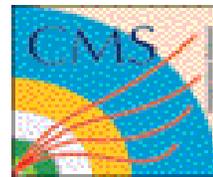


Simulation Status for Pixels

Neeti Parashar

Purdue University Calumet
Hammond, Indiana





➤ **B-tau Web Page**

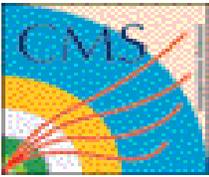
- <http://cmsdoc.cern.ch/cms/Physics/btau/management/top/btau.html>

➤ **Tracker Simulation and Geometry**

- Coordinators: **Filippo Ambroglini** (University of Perugia, Italy)
Neeti Parashar (Purdue University Calumet, USA)

➤ **Tasks:**

- **TIB + TOB + TEC+ TID = Filippo**
- **Barrels + Disks = NP**
- **Geometry**
- **SimHit**
- **Digi**
- **Pixel offline group (chair. V.Chiochia/Uni.Zurich)**
 - <https://uimon.cern.ch/twiki/bin/view/CMS/PixelOfflineSoftware>



➤ Silicon Pixel Tracker (SPT)

➤ Pixel Barrels (PB) + Pixel Forward (PF)

➤ New manpower: Vesna Cuplov

➤ Detector Description for PB + PF : D. Kotlinski and D. Onoprienko

➤ Validation suite- Xingtao and Lisa

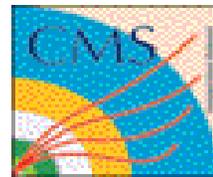
Recent Forward Pixel Geometry Changes



➤ New version : Dmitri Onoprienko

- available for testing:
[/afs/fnal.gov/files/home/room3/onoprien/public/FPix/Version_3_00_00](http://afs/fnal.gov/files/home/room3/onoprien/public/FPix/Version_3_00_00)
- substantial changes both to the actual geometry described (*update based on the latest drawings, more accurate modeling of some components*) and to its implementation in DDL/C++.
- not in CVS yet, will probably go into 070_preX
- aside from a few minor implementation details, this version of the geometry is expected to be frozen for some time.
- eventually, updates will be needed to include FPix components that are now being designed.

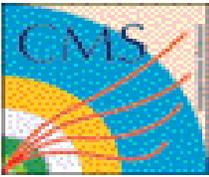
Summary of changes



- Thickness of various layers in panels and plaquettes
- (now conforms to CMSpix-doc-458-v5).
- Spacing between blades in disks
- (now conforms to CMSpix-doc-573-v1).
- Third disk is commented out.
- Panels layout (left or right) in disks
- (now conforms to CMSpix-doc-583-v1).
- Detailed description of coolant "nipples"
- (conforms to CMSpix-doc-573-v1).

- **Note:**
- **Positions of active volumes in the global reference frame have changed.**

Implementation changes

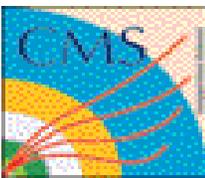


- Added "**pixfwdCommon.xml**" file with definitions of constants and rotations used by multiple components.
- Uniform definition of reference frames and anchor points for various components.
- Extended "**DDPixFwdBlades.cc**" algorithm to calculate parameters needed for describing and placing "nipples".
- Some input geometry parameters moved from XML to "**DDPixFwdBlades.cc**"



- **Dmitri has tested it already – works fine**
- **Xingtao tested it as well with simulation**
- **Elizaveta Shabalina**
 - **Validation/TrackerHits – for all tracker subsystems**
 - **Pixels – working with her**
 - **All info is in local coordinates**
 - **Michael Strang- looks at all subsystems globally**

Tracker Digi Validation Status - Xingtao



➤ The Goal:

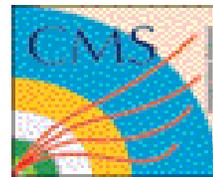
- Verification and Validate of the digitization of 4 Silicon sub-detectors and 2 pixel sub-detectors.

➤ The Package:

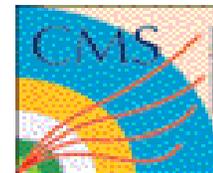
- Validation/TrackerDigis
- has been included in CMSSW_0_7_0_pre1.

➤ The quantities to validate:

- ADC Count per ring/ plaquette
- Row number per ring/plaquette
- Column number per ring/plaquette
- Digi multiplicity per ring/plaquette



- **TrakcerDigi uses DQM tool to save the histogram directly into root files and do statistical comparison with ChI2Test.**
- **Barrel Pixel:**
 - **Structure: 3Layers(8 rings in each layer)**
 - **Totally 96 1-D histograms**
- **Forward Pixel:**
 - **Structure: 4 Disk(7 plaquettes in two panels)**
 - **Totally 112 1-D histograms**
- **Plots:<http://home.fnal.gov/~huangxt/Digi/Pixel/>**

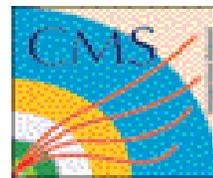


Pixel SimHit verification in CMSSW

D.Kotlinski
14/2/06, CERN

Single muon tracks generated with CMSSW and compared with OSCAR.

CMSSW vs OSCAR



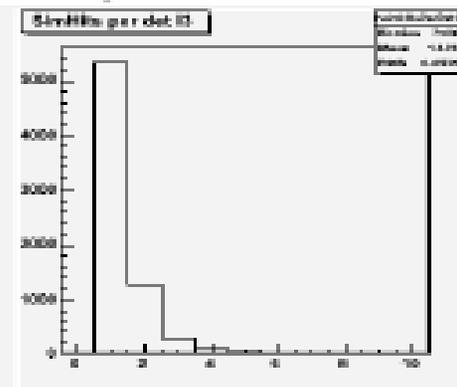
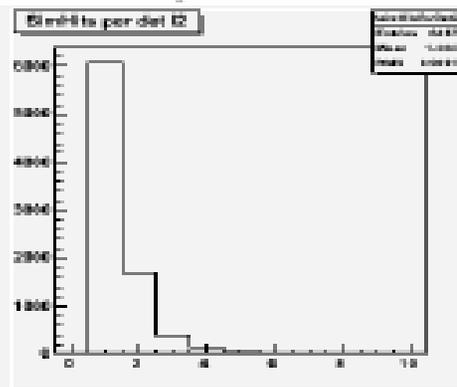
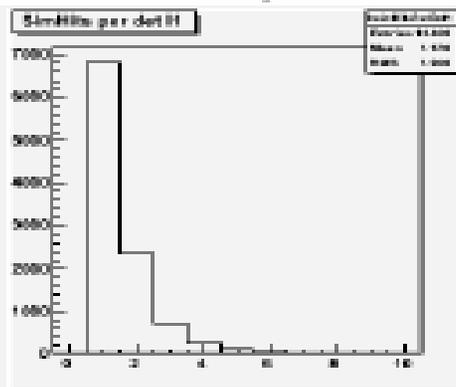
Compare CMSSW & OSCAR

Number of SimHits per module,
muons 10GeV, all eta (<2.5).

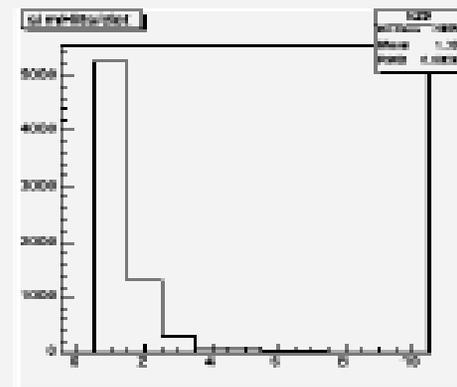
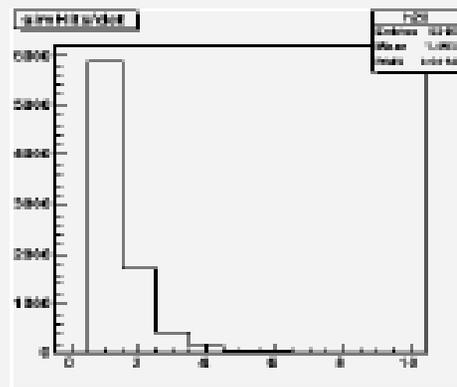
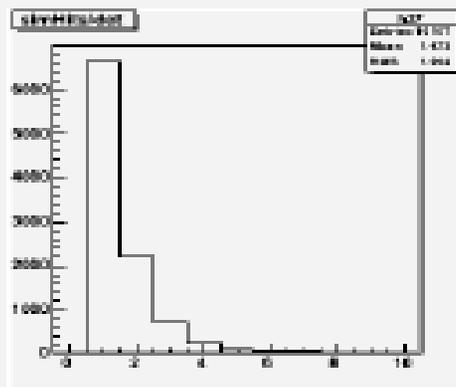
Layer 1

Layer 2

Layer 3

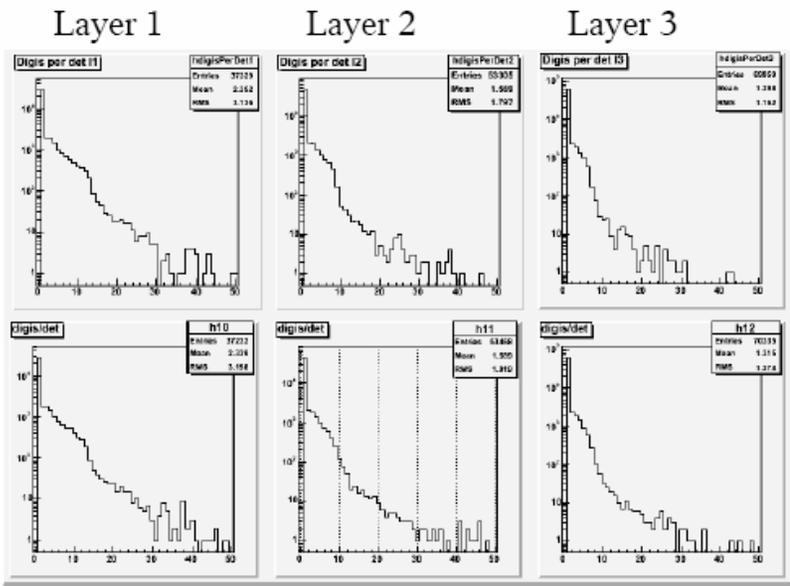


CMSSW



OSCAR

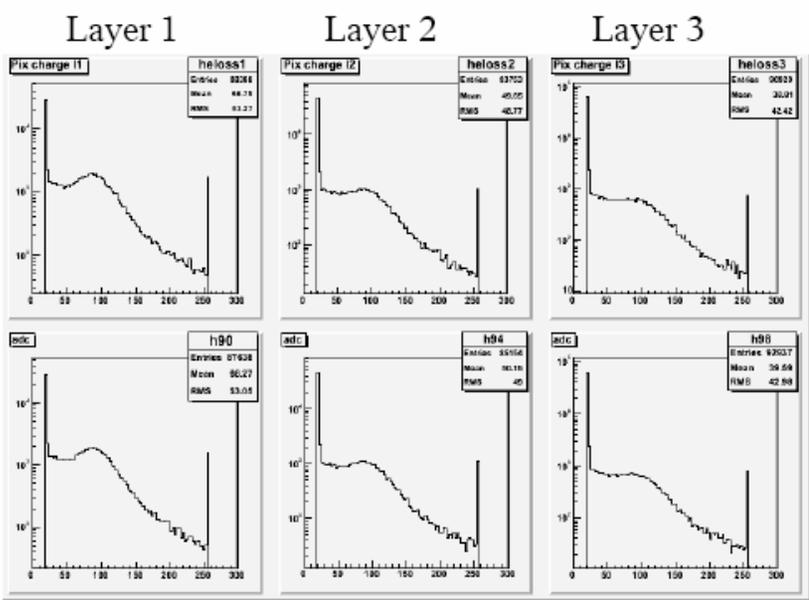
Barrel Digi checks



CMSSW

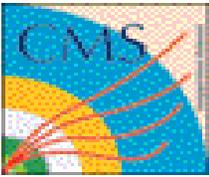
ORCA

Digi barrel checks ok
 ➤ Large pixel topology implemented
 (D.Kotlinski)

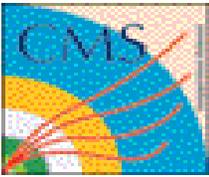


CMSSW

ORCA



- **Pixel digis and digi have been ported to the data container `edm::DetSetVector<>`**
- **Will be available from 070_pre1 on**
- **Pixel clusterizer and digitizer modified accordingly (V.Chiochia, M.Pioppi)**
- **Raw2Digi converter modification under way**



Please send me and Filippo any suggestions/questions at
filippo.ambroglini@cern.ch
neeti@fnal.gov