Propagation of CSC Segments to GEM subsystem

Propagation checks

GEM DPG Meeting

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Propagation 1/3 (RPC-based)

CSC Segment

Characterized by a starting point (x_0; y_0) and a direction (dx; dy; dz).

```
1   #ifndef CSCRecHit_CSCSegment_h
2   #define CSCRecHit_CSCSegment_h
3
4   /** \class CSCSegment
5    *  Describes a reconstructed track segment in the 6 layers of a CSC chamber.
6    *  This is 4-dimensional since it has an origin (x,y) and a direction (x,y)
7    *  in the local coordinate system of the chamber.
8    *
9    *  \author Matteo Sani
10   *  \author Rick Wilkinson
11   *  \author Tim Cox
12   */
```

Propagation 2/3 (RPC-based)

Reference frame

The propagation is performed in the CSC local reference frame.

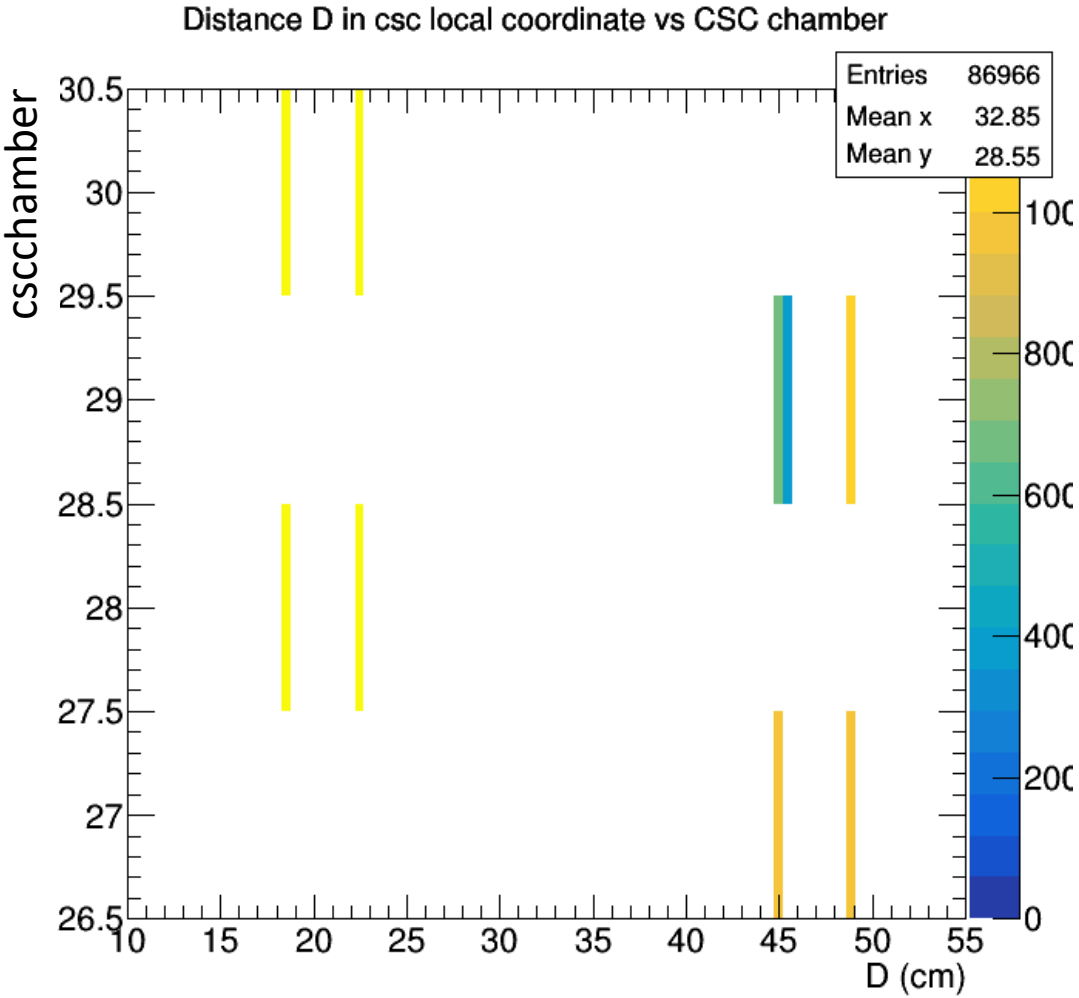
Propagation

The point on the GEM chamber is find according to:

$$x = x_0 + \frac{dx}{dz} D \qquad y = y_0 + \frac{dy}{dz} D \qquad z = D$$

where D is the z-coordinate of the layer of the GEM chamber in the CSC local reference frame.

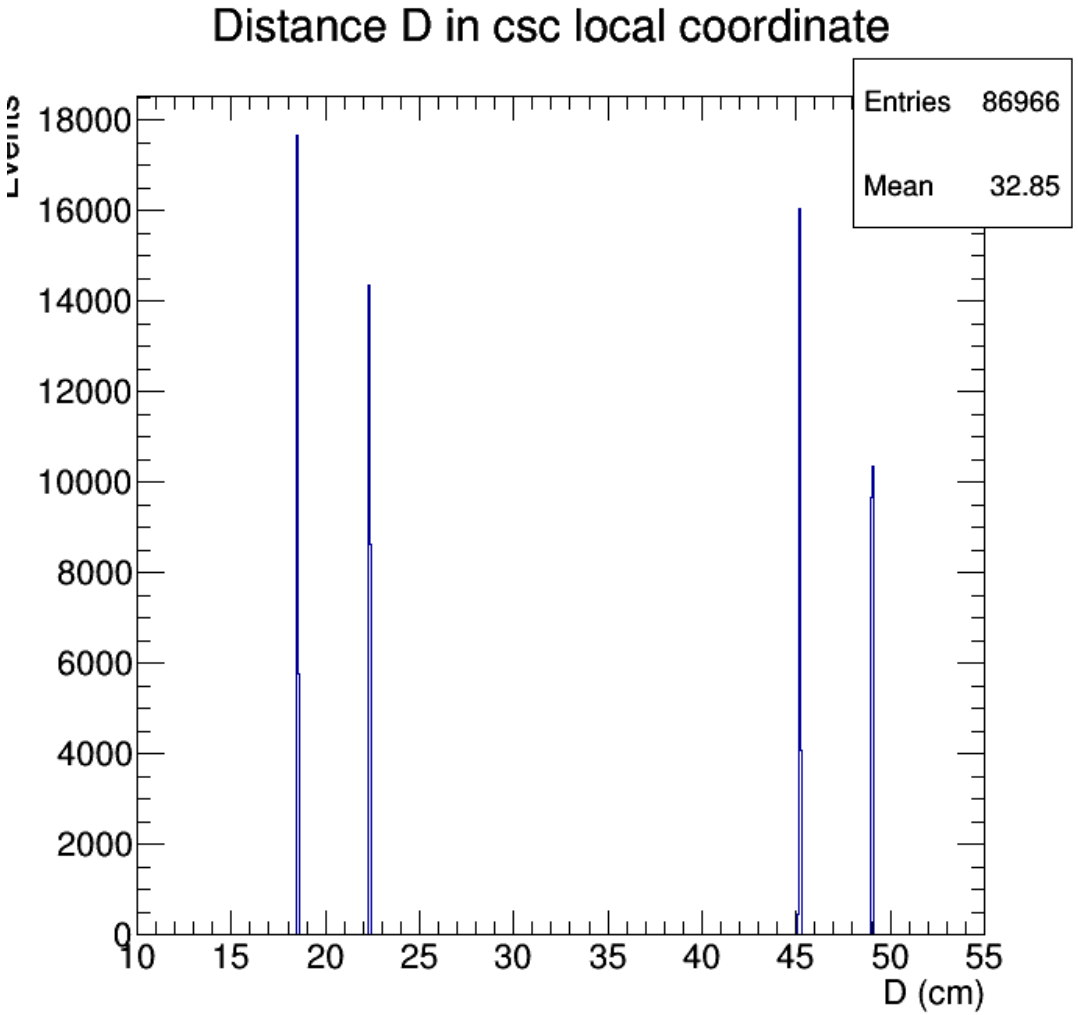
Propagation 3/3



D definition:

z-coordinate of the center of each GEM eta partition in the CSC Local reference frame.

Distance D focus



	Distance (cm)
Even chamb layer 1	18,46
Odd chamb layer 1	22,28
Even chamb layer 2	45,16
Odd chamb layer 2	48,98

Check on z-coordinate

	From Teruki's slides [1]	GEM RecHit	GEM Local (0,0,0) in Global
Even chamb layer 1	5653,7 mm	5653,687 mm	5653,69 mm
Odd chamb layer 1	5692,1 mm	5692,087 mm	5692,09 mm
Even chamb layer 2	5679,7 mm	5679,712 mm	5679,71 mm
Odd chamb layer 2	5718,1 mm	5718,112 mm	5718,11 mm

In the red box, the z-coordinate of the plane where the segments are propagated to are reported.

It seems that everything is fine. The propagation is performed on the correct plane.

[1]https://indico.cern.ch/event/759988/contributions/3152287/attachments/1723607/2783444/180925_GEM_DPG_DBVFAT_v8.pdf

Conclusions

Current status

- Z-coordinate of the GEM in CSC frame checked
- WIP for the improvement of the propagation and matching procedures

Issues we would appreciate feedback on:

- Still missing the full 2018C statistics (the CSCSegments are not included in RECOv7)
- We can try and run RECO ourselves, but we need the exact setup.
- Run on MC simulation for validation: which sample would be the most useful for comparisons?