Class diagram (part 1) - Object Oriented Frontend for Calorimeter Simulation and Data Analysis

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Class: Ions

Attributes
- Ions()

Operations
+ initializeAllIons(&id: std::vector<ionDisplay>): static void

composition

Class: gui

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Class: ElossMonteCarlo

Attributes
- geant4: QProcess*
- env: QProcessEnvironment
- calorimeter: Calorimeter*
- simLog: QString
- textOutput: QString
- rootOutput: QString
- grapOutput: QString
- cOut: TCanvas*
- hOut: TH1D*
- nEvents: int
- boxX: double
- boxXY: double
- maxStep: double
- printProgress: unsigned int
- verbosity: signed int
- printMaterials: bool
- energyMeanMeV: double
- energySigmaMeV: double
- g4ion: G4ion
- beamFWHM: double

Operations
- processOutput(): void
+ ElossMonteCarlo()
+ ~ElossMonteCarlo()
+ runMacro(macro: QString): void
+ parseOutput(): QString
+ const getGeant4(): QProcess*
+ const getSimLog(): QString*
+ synthetizeMacro(): QString
+ const getCalorimeter(): Calorimeter*
+ const getNEvents(): int
+ setNEvents(value: int): void
+ const getBoxX(): double
+ const getBoxYZ(): double
+ setBoxYZ(value: double): void
+ const getMaxStep(): double
+ setMaxStep(value: double): void
+ const getPrintProgress(): unsigned int
+ setPrintProgress(value: unsigned int): void
+ const getVerbosity(): signed int
+ setVerbosity(value: signed int): void
+ const getPrintMaterials(): bool
+ setPrintMaterials(value: bool): void
+ const getEnergyMeanMeV(): double
+ setEnergyMeanMeV(value: double): void
+ const getEnergySigmaMeV(): double
+ setEnergySigmaMeV(value: double): void
+ const getBeamFWHM(): double
+ setBeamFWHM(value: double): void
+ const getG4ion(): G4ion
+ setG4ion(&value: const G4ion): void
+ clearModel(): void

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GEANT4 cmp

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Class: Calorimeter

Operations
+ buildBeamDeliveryPMT(D0mm: double, TicknessMm: double, *mat: Absorber, &zeroRef: double): void
+ buildCalorimeterWall(D1mm: double, TicknessMm: double, *mat: Absorber, &zeroRef: double): void
+ buildSelaedNacelWall(TicknessMm: double, *mat: Absorber, &zeroRef: double): void
+ buildCalorimeterAbso(TicknessMm: double, *mat: Absorber, &zeroRef: double): void
+ buildScintillatorXtl(D3mm: double, TicknessMm: double, *mat: Absorber, &zeroRef: double, nx: int, ny: int, sizeYZ: double): void

inheritance

Class: DetectorModel

Attributes
- xVolume, yVolume, zVolume: double
- xOffset, yOffset, zOffset: double
- layers: std::vector<Absorber*>
- synthesisCache: QString

Operations
+ DetectorModel()
+ ~DetectorModel()
+ addLayer(layer: Absorber*): void
+ removeLayer(index: int): void
+ clear(): void
+ modelSynthesis(): QString

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Class: PmmaAbsorber

Operations
+ PmmaAbsorber()
+ renderTallyMaterial(j: int): const QString
+ renderAll(j: int): const QString
+ static initializeMaterial(&reg: std::vector<materialDisplay>): void

inheritance

Class: ScintAbsorber

Attributes
- nrows: int
- ncols: int
- cellHsize: double
- cellVsize: double

Operations
+ ScintAbsorber()
+ renderTallyMaterial(j: int): const QString
+ renderAll(j: int): const QString
+ static initializeMaterial(&reg: std::vector<materialDisplay>): void
+ getNrows(): const int
+ setNrows(value: int): void
+ getNcols(): const int
+ setNcols(value: int): void
+ getCellHsize(): const double
+ setCellHsize(value: double): void
+ getCellVsize(): const double
+ setCellVsize(value: double): void

Factory pattern

Abstract Class: Absorber

Attributes
- heigh, width, tickness: double
- xpos, ypos, zpos: double
- tallyIndex: int

Operations
+ Absorber()
+ ~Absorber()
+ renderPosition(j: int): const QString
+ renderSize(j: int): const QString
+ virtual renderTallyMaterial(j: int): const QString = 0
+ virtual renderAll(j: int): const QString = 0
+ getHeigh(): const double
+ setHeigh(value: double): void
+ getWidth(): const double
+ setWidth(value: double): void
+ getTickness(): const double
+ setTickness(value: double): void
+ getXpos(): const double
+ setXpos(value: double): void
+ getYpos(): const double
+ setYpos(value: double): void
+ getZpos() const: double
+ setZpos(value: double): void
+ getTallyIndex(): const int
+ setTallyIndex(value: int): void

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Class: AbsAbsorber

Operations
+ AbsAbsorber()
+ renderTallyMaterial(j: int): const QString
+ renderAll(j: int): const QString
+ static initializeMaterial(&reg: std::vector<materialDisplay>): void

Class: LiquidCaloAbsober

Operations
+ LiquidCaloAbsorber()
+ renderTallyMaterial(j: int): const QString
+ renderAll(j: int): const QString
+ static initializeMaterial(&reg: std::vector<materialDisplay>): void

Class diagram (part 2) - Object Oriented Frontend for Calorimeter Simulation and Data Analysis

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Class: FitterClass

Attributes
- fit1D: TF1*
- fit2D: TF2*
- targetObject: T*
- fitFormula: QString
- fitModelName: QString

Operations
+ FitterClass()
+ ~FitterClass()
+ custom1D(numpar: int, formula: QString, data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ gauss1D(data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ landau(data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ moyal(data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ custom2D(index: int, numpar: int, formula: QString, data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ gauss2D(index: int, data: const T*, &p_i: std::vector<double>, &b: std::vector<bool>, &p: std::vector<double>, &r: std::vector<bool>, & p_min: std::vector<double>, & p_max: std::vector<double>): void
+ setTargetObject(data: const T): void
+ setFitFormula(formula: QString): void
+ setFitModelName(name: QString): void
+ getFitFormula(): QString
+ getFitModelName(): QString
+ getFit1D(): TF1*
+ getFit2D(): TF2*

composition

Class: ElossReco

Attributes
- beamEnergy: TH1D*
- mp: std::vector<MeasPoint*>
- eModel: QString;

Operations
+ ElossReco()
+ ElossReco(&v: const std::vector<Measpoint*>)
+ ElossReco(&copy: const ElossReco)
+ ~ElossReco()
+ Add(a: MeasPoint*): void
+ RemoveAt(I: const int) : void
+ DrawEloss(C: TCanvas*) : void
+ Export(fe: FileExport*, opt: std::string):void
+ getMp(): const std::vector<MeasPoint*>
+ getEModel(): const QString
+ setEModel(&value: const QString): void
- updateHistogram: void

Class: MeasPoint

Attributes
- model QString

Operations
+ MeasPoint
+ MeasPoint(path: const QString, inverting: bool)
+ MeasPoint(© const MeasPoint)
+ Export(*fe: FileExport, opt: std::string): void
+ getEModel(): const QString
+ setModel(&value: const QString): void
- getMinRange(): double
- getMaxRange(): double

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Class: FileParser

Attributes
- filepath: QString
- filename: QString
- foldername: QString
- fileextension: QString
- invertingAmplifier: bool
- events: std::vector<double>
- X, Y, Z, E, T: double
- X_err, Y_err, Z_err, E_err: double
- digitizerChannel0, digitizerChannel1, triggerMode, dcOffset0, dcOffset1, actCh, riseTime, trigMean, gateW, preGate, holdoff, baselineMean, noFlatTime, GPO: QString
- psauChannel0, psauChannel1, vSet0, vSet1, gain0, gain1, comp0, comp1, threshold0, threshold1, dateTime, vMon0, vMon1, temp0, temp1, tempBoard: QString
- runImported: bool
- formatMarkerFound: bool

Operations
+ FileParser()
+ ~FileParser()
+ loadFile(path: const QString): void
+ dumpFile(const QString path): const void
+ fileExist(const QString path): const bool
+ getFilepath(): const QString
+ getFilename(): const QString
+ getFoldername(): const QString
+ getFileextension(): const QString
+ getX(): const double
+ getY(): const double
+ getZ(): const double
+ getE(): const double
+ getT(): const double
+ getDigitizerChannel0(): const QString
+ getDigitizerChannel1(): const QString
+ getTriggerMode(): const QString
+ getDcOffset0(): const QString
+ getDcOffset1(): const QString
+ getActCh(): const QString
+ getRiseTime(): const QString
+ getTrigMean(): const QString
+ getGateW(): const QString
+ getPreGate(): const QString
+ getHoldoff(): const QString
+ getBaselineMean(): const QString
+ getNoFlatTime(): const QString
+ getGPO(): const QString
+ getPsauChannel0(): const QString
+ getPsauChannel1(): const QString
+ getVSet0(): const QString
+ getVSet1(): const QString
+ getGain0(): const QString
+ getGain1(): const QString
+ getComp0(): const QString
+ getComp1(): const QString
+ getThreshold0(): const QString
+ getThreshold1(): const QString
+ getDateTime(): const QString
+ getVMon0(): const QString
+ getVMon1(): const QString
+ getTemp0(): const QString
+ getTemp1(): const QString
+ getTempBoard(): const QString
+ getEvents(): const std::vector<double>
+ getRunImported(): const bool
+ getX_err(): const double
+ setX_err(value: double): void
+ getY_err(): const double
+ setY_err(value: double): void
+ getZ_err(): const double
+ setZ_err(value: double): void
+ getE_err(): const double
+ setE_err(value: double): void
+ getInvertingAmplifier(): const bool
+ setInvertingAmplifier(value: bool): void

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TH1D

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TGraphErrors

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Class: Element

Operations
+ virtual ~Element()
+ virtual Export(fe: FileExport*, opt: std::string): void

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Class: gui

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Class: FileExportMp

Attributes
- Option: std::string

Operations
+ FileExportMp()
+ ~FileExportMp()
+ virtual RunExportMp(mp: MeasPoint*): void
+ virtual RunExportEl(er: ElossReco*): void
+ virtual RunExportTr(tr: Transverse*): void
+ virtual SetOpt(opt: const std::string): void
+ virtual setIndex(index: const int): void
+ GetOpt(): std::string

TH2D

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Class: Transverse

Attributes
- beamTransverseImage: std::vector<TH2D*>
- currentSlice: TH2D*
- tModel: QString

Operations
+ Transverse();
+ Transverse(gafchromic: const QString, &minXmm: const double, &minYmm: const double, &maxXmm: const double, &maxYmm: const double);
+ Transverse(elossProfile: const ElossReco*, &zMin: const double, &zMax: const double);
+ ~Transverse()
+ Export(fe: FileExport*, opt: std::string, index: const int): void
+ addGafchromic(gafchromic: QString const, &minXmm: const double, &minYmm: const doubl &maxXmm: const double, & maxYmm: const double): void
+ addElossProfile(elossProfile: const ElossReco*, & minZ: const double, & maxZ: const double): void
+ removeAt(index: int): void
+ count(): int
+ getAt(index: int): TH2D*
+ getCurrentSlice(): const TH2D*
+ getBeamTransverseImage(): const std::vector<TH2D*>
+ getTModel(): const QString
+ setTModel(&value: const QString): void

Class: FileExport

Attributes
+ wc1s: const int
+ hc1s: const int
+ exportPath : const QString

Operations
+ virtual ~FileExport()
+ virtual runExportMp(mp: Measpoint*): void
+ virtual runExportEl(er: ElossReco*): void
+ virtual runExportTr(tr: Transverse*): void
+ virtual SetOpt(opt:const, std::string): void
+ virtual setIndex(index: const int): void

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QtFileSystem

Class: FileExportTr

Attributes
- Option: std::string

Operations
+ FileExportEl()
+ ~FileExportEl()
+ virtual RunExportMp(mp: MeasPoint*): void
+ virtual RunExportEl(er: ElossReco*): void
+ virtual RunExportTr(tr: Transverse*): void
+ virtual SetOpt(opt: const std::string): void
+ virtual setIndex(index: const int): void
+ GetOpt(): std::string

Class: FileExportEl

Attributes
- Option: std::string

Operations
+ FileExportTr()
+ ~FileExportTr()
+ virtual RunExportMp(mp: MeasPoint*): void
+ virtual RunExportEl(er: ElossReco*): void
+ virtual RunExportTr(tr: Transverse*): void
+ virtual SetOpt(opt: const std::string): void
+ virtual setIndex(index: const int): void
+ GetOpt(): std::string

Visitor pattern

cmp

QtFileSystem

Class diagram (part 3) - Object Oriented Frontend for Calorimeter Simulation and Data Analysis
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