

Pixel Pilot Blade: plots for approval

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Motivation for Approval

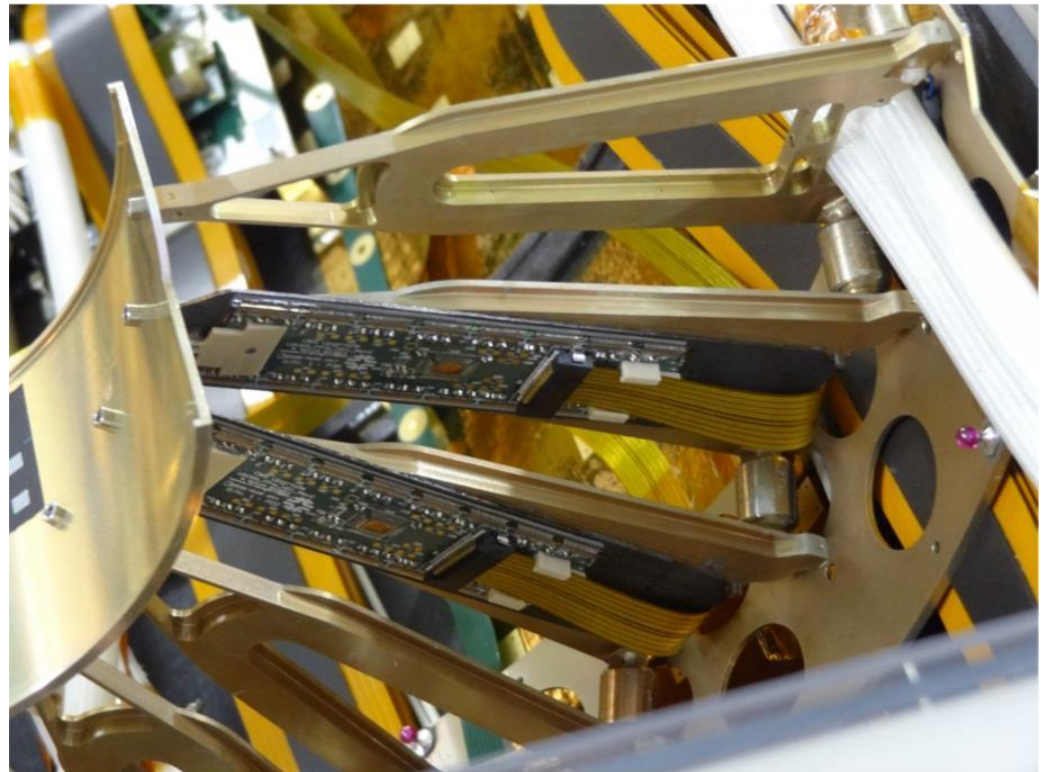
- ▶ Poster on the 3rd Annual Large Hadron Collider Physics Conference
- ▶ St. Petersburg, Russia
- ▶ August 31 – September 5, 2015.
- ▶ Hosted by:
 - ▶ National Research Center "Kurchatov Institute" (NRC KI)
 - ▶ St. Petersburg State University

Pilot Blade

- ▶ 2 modules on the forward disk (disk 3)
- ▶ Phase-I prototype modules

- ▶ On the Z- side

- ▶ detid: 344130820 on blade 1,mod 1
- ▶ detid: 344131844 on blade 2,mod 1
- ▶ detid: 344132868 on blade 3,mod 1
- ▶ detid: 344133892 on blade 4,mod 1
- ▶ detid: 344131076 on blade 1,mod 2
- ▶ detid: 344132100 on blade 2,mod 2
- ▶ detid: 344133124 on blade 3,mod 2
- ▶ detid: 344134148 on blade 4,mod 2



Goals

- ▶ Reconstruct the Pilot Blades
(this is a Private RECO)
 - ▶ Create separate importable python config
 - ▶ Not to propagate track hits to it right now
-
- ▶ Measure the resolution/residual

Method

- ▶ Two steps

- I – Simulate the detector with Pilot Blade

- ▶ GEN-SIM-DIGI-L1-DIGI2RAW

- II – Reconstruction

- ▶ RAW2DIGI-L1Reco-RECO

First step

- ▶ Monte Carlo Simulation
- ▶ GEN-SIM-DIGI-L1-DIGI2RAW using cmsDriver.py
- ▶ Changing geometry
 - ▶ Geometry from DB
 - ▶ Tracking wants a symmetric detector
 - ▶ Creating a Fake Pilot Blade to Z-
 - ▶ It is made out of air
- ▶ Set up the conditions using DB-s

First step

- ▶ Set up the conditions using DB-s:
 - ▶ SiPixelQuality DB
 - ▶ No bad modules now, Fake Pilot Blade is off using it
 - ▶ Lorentz Angle DB
 - ▶ Same values as the other forward modules
 - ▶ Cabling Map
 - ▶ DB contains the info only about the Pilot Blades
 - ▶ Standard CablingMap from the GT
 - ▶ Gain DB
 - ▶ Values set it to the average value

Second step

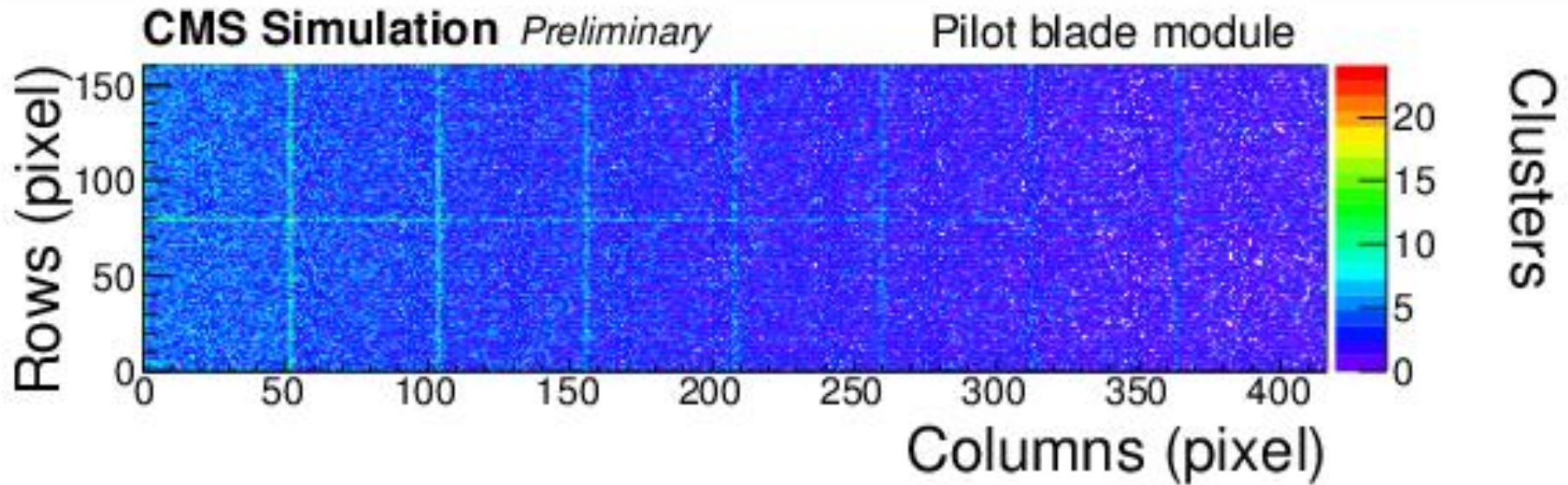
- ▶ RAW2DIGI-L I Reco-RECO using cmsDriver.py
- ▶ Creating two collections using DIGI2RAW
- ▶ Defining a new DIGI2RAW
 - ▶ Clone the original but keep only the Pilot Blade FEDRAWDATA
 - ▶ In the original disable the Pilot Blade
- ▶ Defining a new Clusterizer
 - ▶ The new reconstructs the Pilot Blade
 - ▶ The original goes on the standard way
- ▶ Defining a new RecHitConverter
 - ▶ The new reconstructs the Pilot Blade Clusters

Second step

- ▶ **Reconstructing only with Pilot Geometry results**
 - ▶ Pilot Blade Clusters
 - ▶ Pilot Blade Rechits
- ▶ **Reconstructing without Pilot Geometry results**
 - ▶ Phase 0 Clusters
 - ▶ Phase 0 Rechits
 - ▶ Tracking (invalid hits on the Pilot Blade)

Pilot Blade Cluster Map

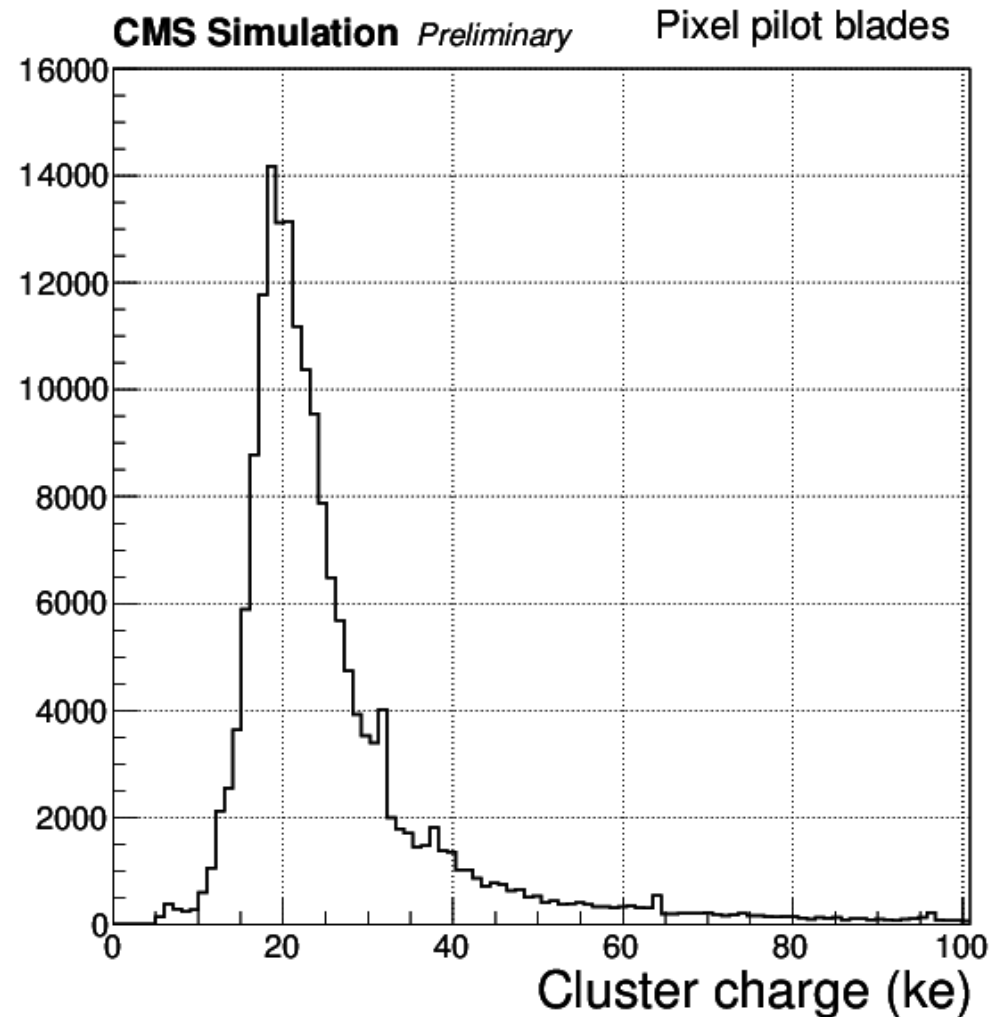
► Pilot Blade Cluster Map



Plot for Approval #1

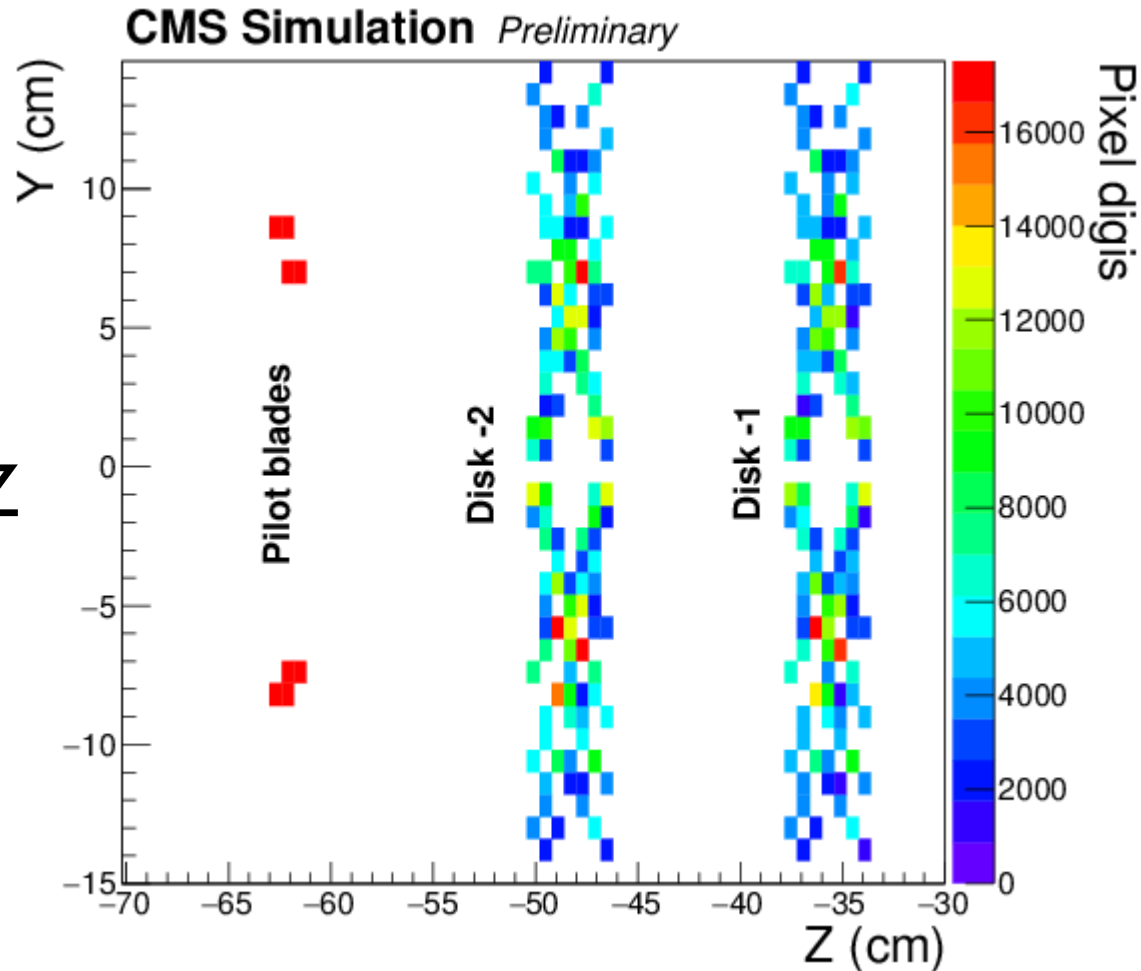
Cluster Charge Distributions

Plot for Approval #2



Global Positions

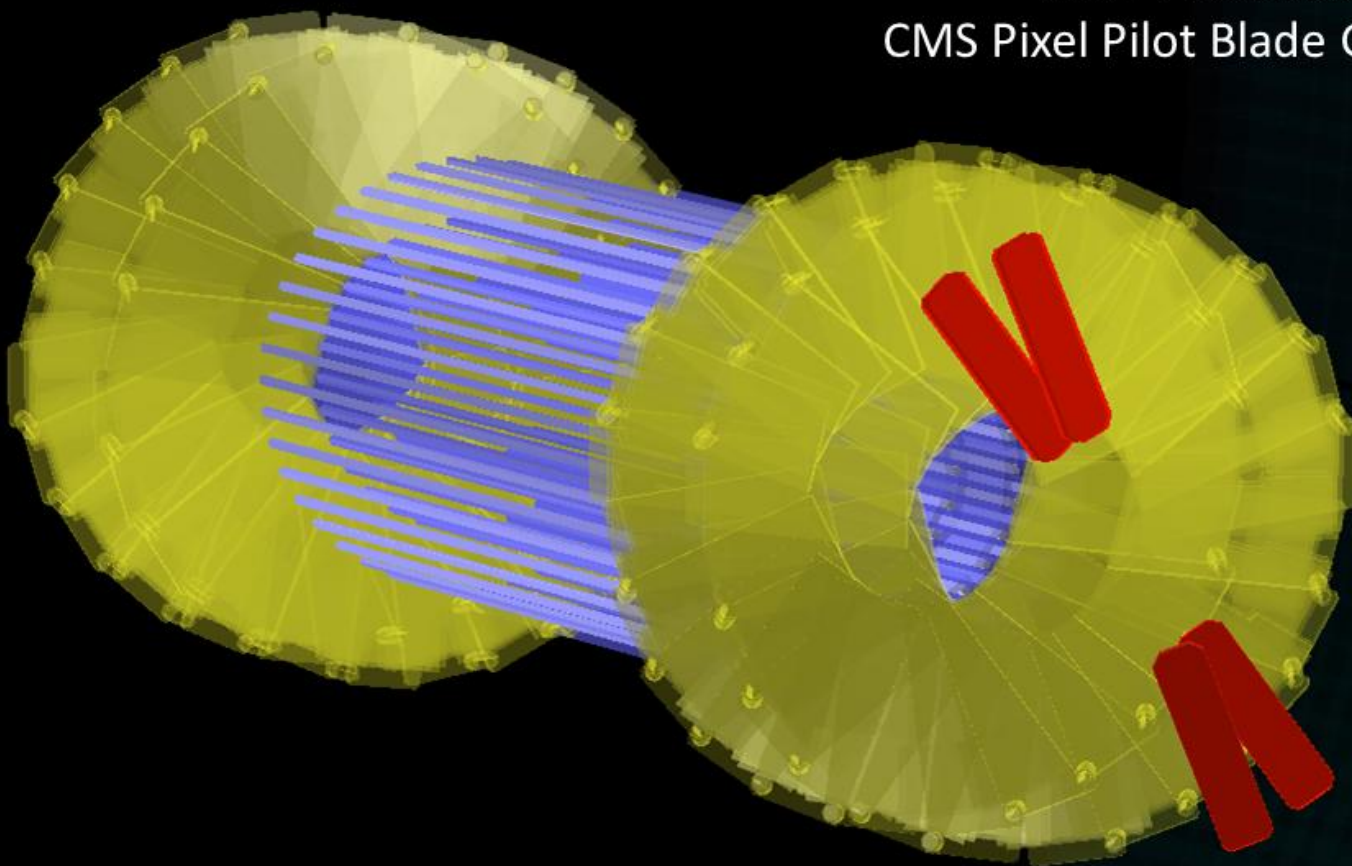
- ▶ Global Positions are OK
- ▶ Plot shows FPIX -Z
- ▶ 2x2 Pilot Blades are visible



Plot for Approval #3

Global Positions

CMS Preliminary
CMS Pixel Pilot Blade Geometry



Plot for Approval #4

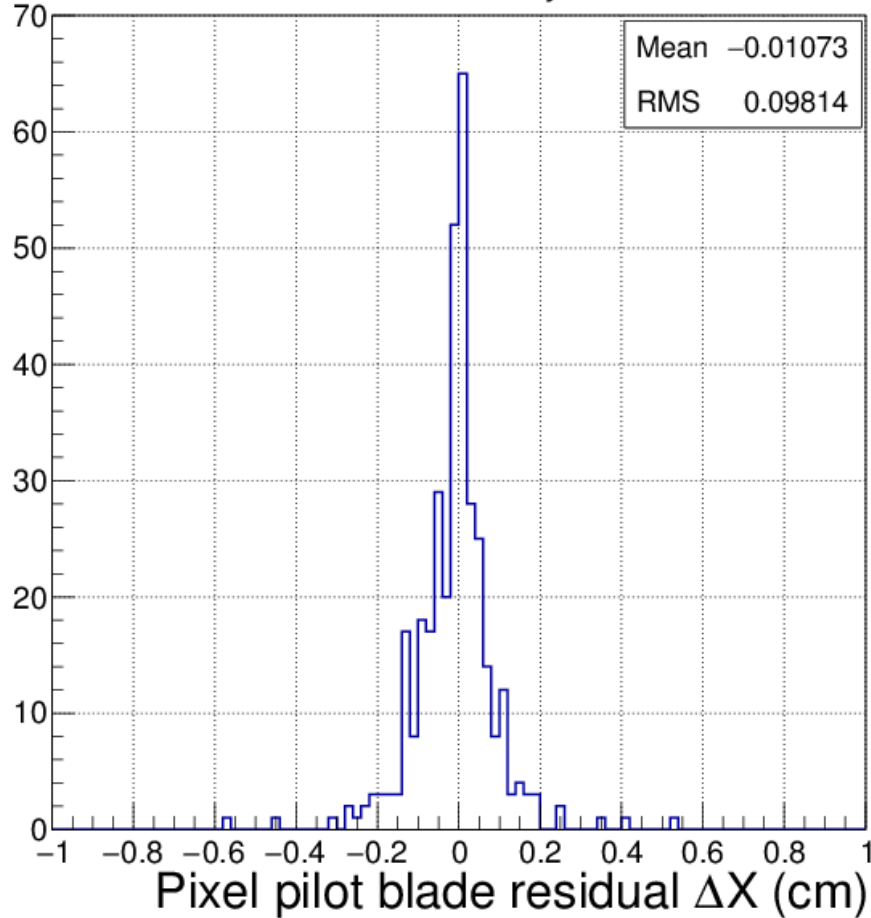
Conclusion

- ▶ Simulate data-like information
- ▶ Reconstruction is OK
 - ▶ Conditions are done (DB-s)
- ▶ Waiting for data taking
 - we can do the same procedures with it
- ▶ Measure residual
- ▶ More statistics

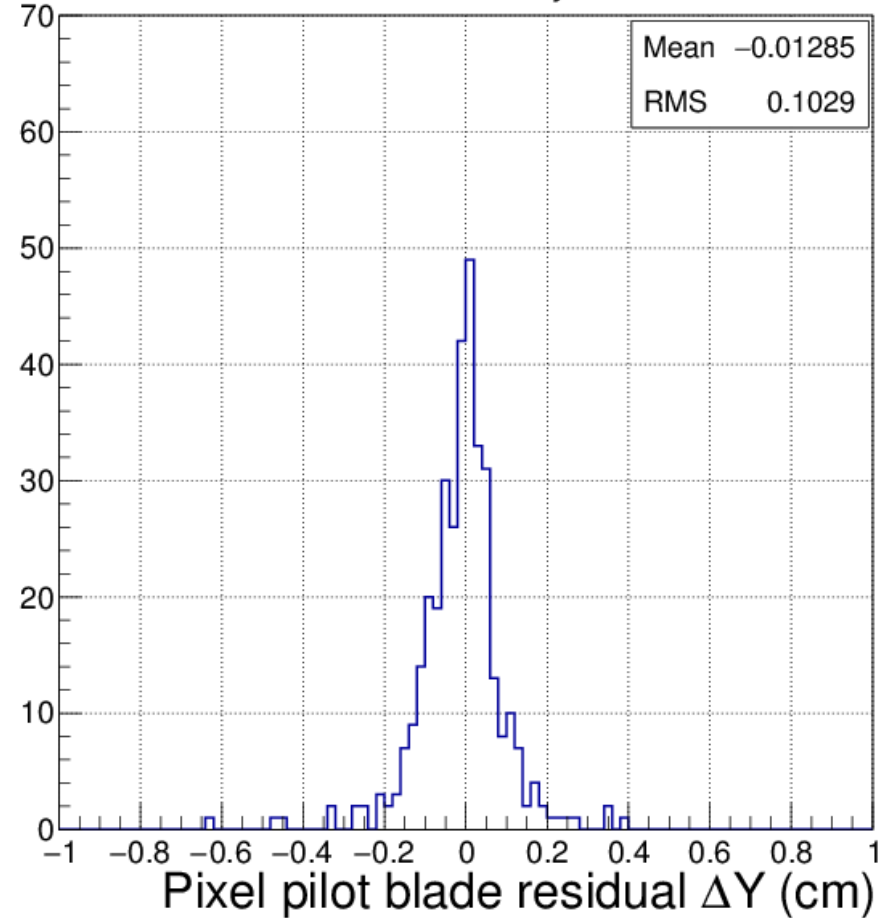
Backup

Backup

CMS Simulation *Preliminary*



CMS Simulation *Preliminary*



NOT for Approval