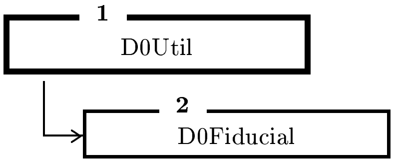
Contents

1 class **D0Util**

Define and set detector positions.

Inheritance



Public Members

	Float_t	**theta** (Float_t etaPhys)	*Return θ for a given etaPhys physics η.*	
	Float_t	**eta_det** (Float_t etaPhys, Float_t ZVertex, char* pos, Float_t DetPos)	*Return eta detector (at Vx=Vy=Vz=0) using etaPhys physics η (η at vertex position), DetPos detector R (if pos is set at "CC", meaning central detector) or DetPos detector Z (if pos is set at "EC", meaning forward detector)*	
	Float_t	**z_coord** (Float_t etaPhys, Float_t ZVertex, Float_t RDetPos)	*Return z coordinate for given etaPhys physics η, Z vertex position (ZVertex) and detector R (RDetPos) position.*	
	Float_t	**r_coord** (Float_t etaPhys, Float_t ZVertex, Float_t ZDetPos)	*Return r coordinate for given etaPhys physics η, Z vertex position (ZVertex) and detector Z (ZDetPos) position.*	
1.1	void	**set_det_pos** ()	*Set the detector positions*	3

1.1 void **set_det_pos** ()

Set the detector positions

Set the detector positions.

- Central Region:

Detector	R (cm)	Zmin (cm)	Zmax (cm)
Central Calorimeter	92.5	-129.9	129.9
Central Preshower	73.0	-120.6	120.6
Central Fiber Tracker 1	20.2	-83.1	83.1
Central Fiber Tracker 2	25.1	-83.1	83.1
Central Fiber Tracker 3	30.0	-126.0	126.0
Central Fiber Tracker 4	34.9	-126.0	126.0
Central Fiber Tracker 5	39.8	-126.0	126.0
Central Fiber Tracker 6	44.7	-126.0	126.0
Central Fiber Tracker 7	49.6	-126.0	126.0
Central Fiber Tracker 8	51.6	-126.0	126.0

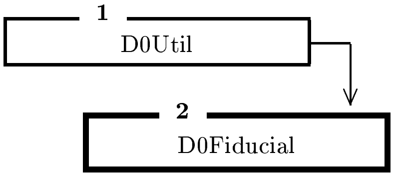
- Forward Region:

Detector	Rmin (cm)	Rmax (cm)	Z (cm)
Forward Calorimeter	6.3	97.2	178.9
Forward Preshower	24.0	44.4	145.0
Forward Tracker	2.7	10.2	38.1

2 class **D0Fiducial** : public D0Util

Define and set detector fiducial cuts.

Inheritance



Public Members

2.1	void	**set_fiducial_cut** (Float_t central = 0.1, Float_t fw_calo_min = 23, Float_t fw_calo_max = 10, Float_t fw_ps_min = 0, Float_t fw_ps_max = 0, Float_t fw_tr_min = 0.25, Float_t fw_tr_max = 0.25)	*Set detector fiducial positions* 5
	void	**print_det_pos** ()	*Print detector positions.*
	Bool_t	**is_EM_CC** (Float_t eta, Float_t ZVertex)	**true** *if in Cental EM Calorimeter region.*
	Bool_t	**is_EM_EC** (Float_t eta, Float_t ZVertex)	**true** *if in forward EM Calorimeter region.*
	Bool_t	**is_PS_CC** (Float_t eta, Float_t ZVertex)	**true** *if in Cental Preshower region.*
	Bool_t	**is_PS_EC** (Float_t eta, Float_t ZVertex)	**true** *if in forward Preshower region.*
	Bool_t	**is_TR_CC** (Float_t eta, Float_t ZVertex)	**true** *if in Central Tracker region.*
	Bool_t	**is_TR_EC** (Float_t eta, Float_t ZVertex)	**true** *if in Forward Tracker region.*

2.1

void **set_fiducial_cut** (Float_t central = 0.1, Float_t fw_calo_min = 23, Float_t fw_calo_max = 10, Float_t fw_ps_min = 0, Float_t fw_ps_max = 0, Float_t fw_tr_min = 0.25, Float_t fw_tr_max = 0.25)

Set detector fiducial positions

Set detector fiducial positions.

- **central**: applies to all central detectors; the detector fiducial Zs are computed as $Z_{fiducial} = (1-central) \times Z_{detector}$
- **fw_calo_min**: Forward calorimeter fiducial $Rmin_{fiducial} = Rmin_{detector} + fw\_calo\_min$
- **fw_calo_max**: Forward calorimeter fiducial $Rmax_{fiducial} = Rmax_{detector} + fw\_calo\_max$
- **fw_ps_min**: Forward preshower fiducial $Rmin_{fiducial} = Rmin_{detector} + fw\_ps\_min$
- **fw_ps_max**: Forward preshower fiducial $Rmax_{fiducial} = Rmax_{detector} + fw\_ps\_max$ [1]
- **fw_tr_min**: Forward tracker fiducial $Rmin_{fiducial} = Rmin_{detector} + fw\_tr\_min$
- **fw_tr_max**: Forward tracker fiducial $Rmax_{fiducial} = Rmax_{detector} + fw\_tr\_max$

Default values are suggestions only, one can decide to apply tighter or looser cuts.

For the central region, a 10% cut corresponds to approximately 10 cm.

For the forward region, calorimeter cuts correspond to approximatively $1.5 \leq \eta \leq 2.5$.

[1] In the case of the Preshower, original detector positions are already set to the detector fiducial positions.

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3 class **Particle**

Contains Particle information.

Public Members

Particle (Float_t vxyz[3], Int_t id = 0, Float_t px = 0, Float_t py = 0, Float_t pz = 0, Float_t pT = 0, Float_t phi = 0, Float_t eta = 0)
Constructor

Bool_t	**is_EM_CC** (D0Fiducial D0)	**true** *if Particle is in Central EM region.*
Bool_t	**is_EM_EC** (D0Fiducial D0)	**true** *if Particle is in Forward EM region.*
Bool_t	**is_PS_CC** (D0Fiducial D0)	**true** *if Particle is in Central PS region.*
Bool_t	**is_PS_EC** (D0Fiducial D0)	**true** *if Particle is in Forward PS region.*
Bool_t	**is_TR_CC** (D0Fiducial D0)	**true** *if Particle is in Central tracker region.*
Bool_t	**is_TR_EC** (D0Fiducial D0)	**true** *if Particle is in Forward tracker region.*
Bool_t	**has_EM** ()	*Particle status:* **true** $\equiv$ *associated EMcluster.*
Bool_t	**has_PS** ()	*Particle status:* **true** $\equiv$ *associated PScluster.*
Bool_t	**has_TR** ()	*Particle status:* **true** $\equiv$ *associated track.*
void	**set_has** (char* what)	*Set the particle status:* **what** *can be* **"EM"** *or* **"PS"** *or* **"TR"**.
void	**set_phi_at** (char* which, char* what)	*to be used with MC particle (or track) only. For a particle with a phi given at the vertex, extrapolate phi value to which = "CC" or "EC" at what = "EM3"*
void	**set_index** (Int_t index)	*Set Particle index.*
Bool_t	**is_phi_edge** (Float_t phi_cut)	

		Return true if particle ϕ is in EM3 (CC) edge region
Float_t	**px** ()	*Return Particle pX.*
Float_t	**py** ()	*Return Particle pY.*
Float_t	**pz** ()	*Return Particle pZ.*
Float_t	**pT** ()	*Return Particle pT.*
Float_t	**phi** ()	*Return Particle ϕ.*
Float_t	**eta** ()	*Return Particle η.*
Int_t	**id** ()	*Return Particle id.*
Int_t	**charge** ()	*Return Particle charge (set by id).*
Int_t	**index** ()	*Return Particle index.*

4 class **cosmetic**

Histrograms, pads and canvas drawing assistant

Public Members

cosmetic (Int_t OptStat = 1111111, Int_t OptFit = 1111,
Color_t CanvasColor = 42, Float_t PadLeftMargin = 0.1,
Float_t PadBottomMargin = 0.2,
Color_t FrameFillColor = 38, Color_t HistFillColor = 1,
Style_t HistFillStyle = 1001, Color_t HistLineColor = 1,
Width_t HistLineWidth = 1, Style_t HistLineStyle = 0,
Int_t MarkerColor = 1, Float_t MarkerSize = 1,
Int_t MarkerStyle = 8, Float_t HistXTitleOffset = 0.,
Float_t HistYTitleOffset = 0., Float_t HistXTitleSize = 0.04,
Float_t HistYTitleSize = 0.04,
Float_t HistXLabelOffset = 0.005,
Float_t HistYLabelOffset = 0.005,
Float_t HistXLabelSize = 0.03,
Float_t HistYLabelSize = 0.03)
constructor

void **SetHisto** (TH1F* histo, Int_t FillColor = 0, Int_t FillStyle = 0,
Float_t HistoMax = 0, Float_t HistoMin = 0)
Set histogram general parameters.

void **SetHistoLine** (TH1F* histo, Color_t LineColor = 0,
Width_t LineWidth = 0, Style_t LineStyle = 0)
Set histogram line parameters.

void **SetHistoMarker** (TH1F* histo, Int_t MarkerColor = 0,
Float_t MarkerSize = 0, Int_t MarkerStyle = 0)
Set histogram marker parameters.

void **SetHistoAxis** (TH1F* histo, char* XTitle = "XTitle",
char* YTitle = "YTitle", Float_t HistXTitleOffset = 0,
Float_t HistYTitleOffset = 0, Float_t HistXTitleSize = 0,
Float_t HistYTitleSize = 0,
Float_t HistXLabelOffset = 0,
Float_t HistYLabelOffset = 0,
Float_t HistXLabelSize = 0, Float_t HistYLabelSize = 0)
Set histogram axis parameters.

Histrograms, pads and canvas drawing assistant.

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The cosmetic class helps to control most of the histograms, pads and canvas drawing options. The following sequence gives a short example of how ot use the cosmetic class:

```
TH1F* histo1 = new TH1F("histo1","histo1",50,0.,100.);
cosmetic GraphStyle(10,0111,18,0.2,0.2,19,46,1001,1,1,0,1,1,8,0.8,0.8,0.1,0.1,0.005,0.005,0.04,0.04);
GraphStyle.SetHistoAxis(histo1,"pT","dN/dpT");
histo1->Draw();
```

Class Graph