063     std::vector<int> *module;
00064     std::vector<std::vector<int>> *pad_charge;
00065     std::vector<std::vector<int>> *pad_time;
00066     std::vector<std::vector<int>> *wf_width;
00067     std::vector<std::vector<int>> *wf_fwhm;
00068     std::vector<std::vector<int>> *pad_x;
00069     std::vector<std::vector<int>> *pad_y;
00070     std::vector<std::vector<std::vector<int>>> *pad_wf_q;
00071
00072     // List of branches
00073     TBranch *b_ev;
00074     TBranch *b_track;
00075     TBranch *b_date;
00076     TBranch *b_beforeMerging;
00077     TBranch *b_dEdx;
00078     TBranch *b_angle_yz;
00079     TBranch *b_angle_xy;
00080     TBranch *b_rob_clusters;
00081     TBranch *b_quality;
00082     TBranch *b_mom;
00083     TBranch *b_sina;
00084     TBranch *b_offset;
00085     TBranch *b_max_mult;
00086     TBranch *b_mean_mult;
00087     TBranch *b_multiplicity;
00088     TBranch *b_charge;
00089     TBranch *b_residual;
00090     TBranch *b_residual_corr;
00091     TBranch *b_dx;

```

```

00092 TBranch *b_qfrac;
00093 TBranch *b_time;
00094 TBranch *b_clust_pos;
00095 TBranch *b_clust_pos_err;
00096 TBranch *b_track_pos;
00097 TBranch *b_module;
00098 TBranch *b_pad_charge;
00099 TBranch *b_pad_time;
00100 TBranch *b_wf_width;
00101 TBranch *b_wf_fwhm;
00102 TBranch *b_pad_x;
00103 TBranch *b_pad_y;
00104 TBranch *b_pad_wf_q;
00105
00106 void Init();
00107
00108 private:
00109     int m_BeforeMerging;
00110     int m_Swap_XY;
00111     int m_Nx;
00112     int m_Ny;
00113 };
00114
00115 #endif

```

9.108 Uploader/inc/Uploader_Prototype.h File Reference

Prototype-format uploader declaration.

```

#include "Misc.h"
#include "Uploader.h"

```

Classes

- class [Uploader_Prototype](#)

9.108.1 Detailed Description

Prototype-format uploader declaration.

Declares [Uploader_Prototype](#) which reads prototype-format datasets and converts them into [Event](#) objects for reconstruction.

9.109 Uploader_Prototype.h

[Go to the documentation of this file.](#)

```

00001 #
00008 #ifndef Uploader_Prototype_H
00009 #define Uploader_Prototype_H
00010
00011 #include "Misc.h"
00012 #include "Uploader.h"
00013
00015 class Uploader_Prototype : public Uploader {
00016 public:
00018     Uploader_Prototype(const std::string &SampleFile,
00019                       Model_ReadOutGeometry *pModel_ReadOutGeometry,
00020                       Model_Electronics *pModel_Electronics,
00021                       Model_ChargeID *pModel_ChargeID);
00022     virtual ~Uploader_Prototype();
00023
00024     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,

```

```

00025                                     const int &Data_to_Use, const int &CloseWF);
00026
00027     virtual Event *GiveMe_Event(const int &iEvent, const int &ModuleNber_Input,
00028                                 const int &Data_to_Use);
00029
00030     //-----Data Members-----//
00031 private:
00032 };
00033
00034 #endif

```

9.110 Uploader/src/GiveMe_Uploader.cxx File Reference

```

#include "GiveMe_Uploader.h"
#include "Model_Charge1D.h"
#include "Model_Electronics.h"
#include "Model_ReadOutGeometry.h"
#include "Uploader_ERAM01.h"
#include "Uploader_MockUp_V1.h"
#include "Uploader_MockUp_V2.h"
#include "Uploader_Prototype.h"

```

Functions

- `Uploader * GiveMe_Uploader` (const int &intUploader, const std::string &SampleFile)

9.110.1 Function Documentation

9.110.1.1 GiveMe_Uploader()

```

Uploader * GiveMe_Uploader (
    const int & intUploader,
    const std::string & SampleFile)

```

9.111 Uploader/src/Uploader.cxx File Reference

```

#include "Uploader.h"
#include "TF1.h"

```

9.112 Uploader/src/Uploader_ERAM01.cxx File Reference

```

#include "Uploader_ERAM01.h"

```


9.113 Uploader/src/Uploader_MockUp_V1.cxx File Reference

```
#include "Uploader_MockUp_V1.h"
```

9.114 Uploader/src/Uploader_MockUp_V2.cxx File Reference

```
#include "Uploader_MockUp_V2.h"
```

9.115 Uploader/src/Uploader_Prototype.cxx File Reference

```
#include "Uploader_Prototype.h"
```

9.116 Utilities/inc/FuncFromTGraph.h File Reference

Create function wrappers from ROOT TGraph objects.

9.116.1 Detailed Description

Create function wrappers from ROOT TGraph objects.

Utility to produce analytic-like function wrappers from TGraph/TGraphErrors objects. Useful for interpolation and for creating TF1-compatible callables from discrete points.

9.117 FuncFromTGraph.h

[Go to the documentation of this file.](#)

```
00001 #ifndef FuncFromTGraph_H
00002 #define FuncFromTGraph_H
00003
00004 #
00012 #ifndef FuncFromTGraph_H
00013 #define FuncFromTGraph_H
00014 #include "Misc.h"
00015
00016 #include "TGraph.h"
00017
00018 //
00020 class FuncFromTGraph {
00021 public:
00023     FuncFromTGraph(TGraph *pTGraph);
00024     virtual ~FuncFromTGraph();
00025
00026     double Get_Y(const double &vX);
00027
00028     void Dump();
00029
00030     double operator()(double *x, double *par);
00031
00032 private:
00033     TGraph *p_TGraph;
00034     double m_StepX;
00035     double m_X_Lowest;
00036     double m_X_Highest;
00037 };
00038
00039 #endif
```

9.118 Utilities/inc/GaussFunction.h File Reference

Gaussian function wrapper declaration.

```
#include "Misc.h"
```

Classes

- class [GaussFunction](#)

9.118.1 Detailed Description

Gaussian function wrapper declaration.

Declares [GaussFunction](#) which provides getters/setters and a TF1-compatible operator() to evaluate a Gaussian with configurable normalization, mean and sigma.

9.119 GaussFunction.h

[Go to the documentation of this file.](#)

```
00001 #
00009 #ifndef GaussFunction_H
00010 #define GaussFunction_H
00011
00012 #include "Misc.h"
00013
00015 class GaussFunction {
00016 public:
00018     GaussFunction();
00019     virtual ~GaussFunction();
00020
00021     double Get_Norm();
00022     double Get_Mean();
00023     double Get_Sigma();
00024     void Set_Norm(const double &Norm);
00025     void Set_Mean(const double &Mean);
00026     void Set_Sigma(const double &Sigma);
00027
00028     double operator()(double *x, double *par);
00029
00030 private:
00031     double m_Norm;
00032     double m_Mean;
00033     double m_Sigma;
00034 };
00035
00036 #endif
```

9.120 Utilities/inc/Misc.h File Reference

Small general-purpose utilities and common definitions.

```
#include <algorithm>
#include <cctype>
#include <cmath>
#include <cstdlib>
#include <cstring>
```

```
#include <fstream>
#include <iomanip>
#include <iostream>
#include <numeric>
#include <sstream>
#include <stdio.h>
#include <string>
#include <vector>
```

9.120.1 Detailed Description

Small general-purpose utilities and common definitions.

Contains lightweight helpers, constants and convenience utilities used across the project. Keep this header minimal to reduce coupling.

9.121 Misc.h

[Go to the documentation of this file.](#)

```
00001 #
00008 #ifndef Misc_H
00009 #define Misc_H
00010
00011 #include <algorithm>
00012 #include <cctype>
00013 #include <cmath>
00014 #include <cstdlib>
00015 #include <cstring>
00016 #include <fstream>
00017 #include <iomanip>
00018 #include <iostream>
00019 #include <numeric>
00020 #include <sstream>
00021 #include <stdio.h>
00022 #include <string>
00023 #include <vector>
00024
00025 #endif
```

9.122 Utilities/inc/ParabolaFunction.h File Reference

Parabola helper function declaration.

```
#include "Misc.h"
```

Classes

- class [ParabolaFunction](#)

9.122.1 Detailed Description

Parabola helper function declaration.

Declares [ParabolaFunction](#) which implements a simple parabola wrapper used for fitting and curve approximation. A TF1-callable operator() is provided for integration with ROOT if needed.

9.123 ParabolaFunction.h

[Go to the documentation of this file.](#)

```

00001 #
00009 #ifndef ParabolaFunction_H
00010 #define ParabolaFunction_H
00011
00012 #include "Misc.h"
00013
00014 //
00015 // Fit parabola -std::fabs(A0) * std::pow(X0-vX,2)+ Y0 );
00016
00018 class ParabolaFunction {
00019 public:
00021     ParabolaFunction();
00022     virtual ~ParabolaFunction();
00023
00024     double Get_A0();
00025     double Get_X0();
00026     double Get_Y0();
00027     void Set_A0(const double &A0);
00028     void Set_X0(const double &X0);
00029     void Set_Y0(const double &Y0);
00030
00031     double operator()(double *x, double *par);
00032
00033 private:
00034     double m_A0;
00035     double m_X0;
00036     double m_Y0;
00037 };
00038
00039 #endif

```

9.124 Utilities/inc/ParabolaFunctionNG.h File Reference

Non-symmetric parabola helper function declaration.

```
#include "Misc.h"
```

Classes

- class [ParabolaFunctionNG](#)

9.124.1 Detailed Description

Non-symmetric parabola helper function declaration.

Declares [ParabolaFunctionNG](#) which implements a parabola with different curvature on either side of the vertex. Useful for asymmetric fits and TF1-compatible callbacks.

9.125 ParabolaFunctionNG.h

[Go to the documentation of this file.](#)

```

00001 #
00009 #ifndef ParabolaFunctionNG_H
00010 #define ParabolaFunctionNG_H
00011
00012 #include "Misc.h"
00013
00014 //
00015 // Fit parabola -std::fabs(A0) * std::pow(X0-vX,2)+ Y0 );
00016
00018 class ParabolaFunctionNG {
00019 public:
00021     ParabolaFunctionNG();
00022     virtual ~ParabolaFunctionNG();
00023
00024     double Get_A0P();
00025     double Get_A0M();
00026     double Get_X0();
00027     double Get_Y0();
00028     void Set_A0P(const double &A0P);
00029     void Set_A0M(const double &A0M);
00030     void Set_X0(const double &X0);
00031     void Set_Y0(const double &Y0);
00032
00033     double operator()(double *x, double *par);
00034
00035 private:
00036     double m_A0P;
00037     double m_A0M;
00038     double m_X0;
00039     double m_Y0;
00040 };
00041
00042 #endif

```

9.126 Utilities/inc/SignalTools.h File Reference

Signal-processing helper declarations (baseline, pulse finding, ...).

```
#include "TH1F.h"
```

Functions

- TH1F * [ETF](#) (std::string name, const float &tmin, float const &tmax, const float &t_0, const int &nbins, const int &iC, const float &PT, const float &TB)

9.126.1 Detailed Description

Signal-processing helper declarations (baseline, pulse finding, ...).

Provides utility declarations used by reconstruction and fitting code for basic signal processing tasks such as building ETF pulse shapes.

9.126.2 Function Documentation

9.126.2.1 ETF()

```
TH1F * ETF (
    std::string name,
    const float & tmin,
    float const & tmax,
    const float & t_0,
    const int & nbins,
    const int & iC,
    const float & PT,
    const float & TB)
```

The corresponding source file [SignalTools.cxx](#) implements ETF and other electronics-response helpers used to simulate and normalise pulse shapes. These utilities are used by reconstruction and testing code that needs a reproducible electronics impulse response (ETF) and related helpers.

9.127 SignalTools.h

[Go to the documentation of this file.](#)

```
00001
00009 #
00010 #
00017
00018 #ifndef MISC_SIGNALTOOLS_H
00019 #define MISC_SIGNALTOOLS_H
00020
00021 #include "TH1F.h"
00022
00023 // Electronics pulse response function
00024 TH1F *ETF(std::string name, const float &tmin, float const &tmax,
00025           const float &t_0, const int &nbins, const int &iC, const float &PT,
00026           const float &TB);
00027
00028 #endif
```

9.128 Utilities/src/FuncFromTGraph.cxx File Reference

```
#include "FuncFromTGraph.h"
```

9.129 Utilities/src/GaussFunction.cxx File Reference

```
#include "GaussFunction.h"
```

9.130 Utilities/src/ParabolaFunction.cxx File Reference

```
#include "ParabolaFunction.h"
```

9.131 Utilities/src/ParabolaFunctionNG.cxx File Reference

```
#include "ParabolaFunctionNG.h"
```

9.132 Utilities/src/SignalTools.cxx File Reference

```
#include "SignalTools.h"  
#include "Misc_Functions.h"
```

Functions

- TH1F * [ETF](#) (std::string name, const float &tmin, float const &tmax, const float &t_0, const int &nbins, const int &iC, const float &PT, const float &TB)

9.132.1 Function Documentation

9.132.1.1 ETF()

```
TH1F * ETF (  
    std::string name,  
    const float & tmin,  
    float const & tmax,  
    const float & t_0,  
    const int & nbins,  
    const int & iC,  
    const float & PT,  
    const float & TB)
```

The corresponding source file [SignalTools.cxx](#) implements ETF and other electronics-response helpers used to simulate and normalise pulse shapes. These utilities are used by reconstruction and testing code that needs a reproducible electronics impulse response (ETF) and related helpers.

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