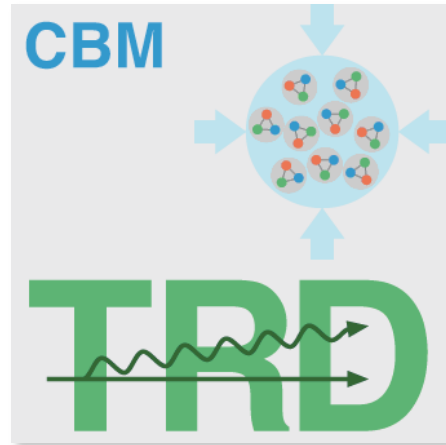


Software Status

TRD Retreat

09.11.2023

Dennis Spicker
Goethe-Universität Frankfurt



Overview

- Following on [Axels summary](#) at the collaboration meeting
- Pascals changes
- Hit position uncertainties

Plans for the TRD detector part of CbmRoot release Oct23

Redmine issue [#2769](#)

Subtasks **11** (9 open — 2 closed)

Development #2846: Modify Standard-TRD unpacker for new data format	New		0
> Development #2847: New Standard-TRD data format definition	New	David Schledt	0
Development #2848: Define recognition and handling of incomplete charge clusters	New		0
> Development #2849: Define recognition and handling of incomplete charge clusters for Standard-TRD	Closed	Philipp Kähler	0
> Development #2850: Define recognition and handling of incomplete charge cluster for TRD-2D	New	Alexandru Bercuci	0
Development #2854: Include the beam pipe and especially the beam bellow influence.	New		0
Test #2855: QA on the dEdx to check deuteriu 4He separation	New		0
Development #2897: TRD geometry updates	Assigned	Omveer Singh	0
> Development #2851: Integrate TRD mainframe into TRD geometries	Assigned	Omveer Singh	0
> Development #2852: Merge TRD-2D into default TRD geometries	Assigned	Alexandru Bercuci	0
> Development #2888: Create TRD "day-1" geometry	Closed	Pierre-Alain Loizeau	0

Related issues

Related to CbmRoot - Development #2853: TRD parameter and calibration handling	Assigned	Alexandru Bercuci
Related to CbmRoot - Bug #2963: Review TRD hit position uncertainties	In Progress	Dennis Spicker

Pascals Changes

■ Rework Spadic Class

- Many small improvements in digitization-simulation and reconstruction
- Applying changes to current master already done
- QA still to be done
- Original branch praisig/cbmroot/[trdReworkSpadicClass](#) [change-summary](#)
- Current development branch d.spicker/cbmroot/[trdReworkSpadic](#)

Pascals Changes

- Parameter Handling
 - Branch [improveParHandlingTrd1D](#)
 - Merge request in CbmRoot [!656](#)
 - Merge request in cbmroot_parameter [!72](#)
 - Redmine Issue [#2853](#)
 - Work started by Alexandru

TRD Hit Position Uncertainties

- Redmine issue [#2963](#)
- Merge request [!1368](#)
- Coding done
- QA in progress
 - Currently difficulties with standard QA macro
 - Some MR pipelines failing without obvious reason → asking F. Uhlig

TRD Hit

```
// Parameters we need to make a Hit:

int32_t hit_moduleId      = fModAddress;
TVector3 hit_pos_global   = {0., 0., 0.}; // pos in global coords [cm]
TVector3 hit_dpos_global  = {0., 0., 0.}; // pos error [cm]
double hit_dxy            = 0;           // covariance
int32_t hit_clusterId     = clusterId;
double hit_eLoss          = 0;           // energy deposition [GeV]
double hit_time           = 0;           // [ns]
double hit_time_err       = 0;           // [ns]
```

Hit Finder

```
// Preliminary hard coded position deviation value
const Double_t xDevDesignVal = 0.03; // cm
const Double_t xDevFactor = 1.0; //

for (all digis in the current cluster) {
    hit_position += digi_position * digi->GetCharge(); // weighted mean
    hit_position_err.SetX(xDevDesignVal * xDevFactor);
    hit_position_err.SetY((digi_position_err.y() * 2) / (sqrt(12.)));
    hit_charge += digi->GetCharge();
    hit_time += digi->GetTime();
}
hit_position *= (Double_t)(1. / hit_charge); // weighted mean
hit_time /= (Double_t) n_digis; // mean
hit_time_err = 62.5 / 2.; // in the previous version it was 8.5 but why?
```

Hit Finder

- Transform local position into global coordinates with `TGeoNavigator::LocalToMaster()`
- For the position error: Take rotation of modules into account
- For incomplete clusters: Set charge to -1

```
// Preliminary correction for angle dependence in the position reconstruction.  
// See PhD thesis of Etienne Bechtel, page 88, for details.  
hit_pos_global[0] = hit_pos_global[0] + (0.00214788 + hit_pos_global[0] * 0.000195394);  
hit_pos_global[1] = hit_pos_global[1] + (0.00370566 + hit_pos_global[1] * 0.000213235);  
  
return new CbmTrdHit(...);
```

TRD Hit Position Uncertainties

- Link to directly see the changes:

https://git.cbm.gsi.de/trd/cbmsoft/cbmroot/-/compare/master...bug%2F2963_trdPosVar?from_project_id=462&straight=false