

Updates

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Outline

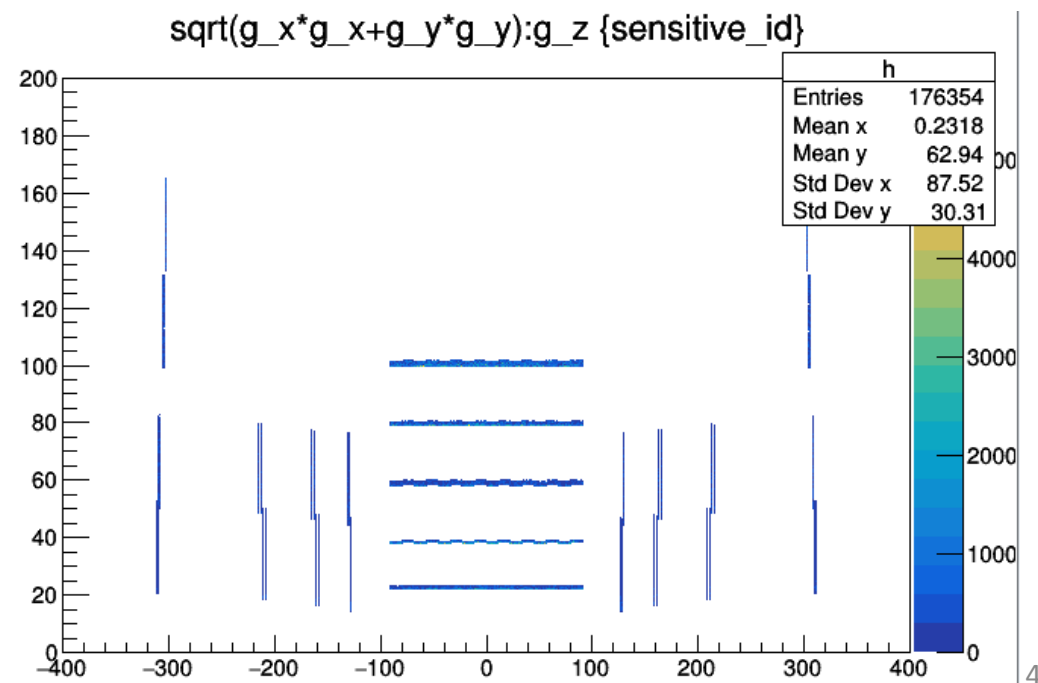
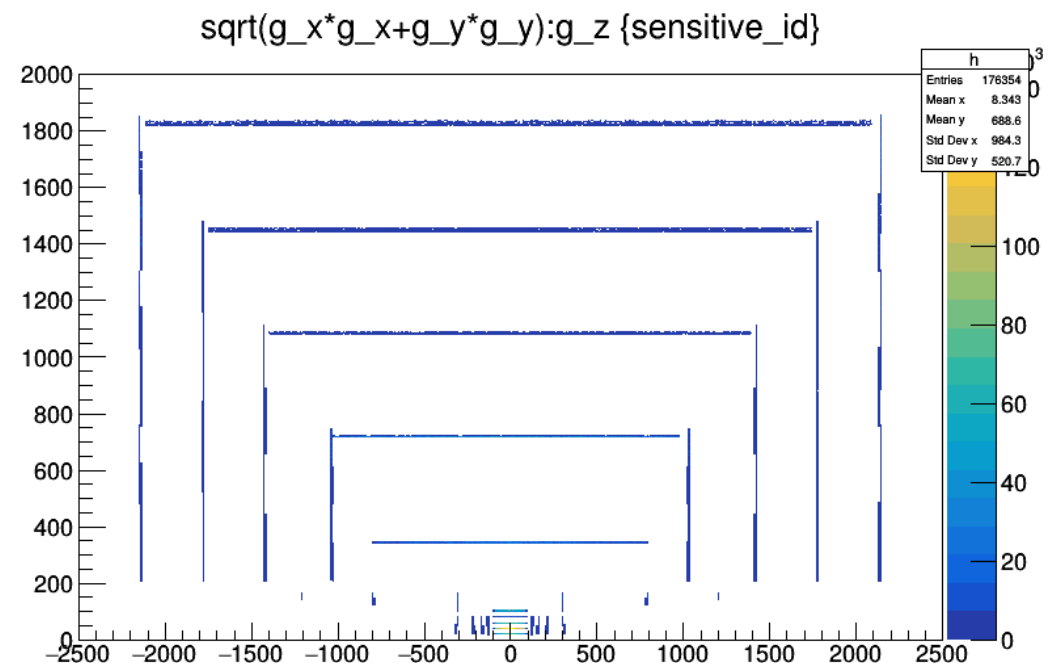
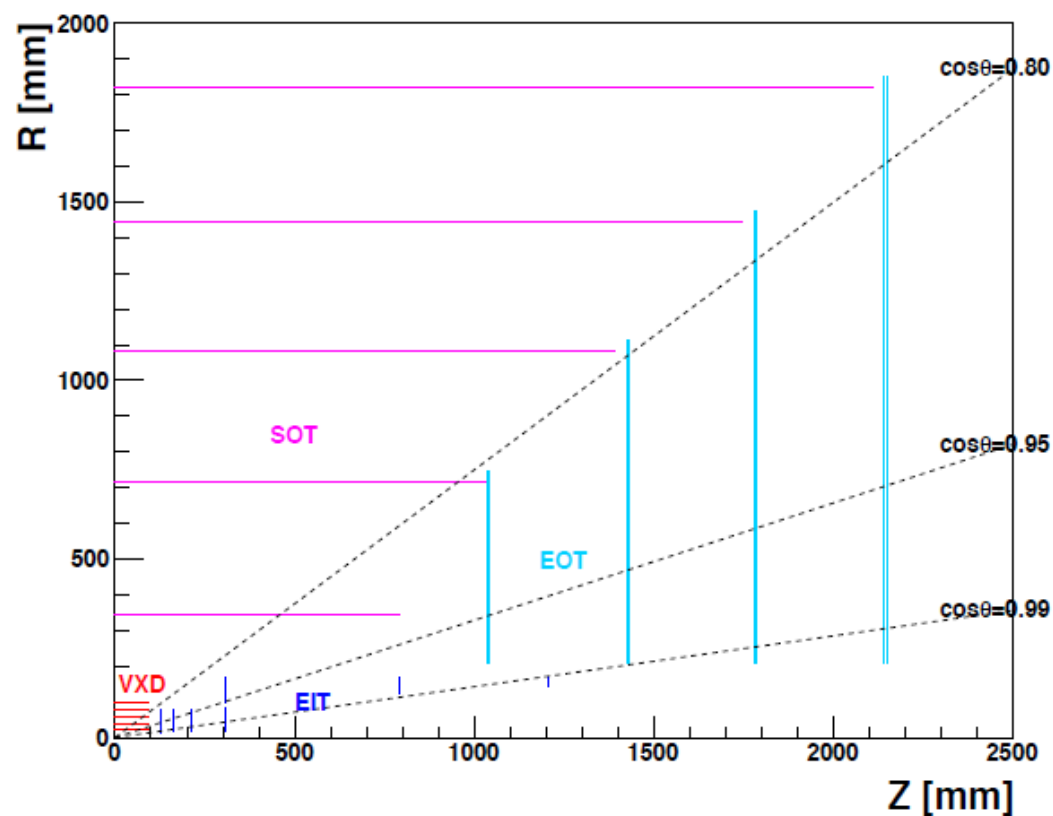
- FST2 validation
- TPC material description
 - Surface material mapping

FST2 Validation

Overlap:

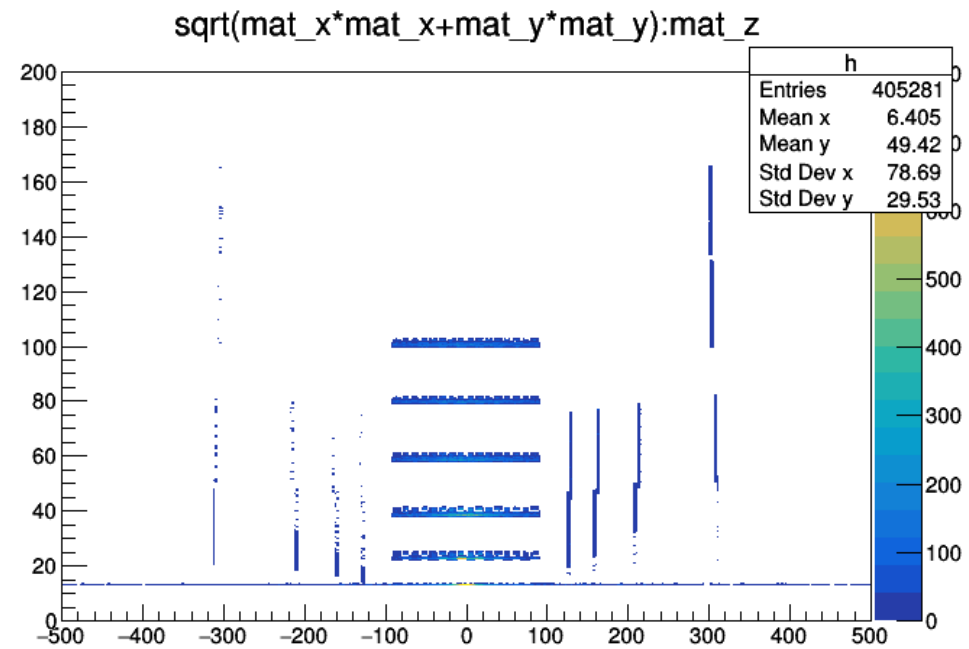
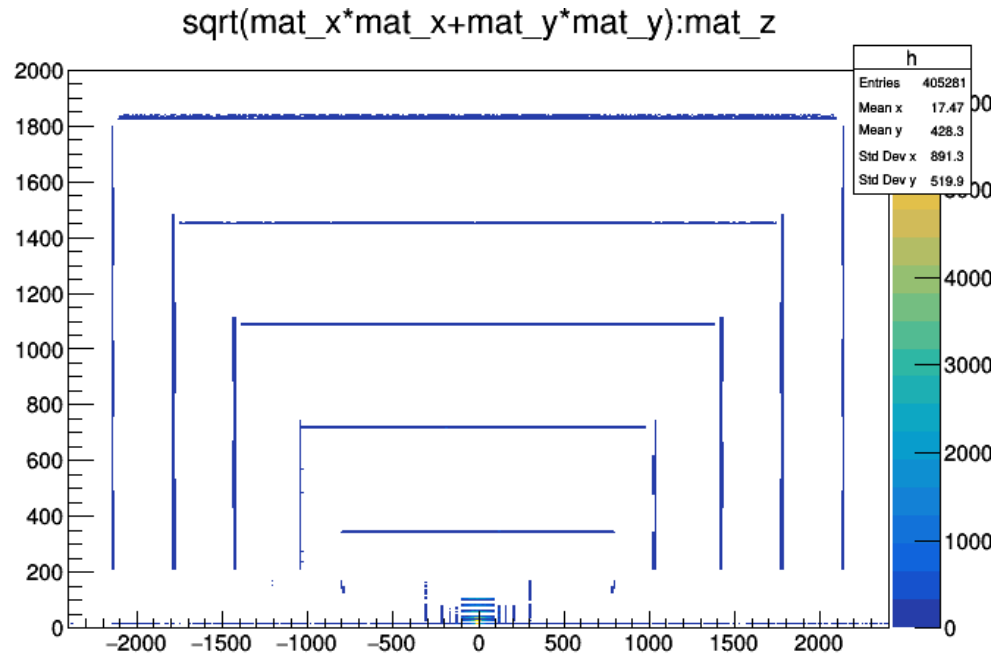
- solid overlapping -> failed to run ACTS geometry
 - Length of the modules
 - Size of the disc
- ACTS: tracking geometry logic
 - Inner -> outer sub-volume
 - outer layer not expected to be included in the inner sub-volume (tube)

Propagation output



Geantino output

Missing endcap at the inner part



- Current not clear the reason for the missing part of vertex detector
- ❑ Move on to the next step (fatras) to see if it could help us targeting the problem

TPC material

- <https://gitlab.cern.ch/acts/acts-wiki/-/wikis/howto/Material-Mapping>
- **Acts-framework-cepc: combine-bump** (core: v0.19.0)
 - Surface mapping: not working (both ODD and CEPC) with the mapping procedure in the link -> **solved**
 - Volume mapping: not available
- **Acts (core: v0.26.0, v0.25.0)**
 - Modifications: files management, source file ...
 - Problems while doing the GeantinoRecording ... -> **fixed in the latest version**

TPC material

<https://gitlab.cern.ch/acts/acts-wiki/-/wikis/howto/Material-Mapping>

Steps to do the material mapping:

1. Geometry json file (GeometryExample)
(1.5) Surfaces configuration -> where the TPC surface been added
2. Geantino scan
3. Material mapping
- (4) Validation

The geometry json file

1.

```
ACTFWDD4hepGeometryExample -n1 -j1 --mat-output-file surfaces-map-cepc-all --dd4hep-  
input ../../Detectors/DD4hepDetector/compact/CEPC/cepc_v04_master.xml --output-json true --mat-output-  
allsurfaces true --mat-output-sensitive true --dd4hep-envelopeR 0.1 --dd4hep-envelopeZ 0.1
```

-> .json file containing all the surfaces in the geometry

2.

```
ACTFWDD4hepGeometryExample -n1 -j1 --mat-output-file surfaces-map-cepc --dd4hep-  
input ../../Detectors/DD4hepDetector/compact/CEPC/cepc_v04_master.xml --output-json true  
--mat-output-sensitive true --dd4hep-envelopeR 0.1 --dd4hep-envelopeZ 0.1
```

-> .json file (silicon layers)

-> copy the TPC barrel layers from the json file last command generated

set the "matSurface": false, to true

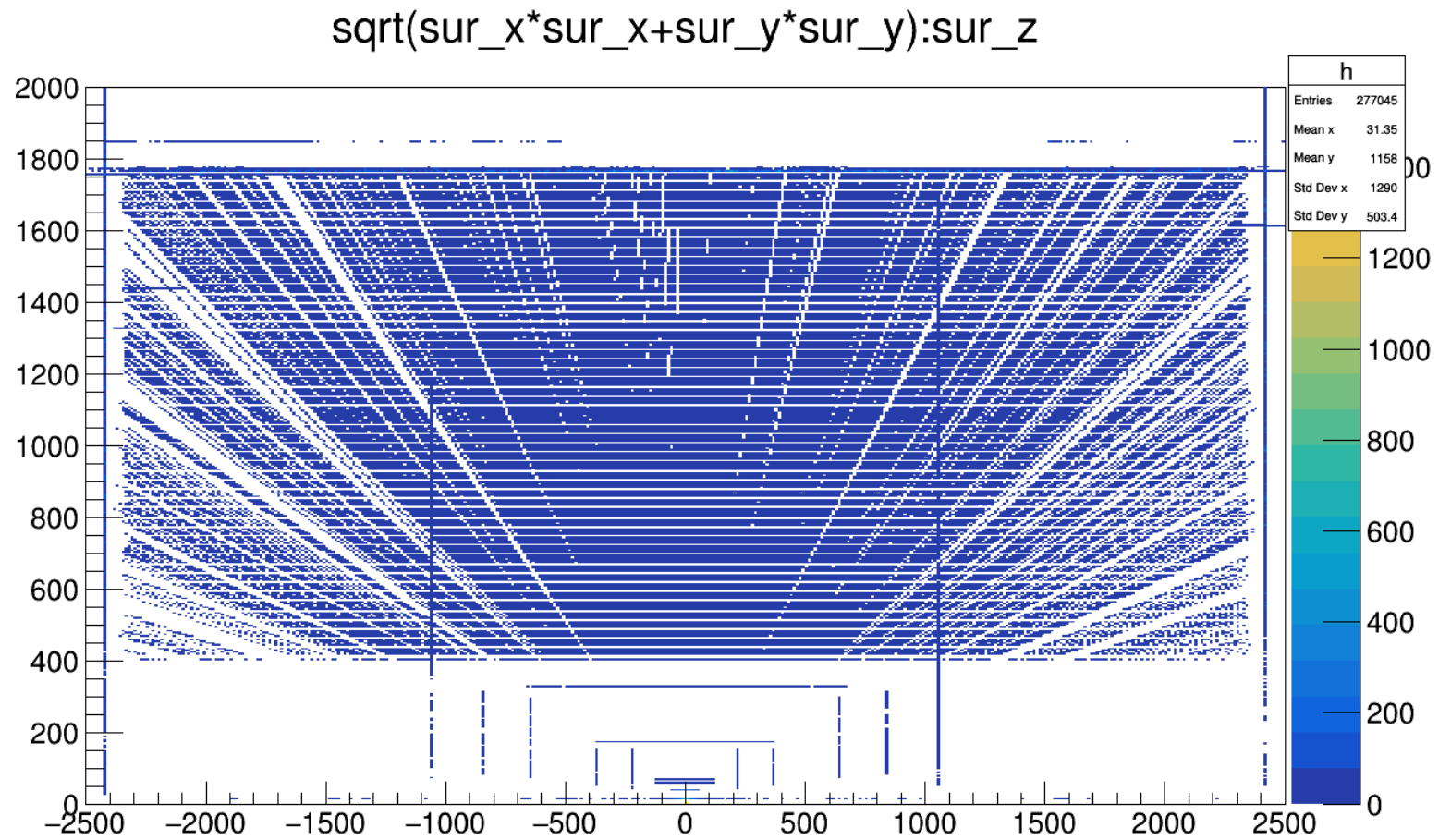
-> ready for the material mapping processing

The geometry json file

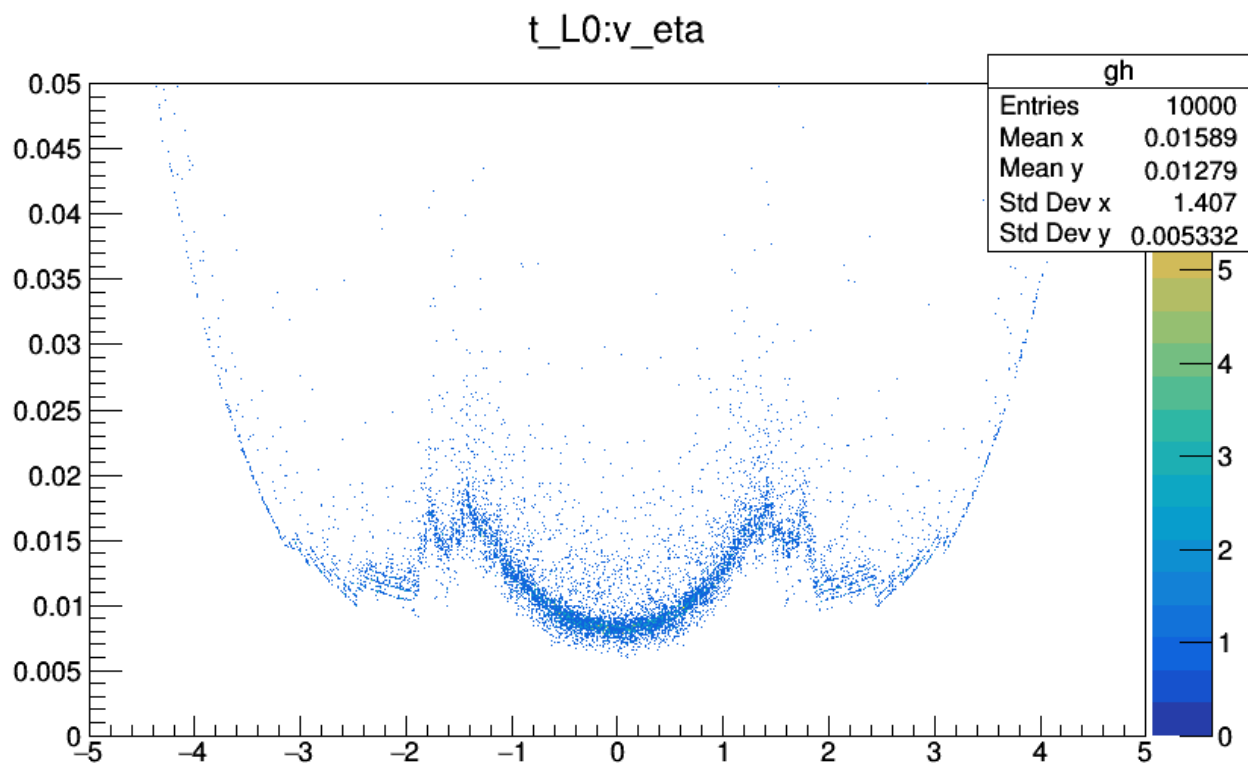
```
"34": {
  "Geoid": "[ 34 | 0 | 0 | 0 | 0 ]",
  "Name": "TPC_::Barrel",
  "boundaries": {
    "1": {
      "SGeoid": "[ 35 | 1 | 0 | 0 | 0 ]",
      "bin0": [
        "binPhi",
        "closed",
        1
      ],
      "bin1": [
        "binR",
        "open",
        1
      ],
      "matSurface": false,
      "sposition": 2340.1000000000004,
      "srange": [
        15.9,
        1781.0500000010002
      ],
      "stype": "Disk",
      "type": "proto"
    },
    "4": {
```

```
},
"34": {
  "Geoid": "[ 34 | 0 | 0 | 0 | 0 ]",
  "Name": "TPC_::Barrel",
  "layers": {
    "2": {
      "Geoid": "[ 34 | 0 | 2 | 0 | 0 ]",
      "approach": {
        "1": {
          "SGeoid": "[ 34 | 0 | 2 | 1 | 0 ]",
          "bin0": [
            "binPhi",
            "open",
            1
          ],
          "bin1": [
            "binZ",
            "open",
            1
          ],
          "matSurface": true,
          "sposition": 400.10000000000025,
          "srange": [
            -2340.0,
            2340.0
          ],
          "stype": "Cylinder",
          "type": "proto"
        },
        "4": {
```

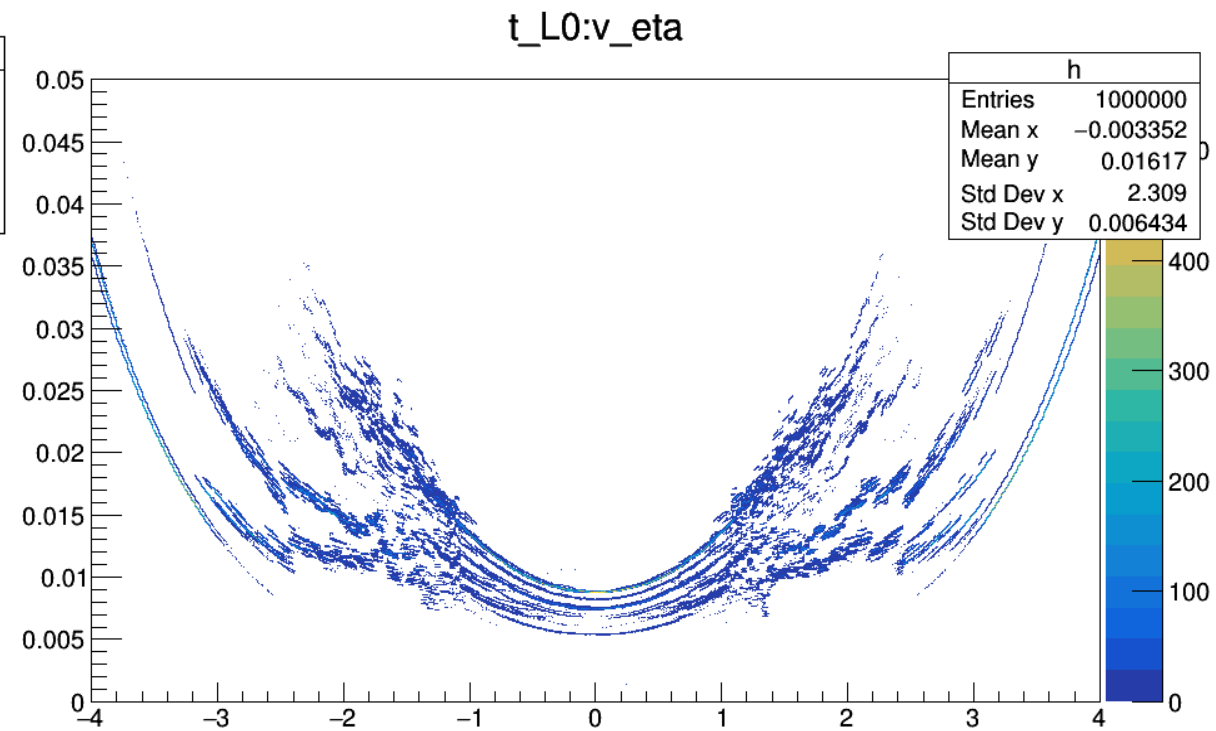
TPC material



TPC material

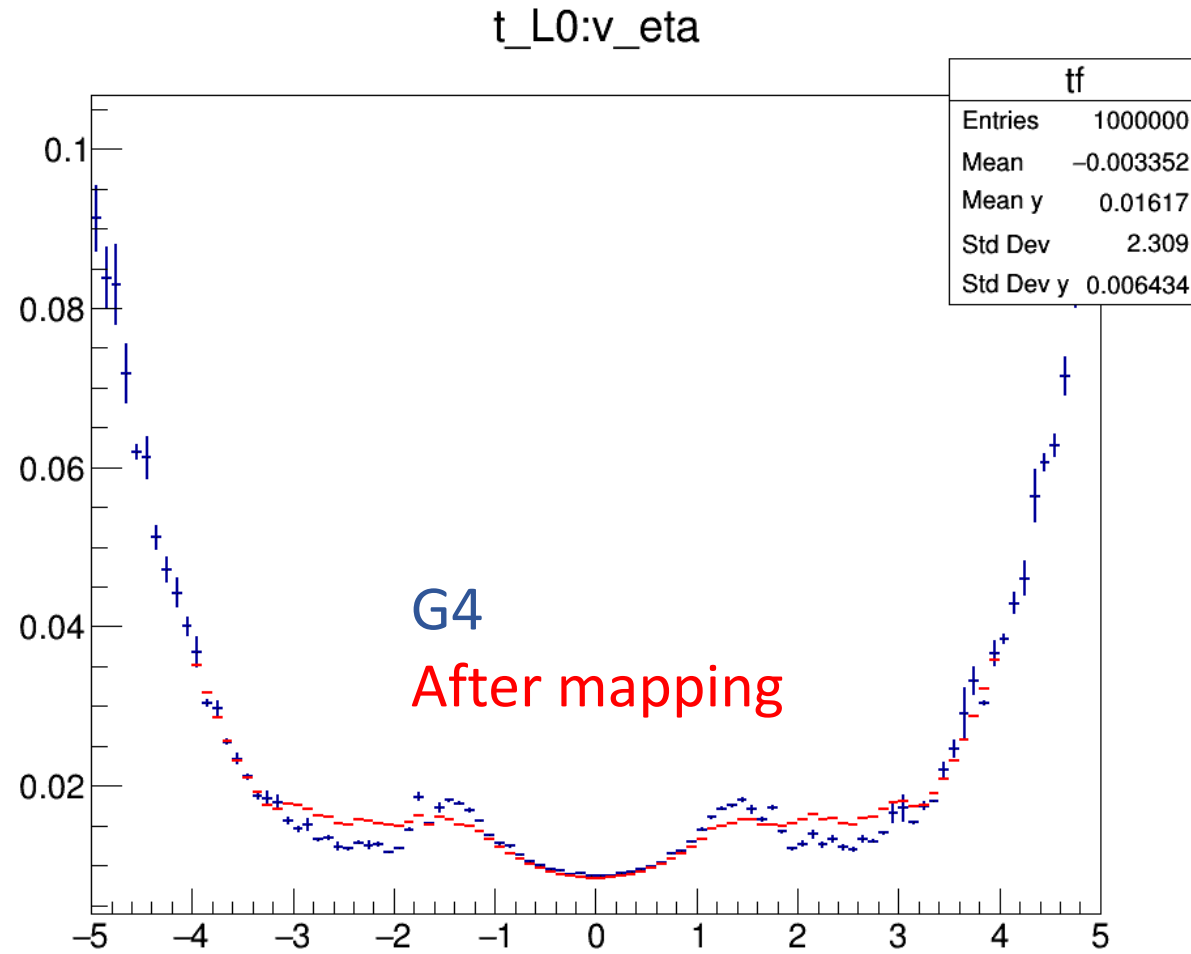


G4



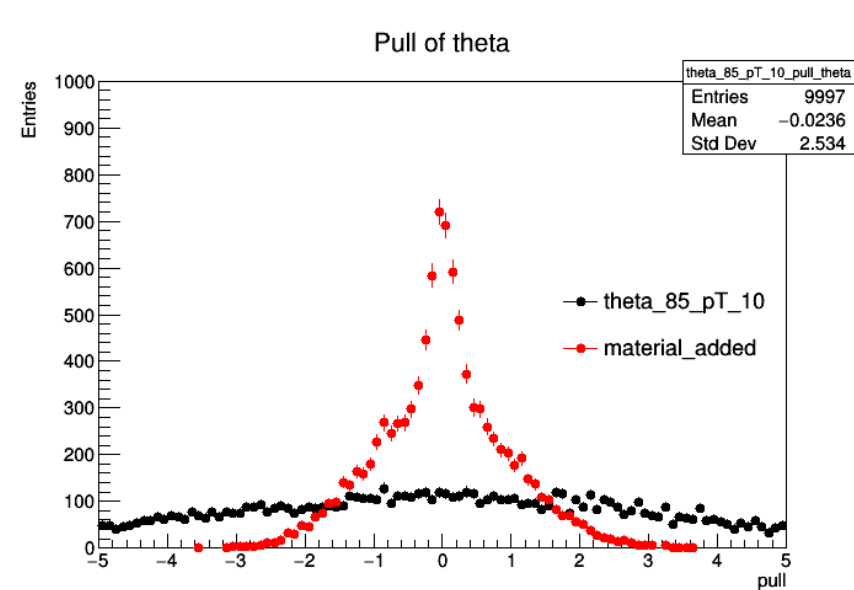
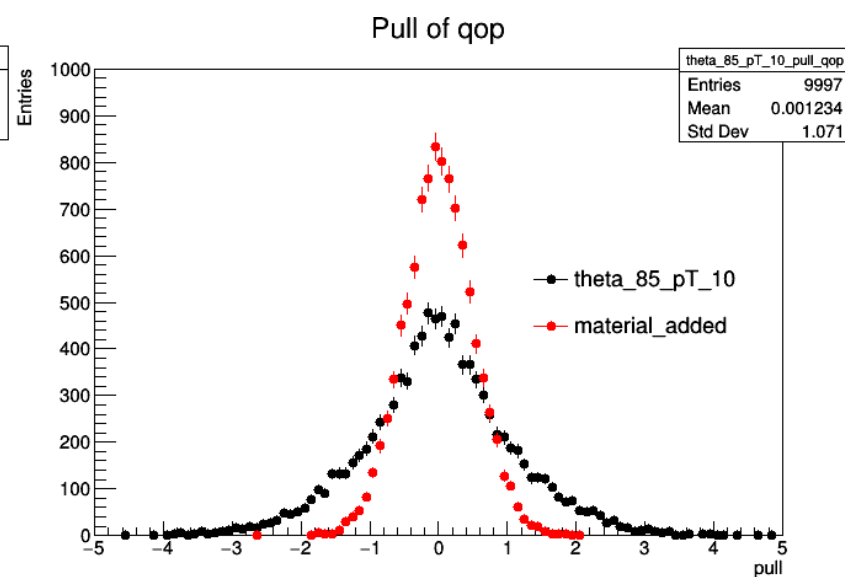
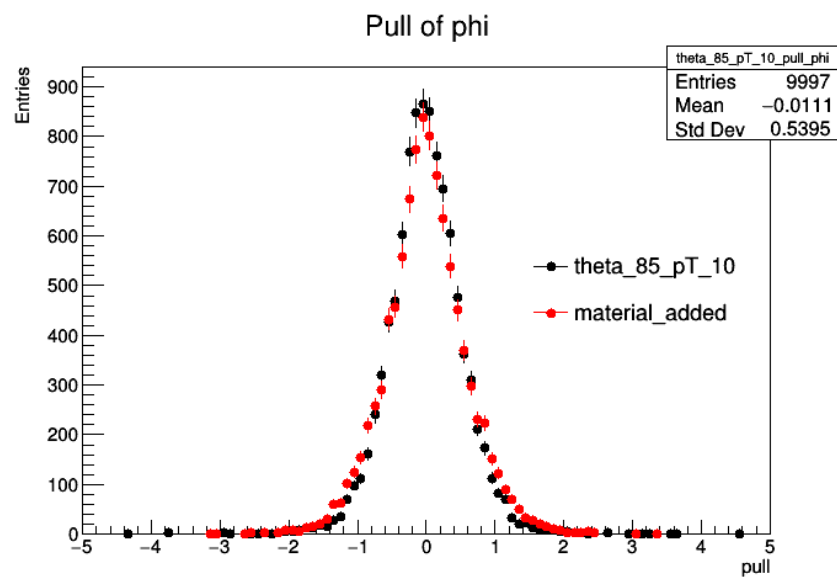
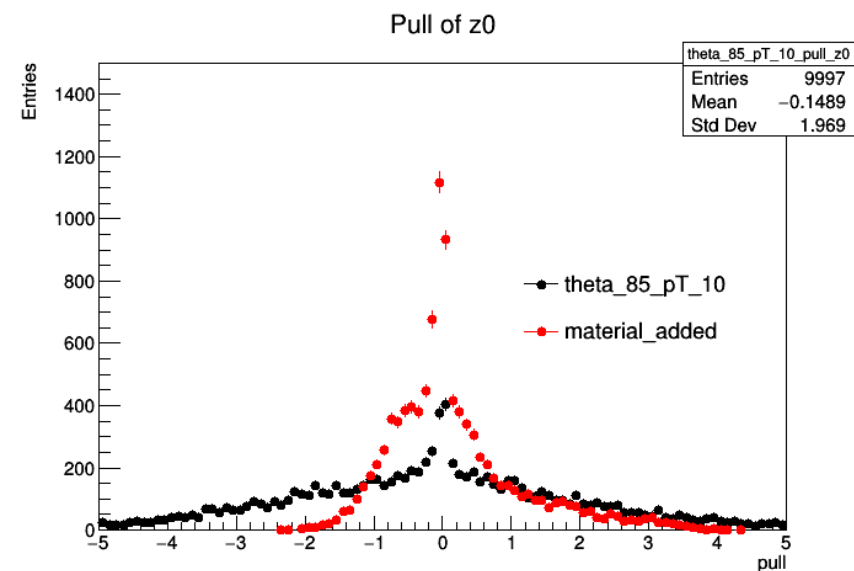
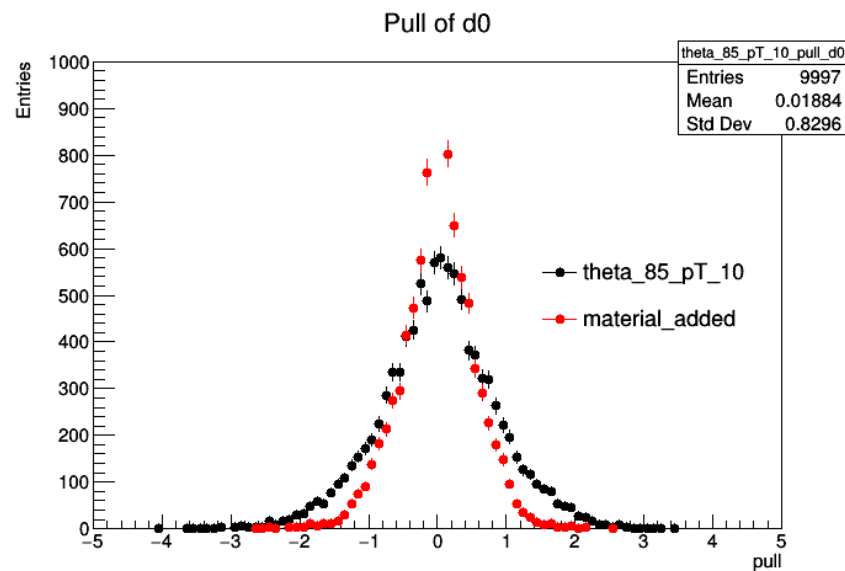
After mapping

TPC material



Fatras with/without material

Theta 85
Pt 10GeV



Fatras with/without material

Theta 20
Pt 10GeV

