Layer definition's Rosetta Stone

or: How to accomodate the new alignment definition with the default one

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CGEM SW Weekly Meeting

The two definitions

New definition (ND)

Introduced for new alignment procedure by Aiqiang

Layers
[0 - 5] (e.g. L1S1 = 0, L2S2 = 3)

Affects the CgemAlignAlg-[xxx] and the CgemGeomSvc-[xxx] packages

Default definition (DD)

Standard definition up to release *CgemBoss6.6.5.f*

Layers [0 - 2]
Sheets [0 - 1]

Used in the QA

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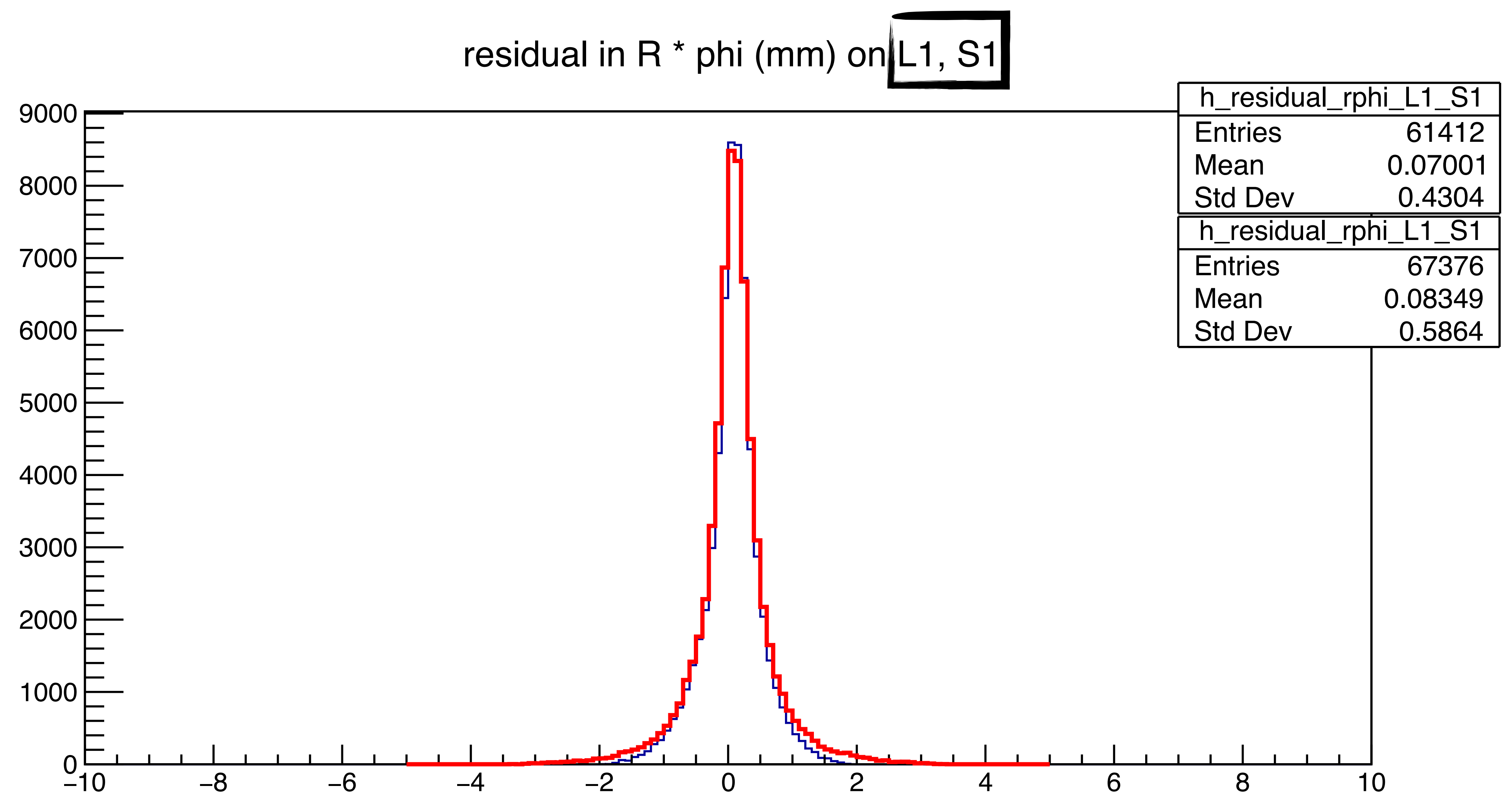
Sheets [0 - 1]

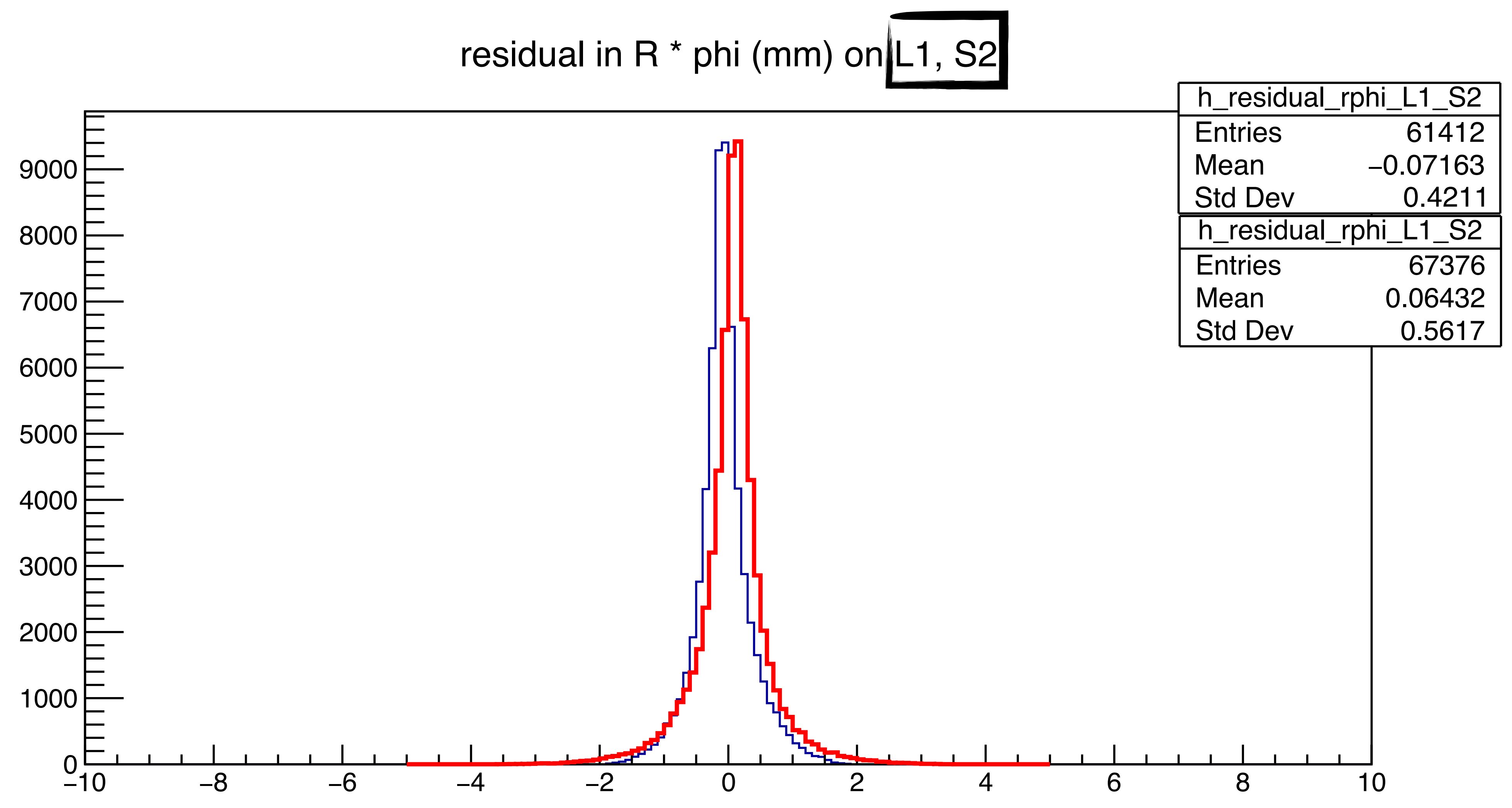
Used in the QA

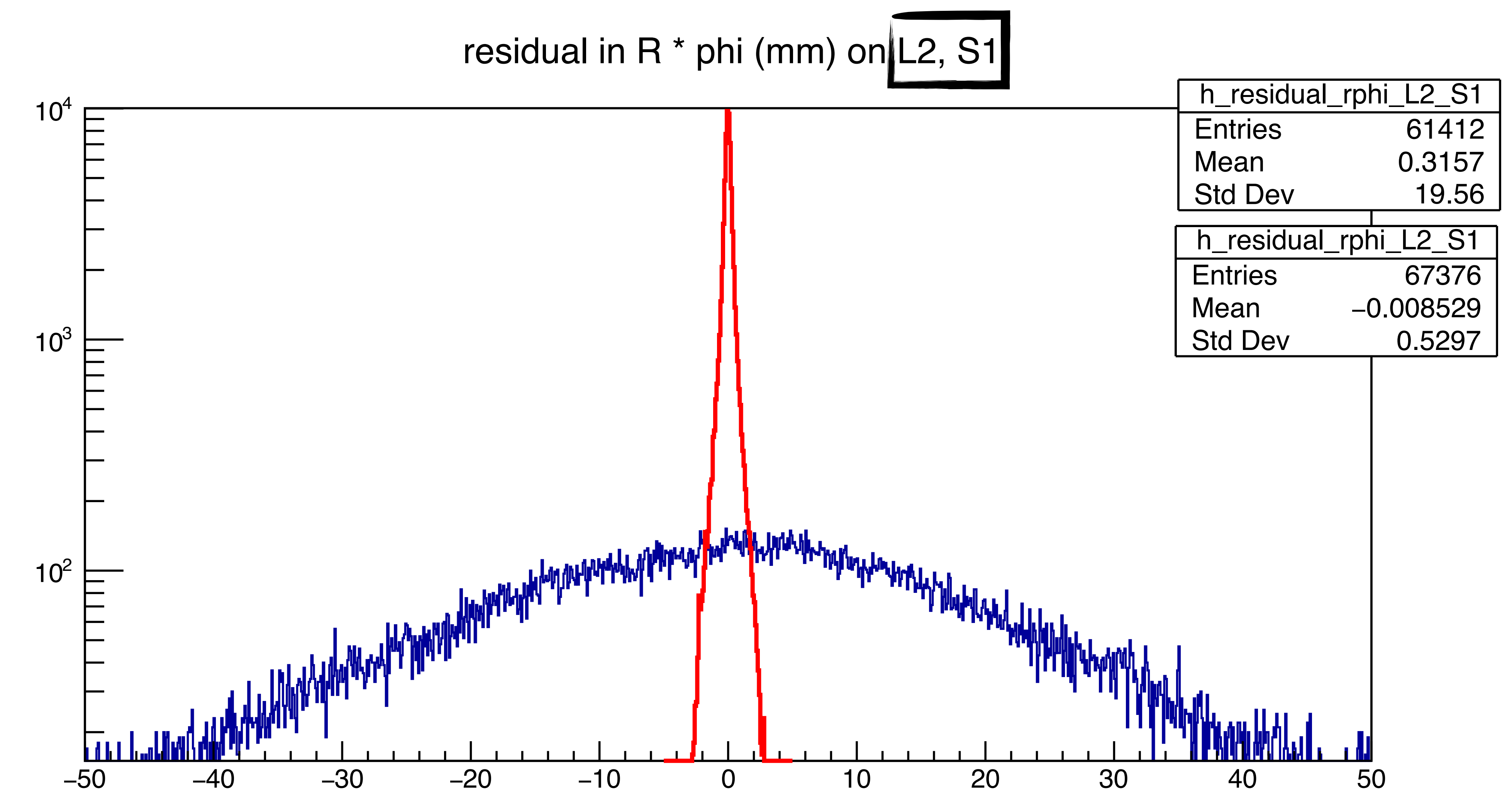
At the present state of the code,
these two definitions **coexist**
and **cause problems**...

Problems arose

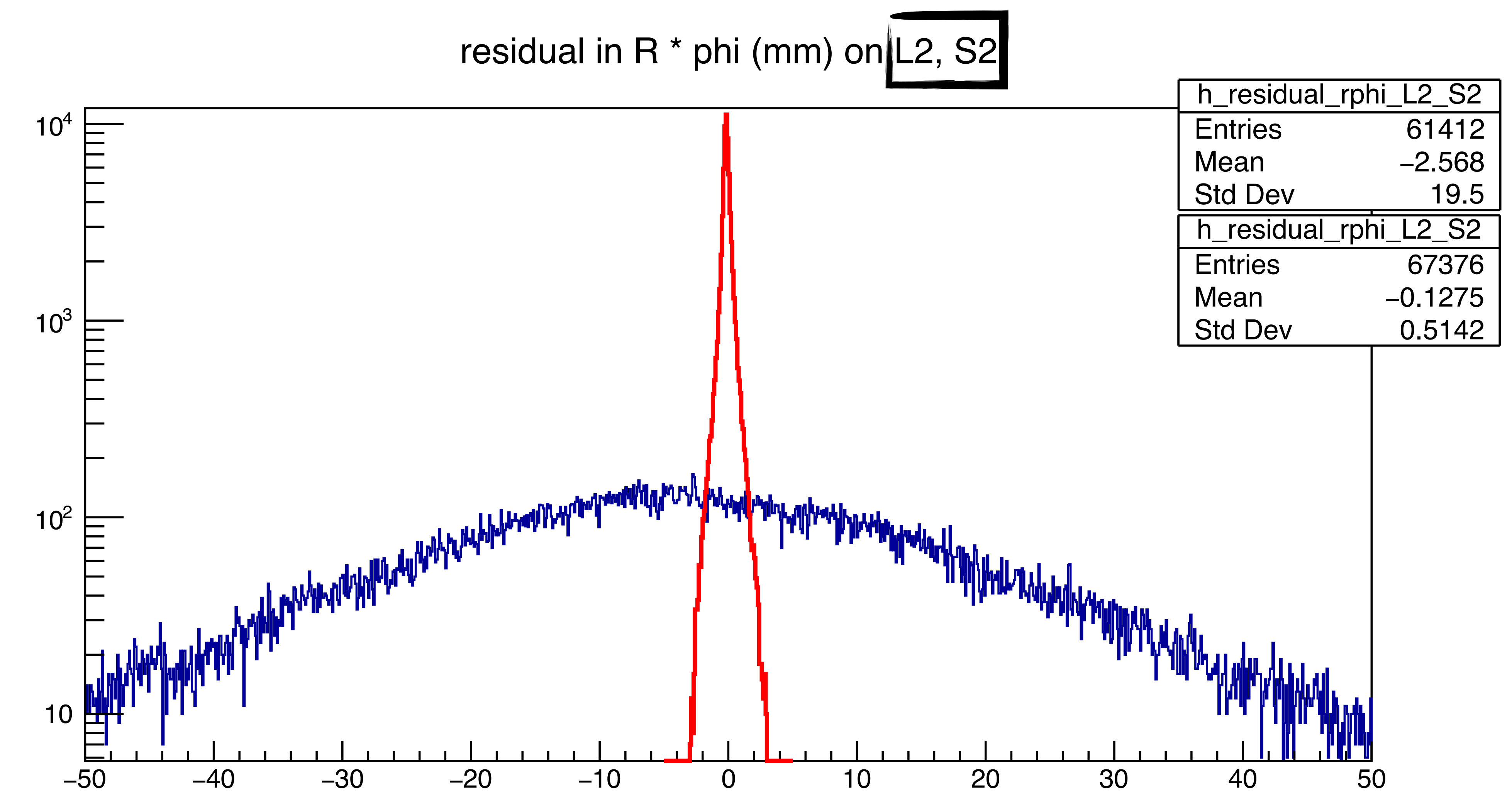


Red: Baseline (665f)
Blue: Testing (665g)





Clearly there is a **problem** in the **definition of Layer 2**, but who is the culprit?



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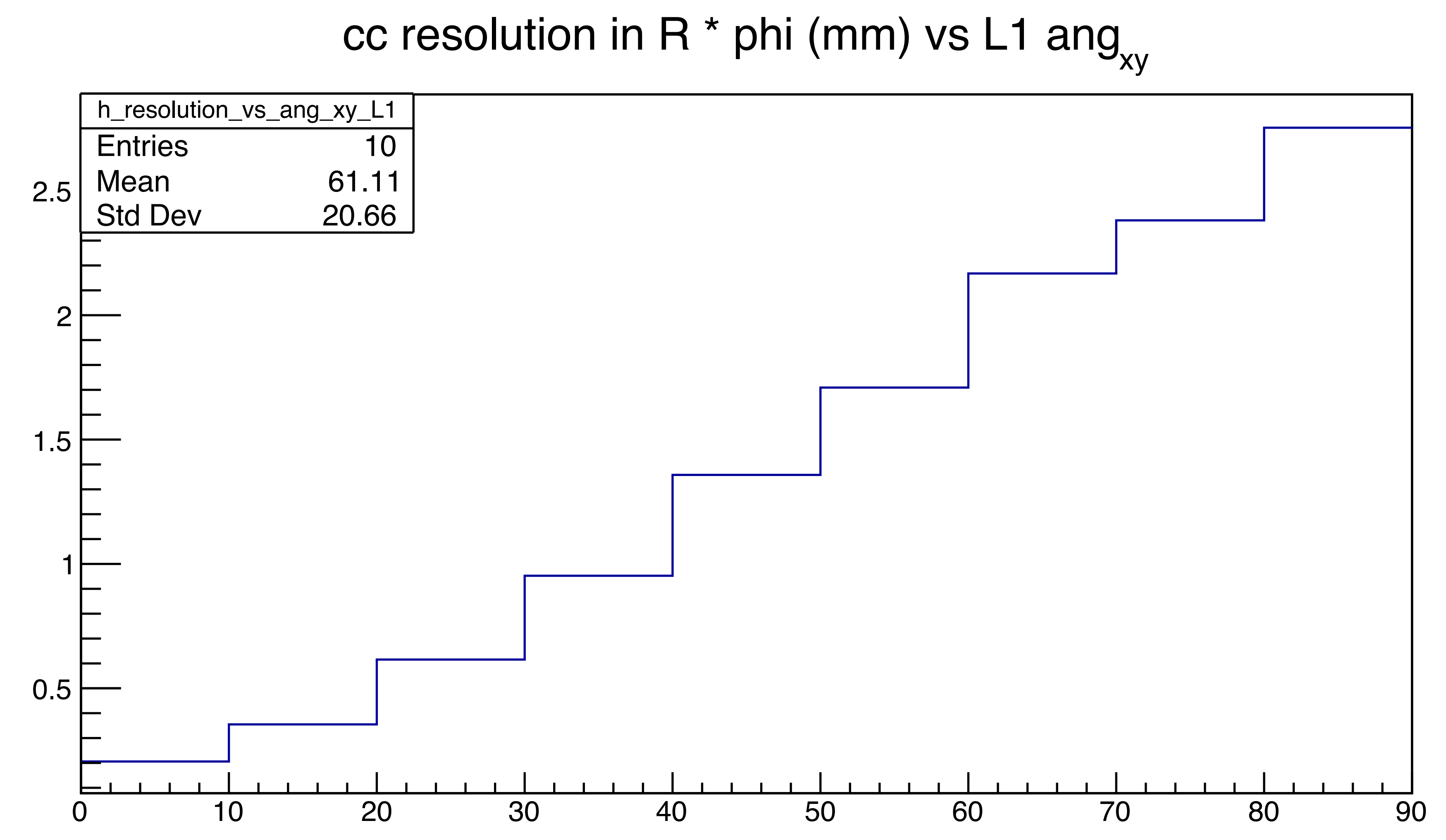
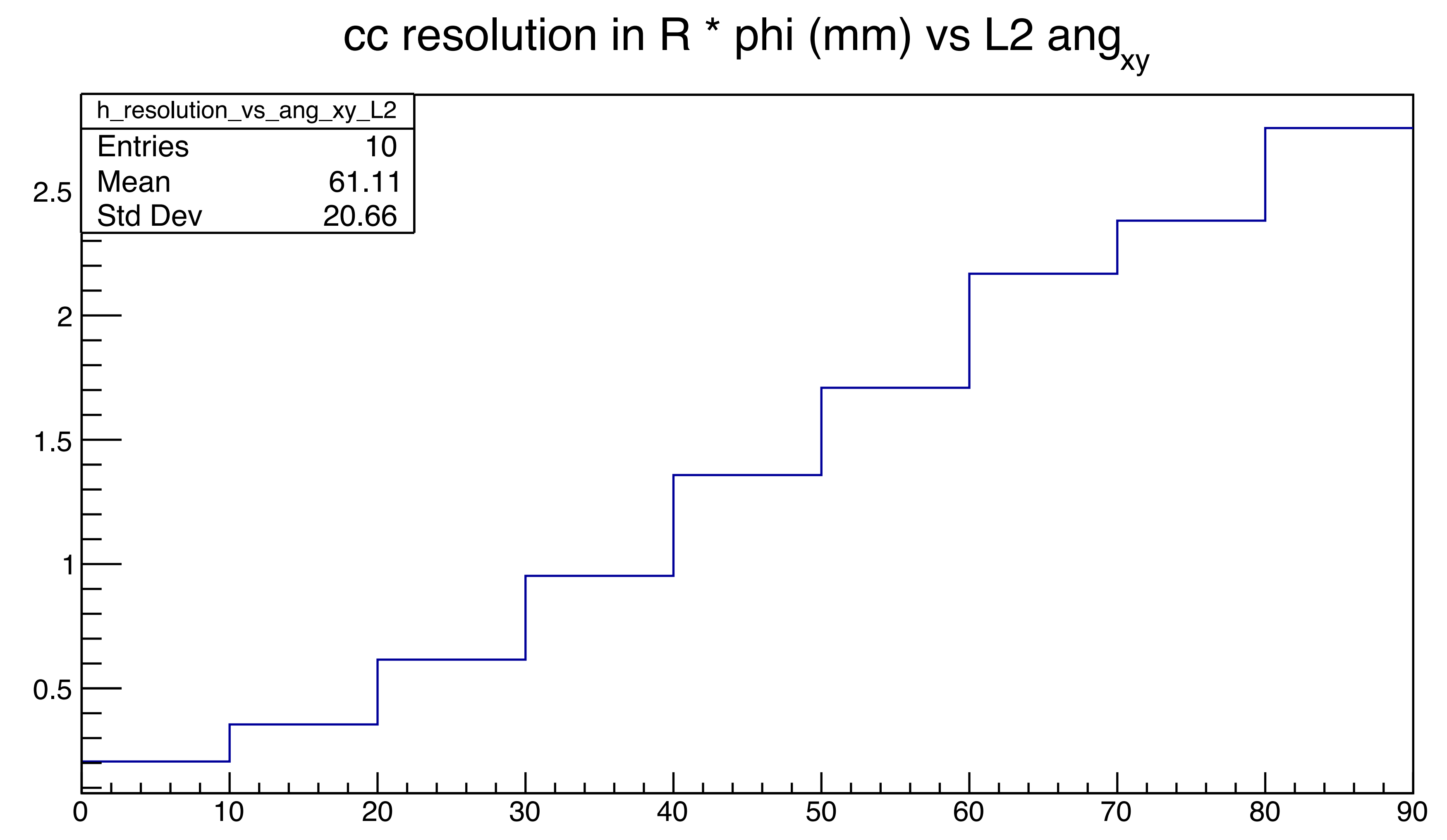


Testing release

CgemBoss6.6.5.g

Clearly there is a **problem** in the **definition of Layer 2**, but who is the culprit?

In CgemLineFit/…/TestTrack.cxx
```
bool TestTrack::ComputeIntersection
```



Let’s get to the code

CgemLineFit/…/TestTrack.cxx

L865
```
bool TestTrack::ComputeIntersection(int layerid,
                                    double &x1, double &y1, double &z1, double& phi1, double &v1,
                                    double &x2, double &y2, double &z2, double& phi2, double &v2,
                                    double &angCR_xy, double &angCR_yz) {
```

[...]

layerid takes the DD of layers and is fed into `getPointAligned` and `getPointIdealGeom`

```
if(align_flag==true) gotit = midplane->getPointAligned(layerid, linefit, posup, posdown, phivup, phivdown);
     else gotit = midplane->getPointIdealGeom(layerid, linefit, posup, posdown, phivup, phivdown);
```

[...]

}

Let’s get to the code

CgemGeomSvc/CgemGeomSvc-00-00-37/…/CgemMidDriftPlane.cxx

```
bool CgemMidDriftPlane::getPointIdealGeom(int layer, StraightLine pLine,
                                          HepPoint3D& posUp, HepPoint3D& posDown,
                                          double phiVUp[], double phiVDown[]){

     int layer_geo = int(layer/2);
```

Takes the ND to convert it back to the DD

```
bool CgemMidDriftPlane::getPointAligned(int layer, StraightLine pLine,
                                        HepPoint3D& posUp, HepPoint3D& posDown,
                                        double phiVUp[], double phiVDown[]){

     int layer_geo = int(layer/2);
```

```
bool CgemMidDriftPlane::getPointAligned_New(int layer, StraightLine pLine,
                                            HepPoint3D& posUp, HepPoint3D& posDown,
                                            double phiVUp[], double phiVDown[]){

     int layer_geo = int(layer/2);
```

A solution

A possible one given the idea of uniformity inside the QA

Keeping in mind the paradigm of uniformity within a package,
it was opted to let `ComputeIntersection` externally the same while changing the call
to
`CgemMidDriftPlane::getPointAligned`
into
`CgemMidDriftPlane::getPointAligned_QA`

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Why?

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Why?

In **TestTrack.cxx** we use the DD

```
      int layer = CgemID::layer(ident);
      int sheet = CgemID::sheet(ident);
      int layerid = (*iClusterCol)->getlayerid();
      int sheetid = (*iClusterCol)->getsheetid();
      track_layerid[iclus]   = tcluster->getlayerid();
      track_sheetid[iclus]   = tcluster->getsheetid();
```

A solution

A possible one given the idea of uniformity inside the QA

Keeping in mind the paradigm of uniformity within a package,
it was opted to let `ComputeIntersection` externally the same while changing the call to
`CgemMidDriftPlane::getPointAligned(int layer_id, …)`
into
`CgemMidDriftPlane::getPointAligned_QA(int layer_id, int sheet_id, …)`

Reverting what it was done: Now we convert the DD to the ND

```
int layer =  2*layer_geo + sheet;
```

leaving the ND in all the function referring to the alignment

Conclusions

After some off-line discussions with Aiqiang, regarding the solution he propose (the ND -> DD), this different solution proposed was concocted (DD -> ND) in order to keep uniformity within the QA

“My solution” came from a not having a clear picture of the Aiqiang’s one (this is on me completely), which sparked more tests on my side and this will of uniformity

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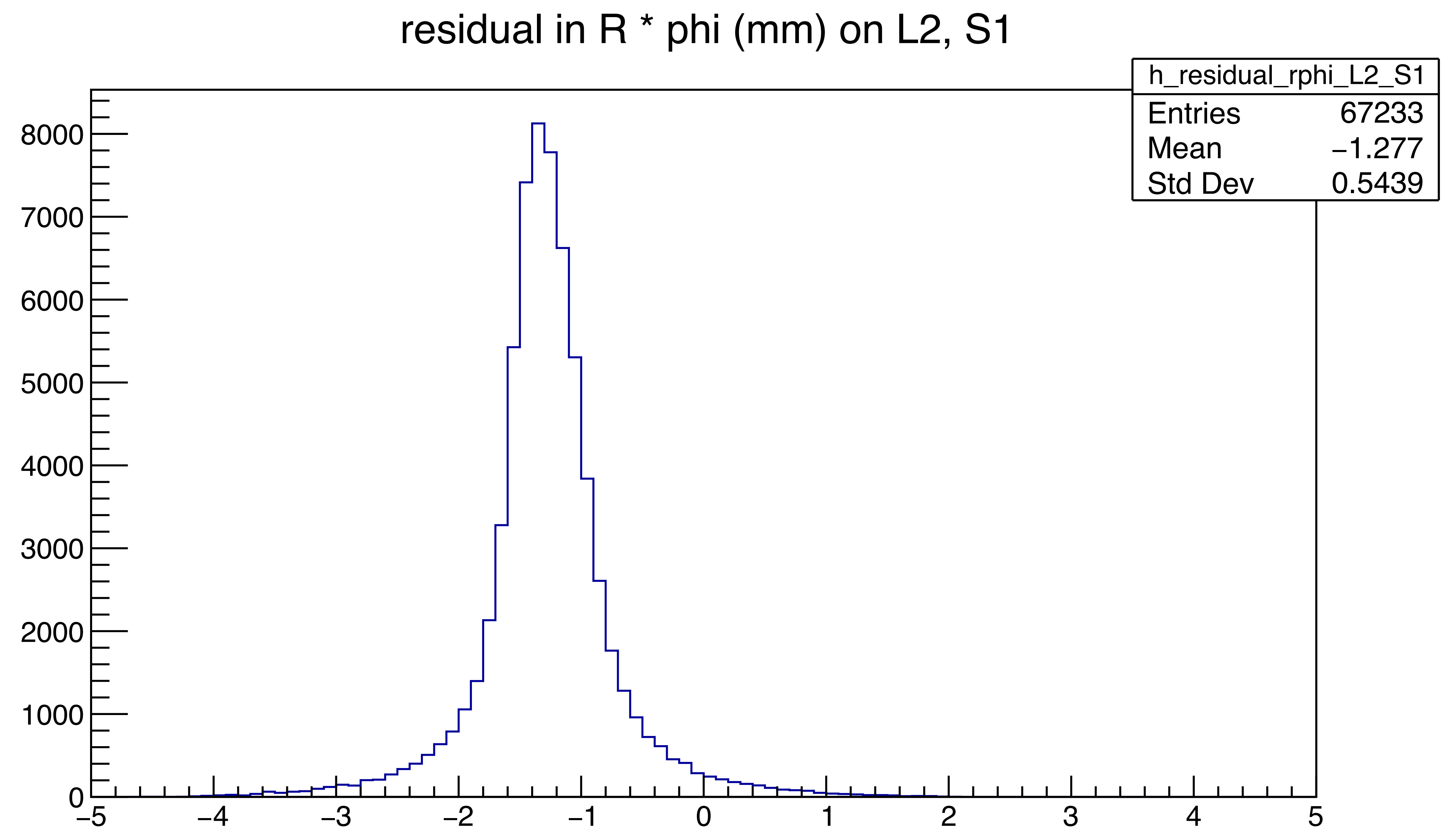
The solution seems to work, more tests are needed…

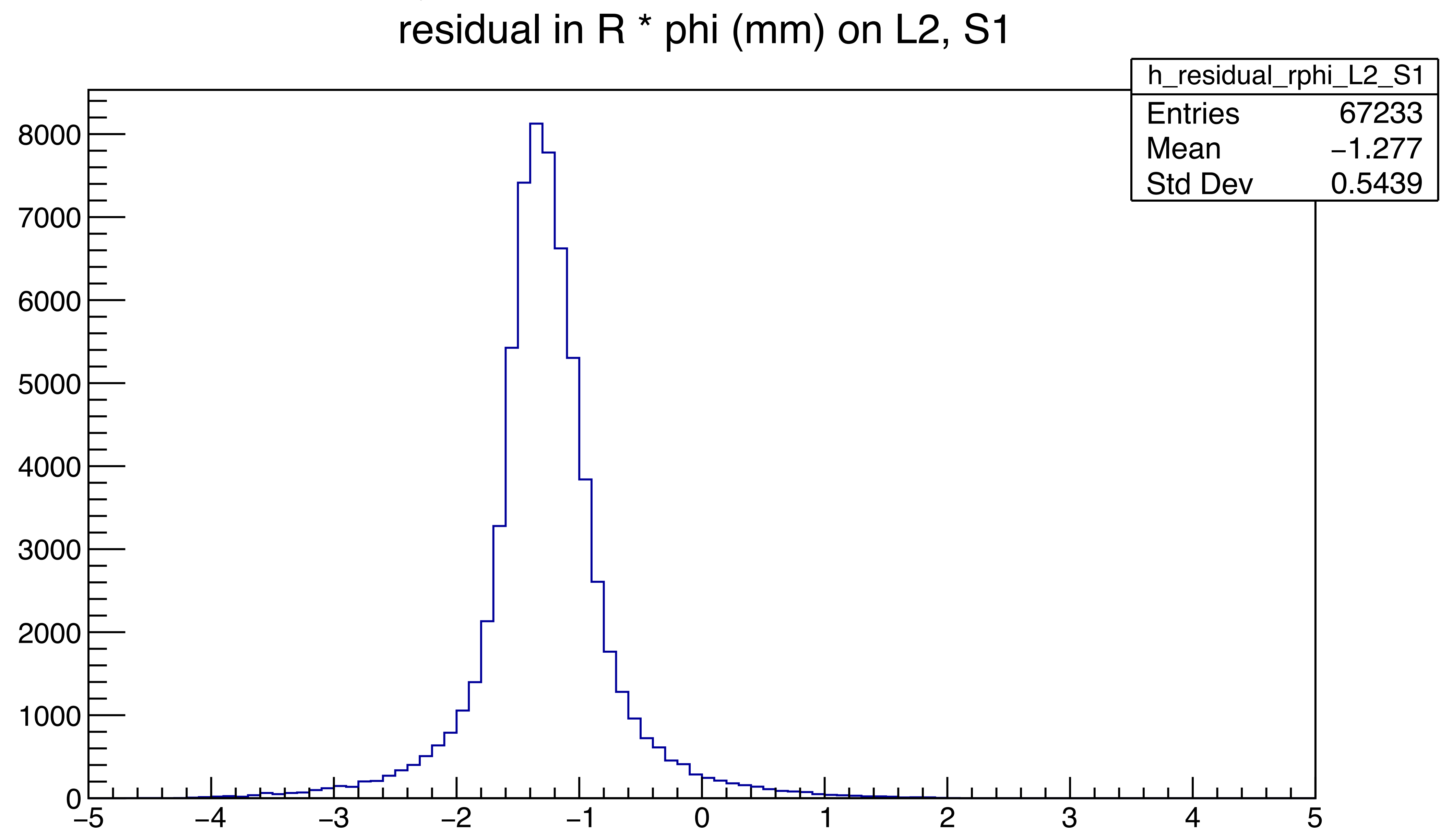


Conclusions

Why so off-centred? More corrections are needed?

The solution seems to work, more tests are needed...

In CgemLineFit.cxx it seems that, for `getPointIdealGeom` or `getPointAligned_New`, the virtual layer (i.e. ND) is used... maybe something else is needed?


residual in R * phi (mm) on L2, S1
h_residual_rphi_L2_S1
Entries 67233
Mean −1.277
Std Dev 0.5439