Collaboration Meeting
MVD Subgroup
Torino, April 15, 2009

Thomas Würschig

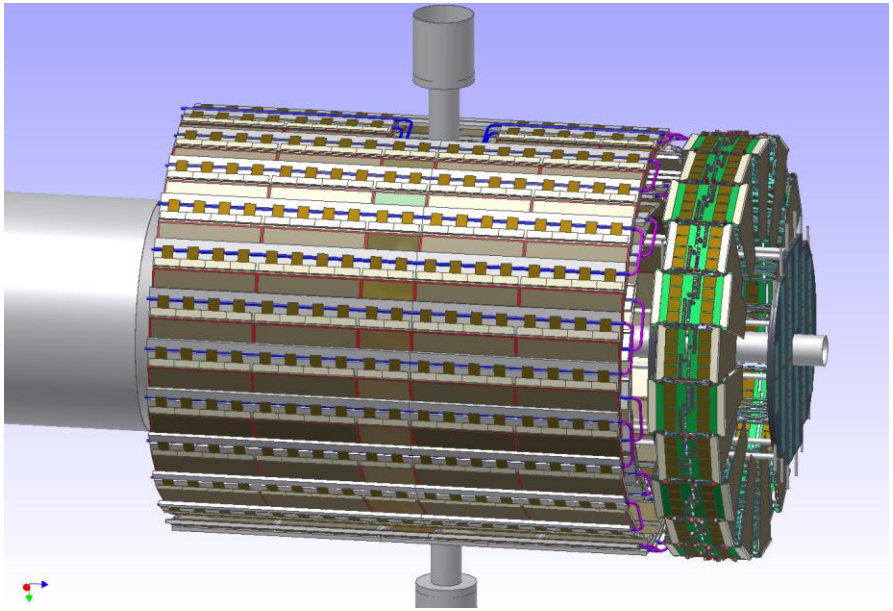
Implementation of new CAD model

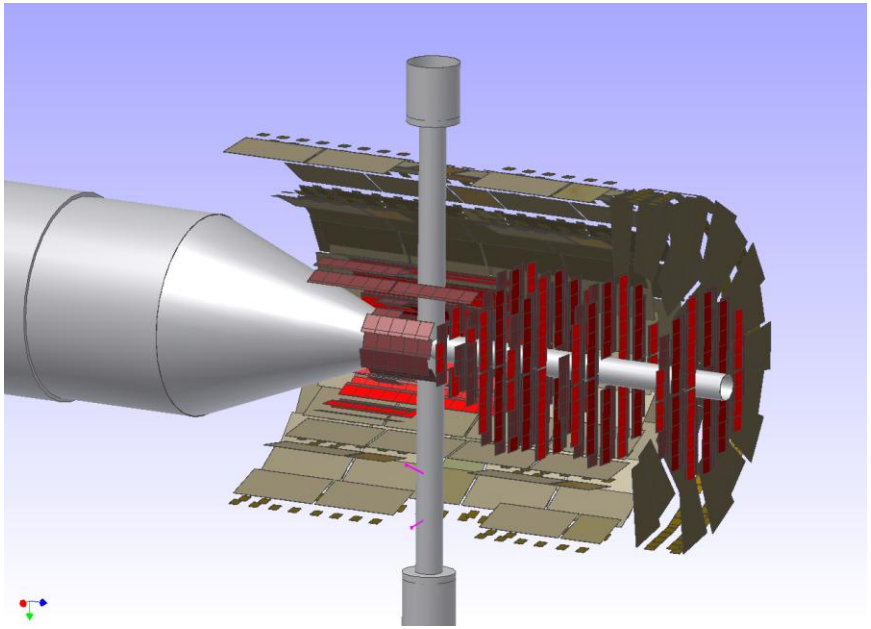
Modification of MVD Wiki-Pages

MVD routing issues

New model

- Mvd-2.0_Pv-3.0_Sv-3.2
  - Based on discussions of last MVD Mechanics meetings
  - **Full version** (mechanics) and slimed versions with **active sensor** or active sensor and **frontend electronics** available





New model

- Mvd-2.0_Pv-3.0_Sv-3.2
  - Uploaded to the Wiki page together with a detailed documentation (PDF files)

MVD CAD file dump

MVD-2.0

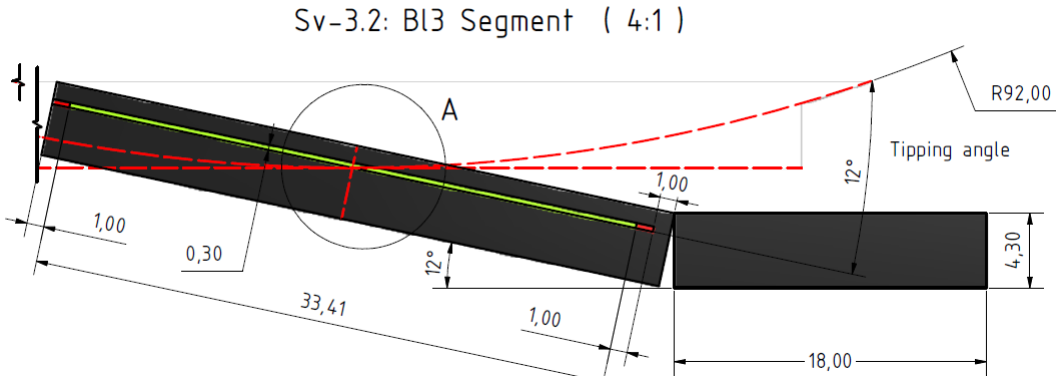
Full versions

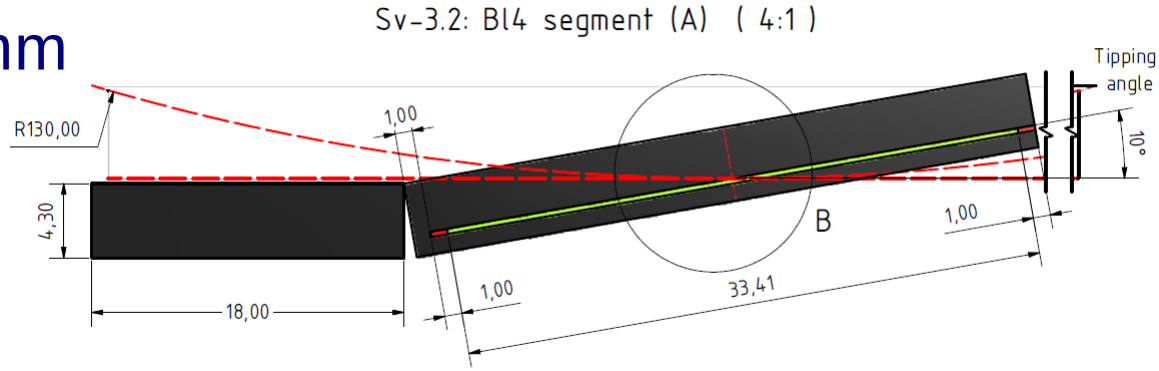
- Download file -	- Link to documentation -	- Comment -
: Mvd-2.0_Pv-3.0_Sv-3.2.stp :	ModelMvd2pt0	: MVD-2.0 step file including Sv-3.2 and Pv-3.0
: Mvd-2.0_Pv-3.0_Sv-3.2_ActiveSensor.stp :	ModelMvd2pt0	: same version, only active area :
: Mvd-2.0_Pv-3.0_Sv-3.2_ActiveSensor_FEE.stp :	ModelMvd2pt0	: same version, only active area and frontend chips:

http://panda-wiki.gsi.de/cgi-bin/view/Mvd/ModelMvd2pt0
> http://panda-wiki.gsi.de/pub/Mvd/ModelMvd2pt0/Pv-3_0-Docu.pdf
> http://panda-wiki.gsi.de/pub/Mvd/ModelMvd2pt0/Sv-3_2-Docu_PWD.pdf

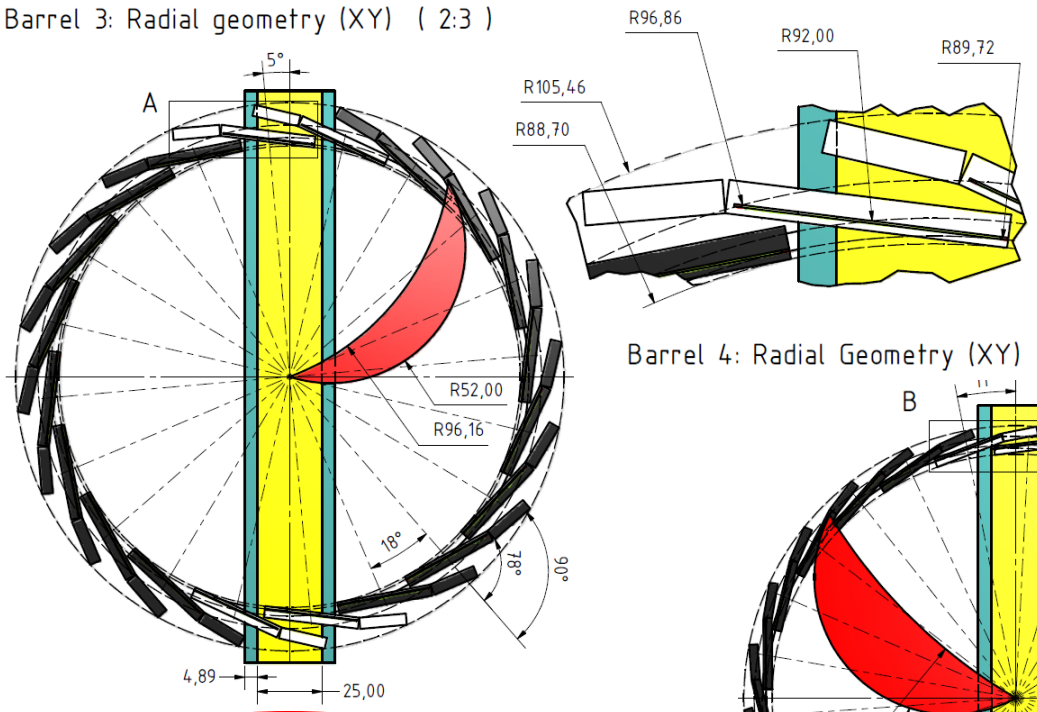
New model: Strip part

- Barrel part
  - Implementation of deflected staves
    - ✓ Deflection angle balancing tilting angle of sensor
  - Keep-out volume
    - ✓ Thickness: 4.3 mm
    - ✓ Width: 18 mm (frontend side)



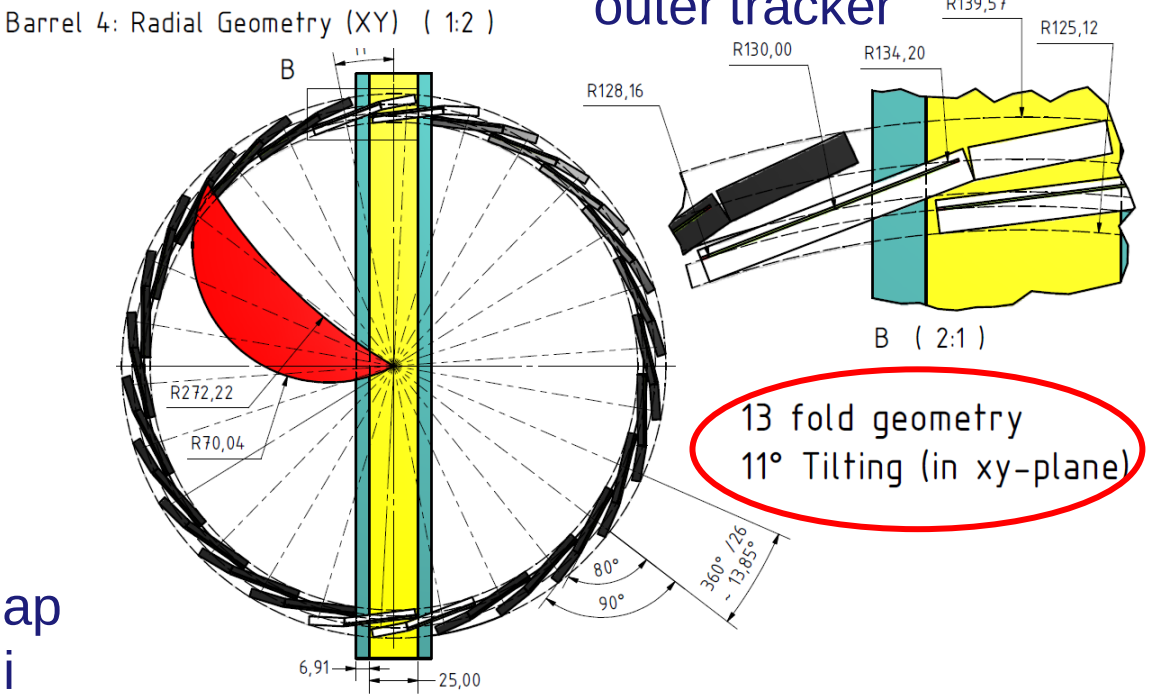


New model: Strip part



10 fold geometry
5° Tilting (in xy-plane)

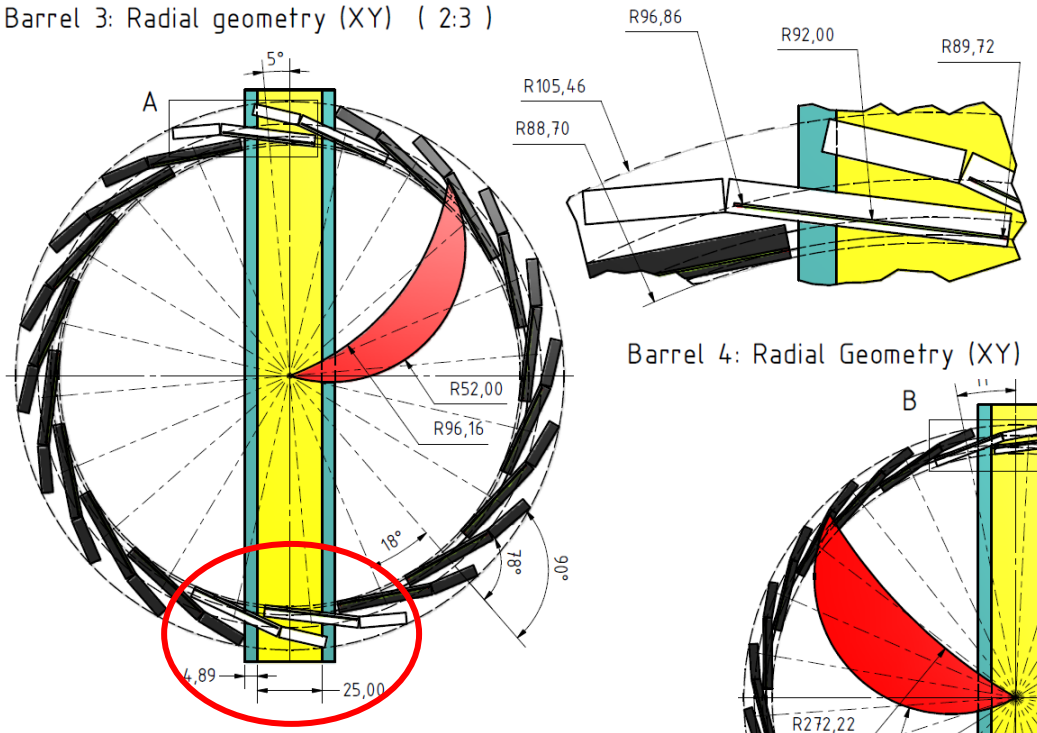
- Optimised radii
  - ✓ Increased space between layer 3 and layer 4
  - ✓ Last MVD point closer to outer tracker



13 fold geometry
11° Tilting (in xy-plane)

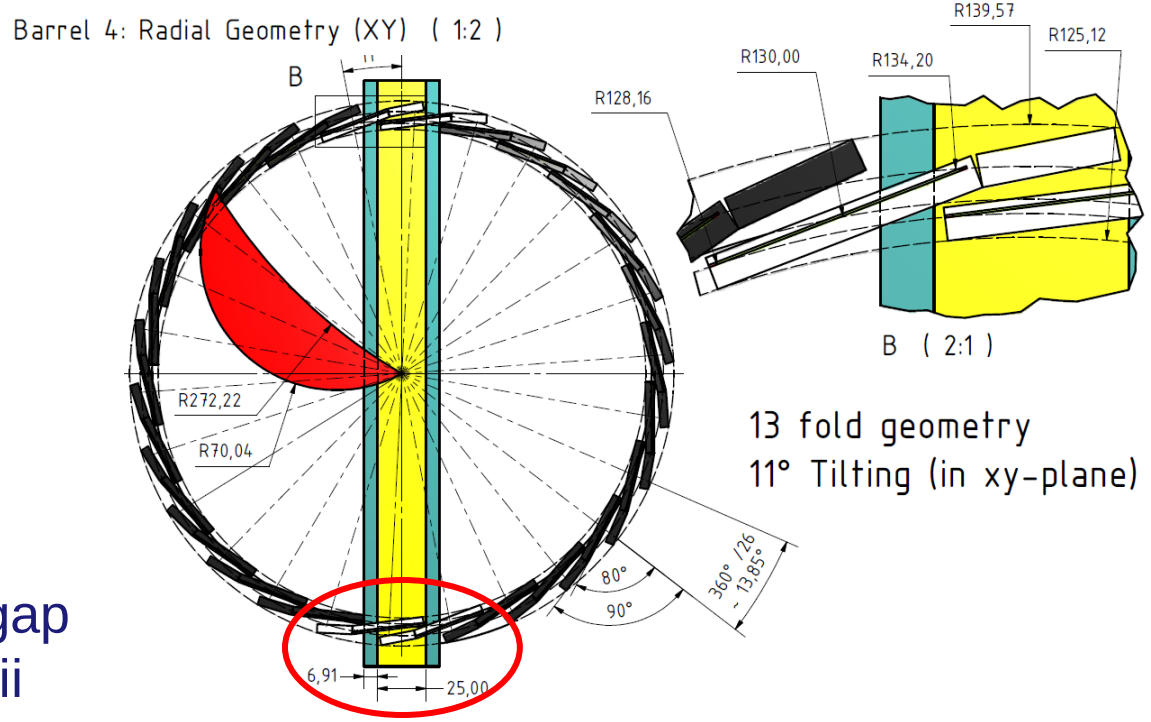
- ✓ Smaller radial gap for bending radii

New model: Strip part



10 fold geometry
5° Tilting (in xy-plane)

- Target pipe
  - ✓ 2 element keep-put
  - ✓ Additional space safety margin left

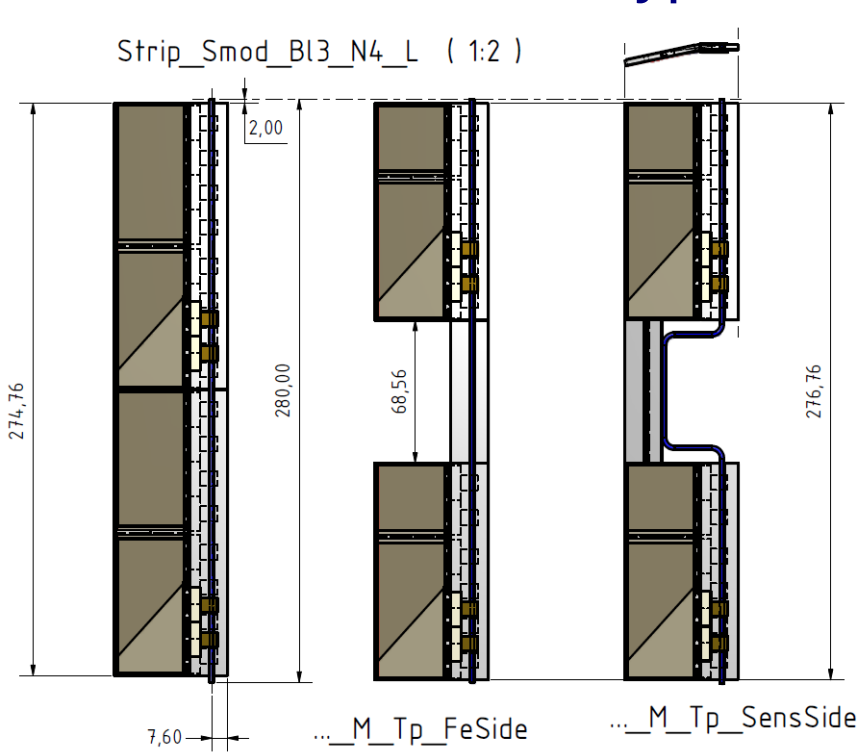


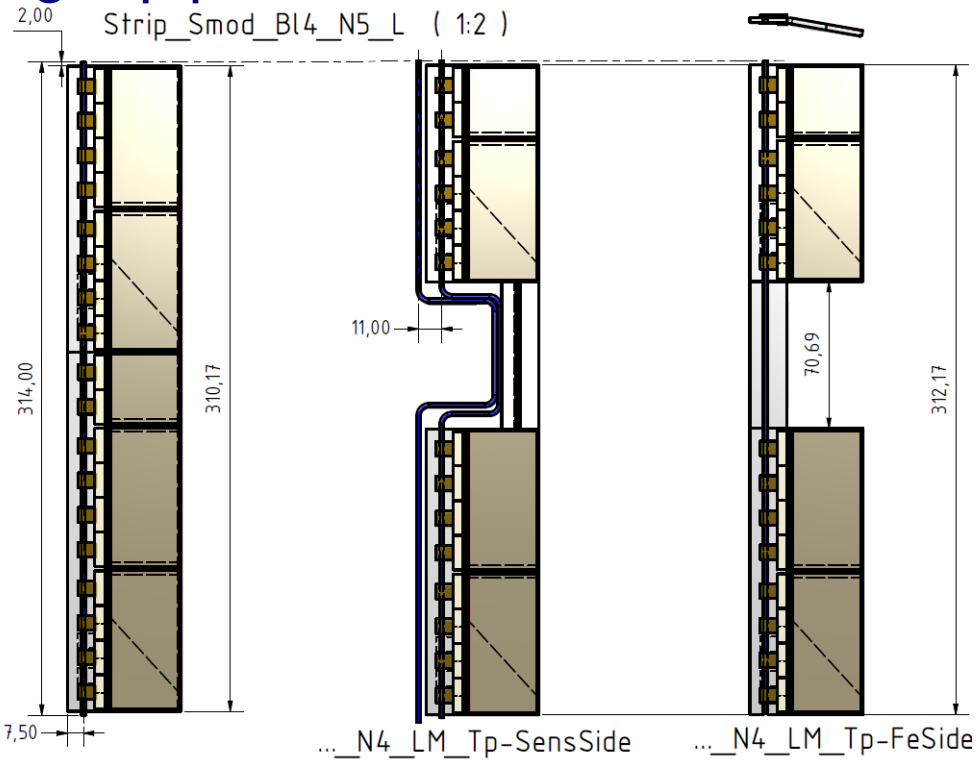
13 fold geometry
11° Tilting (in xy-plane)

- ✓ Smaller radial gap for bending radii

New model: Strip part

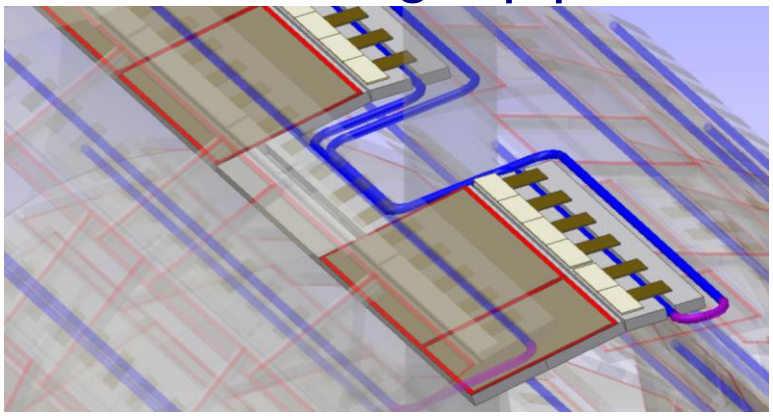
- Barrel part: Super modules
  - Common stave support over full lengths
  - 2 modified stave types at target pipe

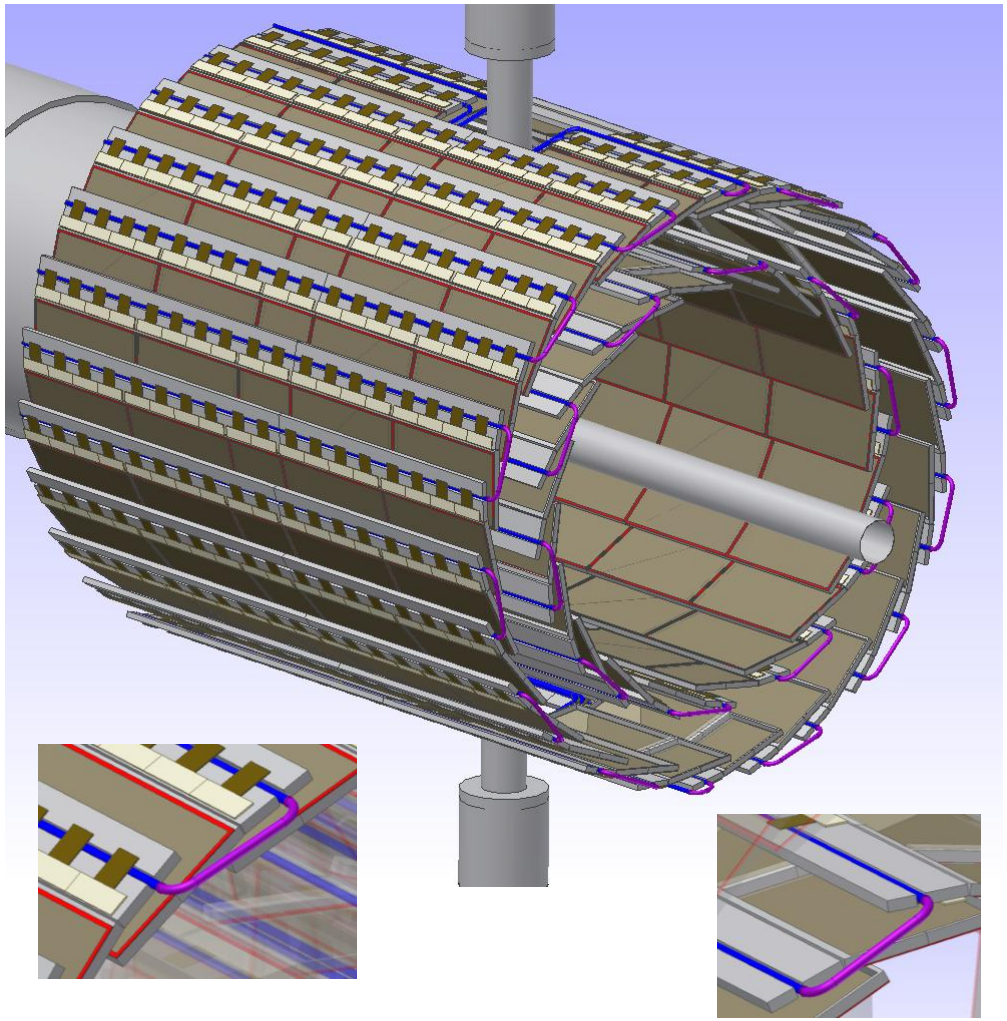




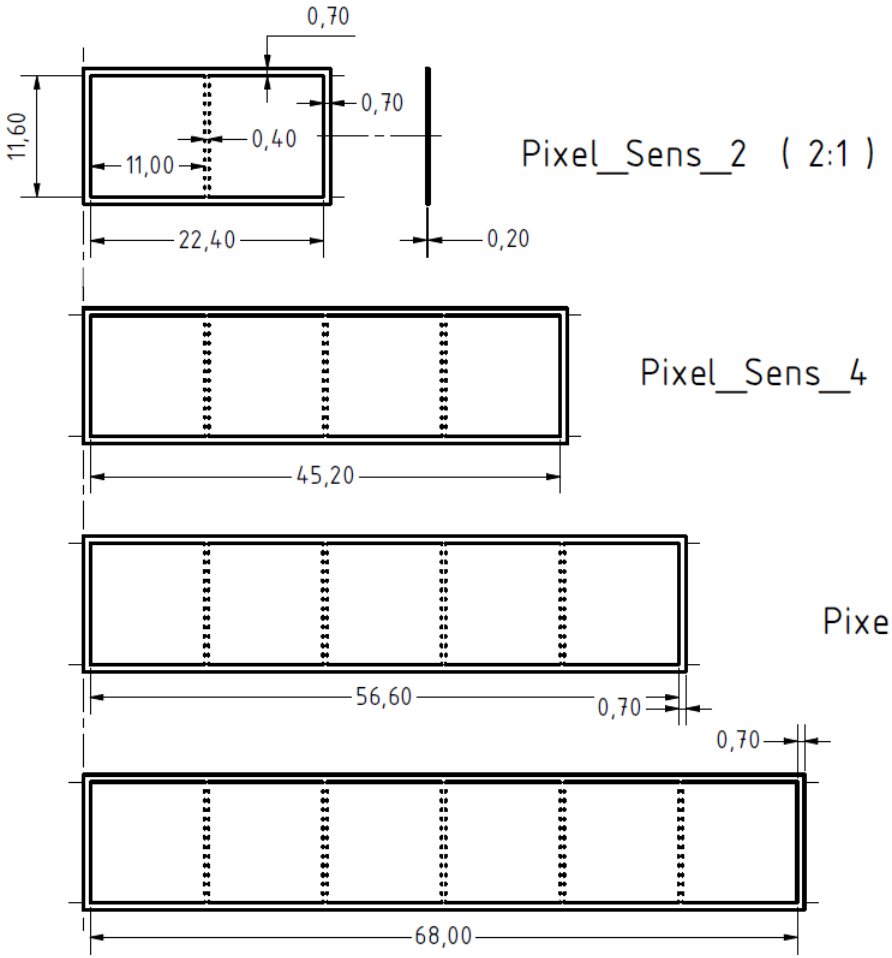
New model: Strip part

- Barrel part: Half-shell Cooling
  - 1 pipe / stave
  - Connection of 2 staves
  - Barrel 4:
    2 pipes in modified stave at target pipe





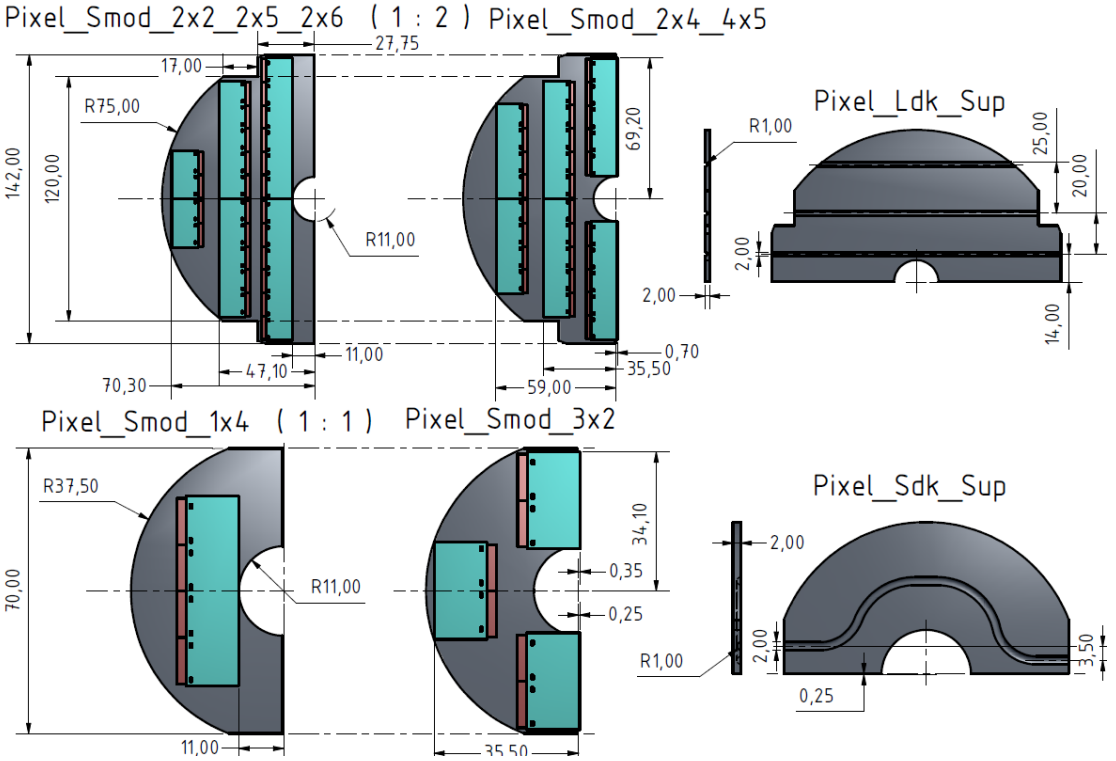
New model: Pixel part

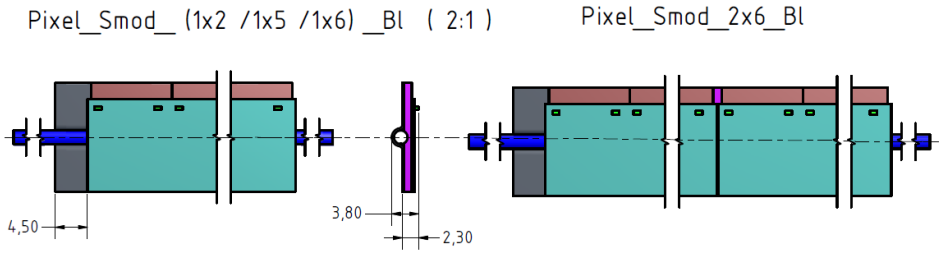


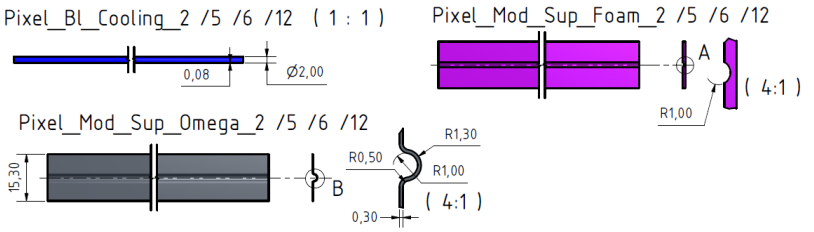
- Main parameters
  - Optimised for disk coverage
  - Active sensor area: 11.6 x 11.0 mm^2
  - Nominal pixel chip size: 14.8 x 11.4 mm^2
  - 4 different sensor sizes

New model: Pixel part

- Super-Modules
  - Barrel part:
    Stave
    → Omega support
  - Disk part:
    Half-disk support

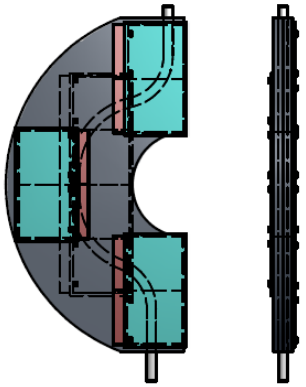




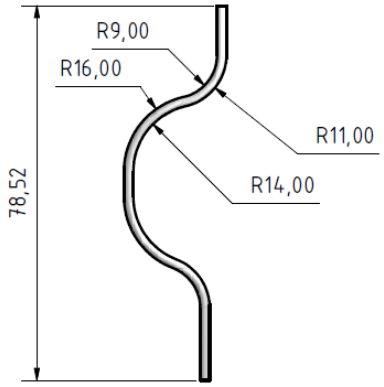


New model: Pixel part

Pixel_Sdk (1:1)

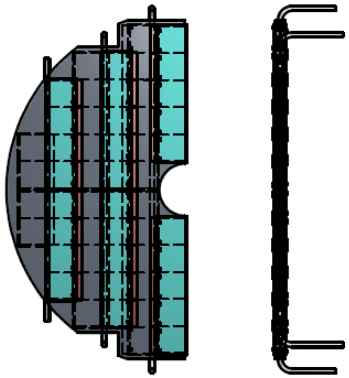


Pixel_Sdk_Cooling

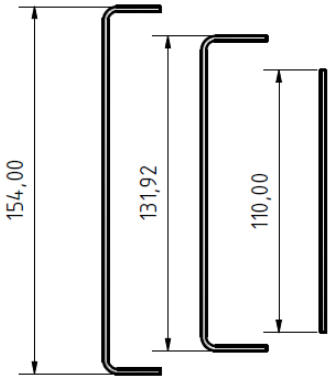


- Forward layer
  - Double-sided equipped disks
  - Cooling: 1 pipe for 1 row at front and rear side

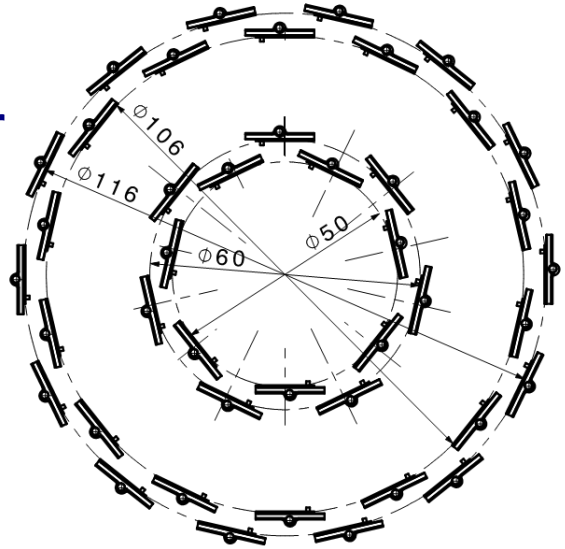
Pixel_Ldk (1:2)



Cooling pipes layer 3/4

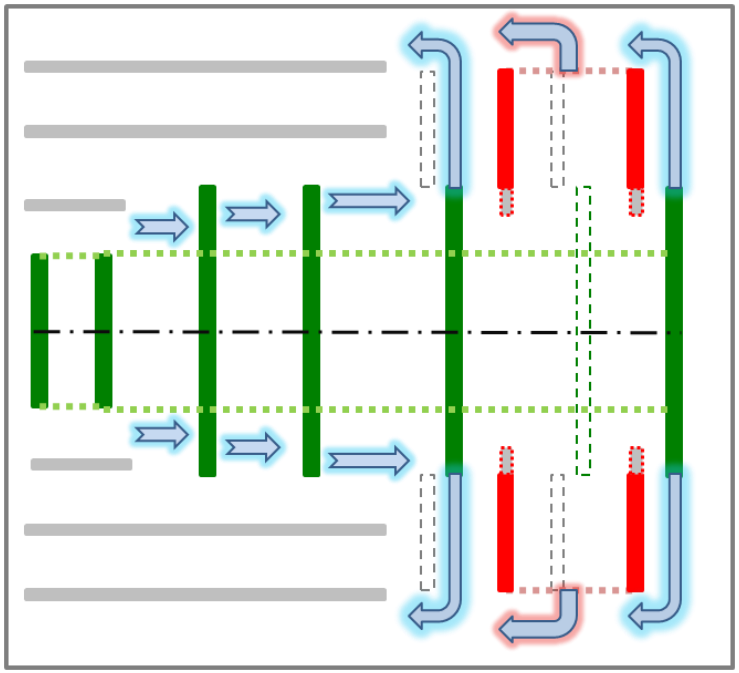


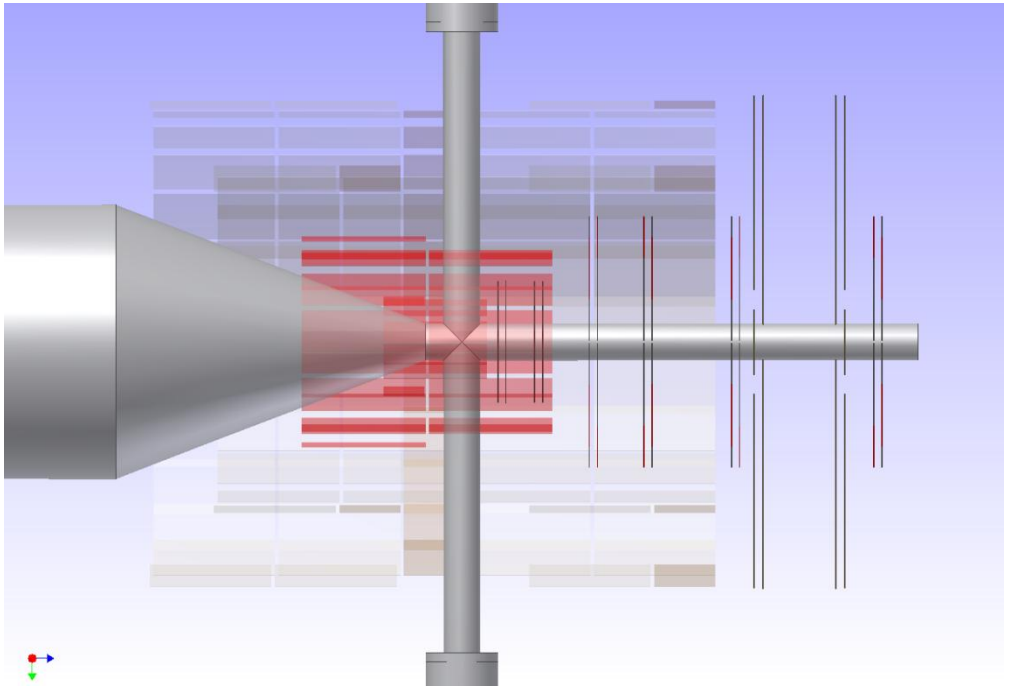
- Barrel layer
  - 14 modules layer 1
  - 28 modules layer 2



New model: Forward part

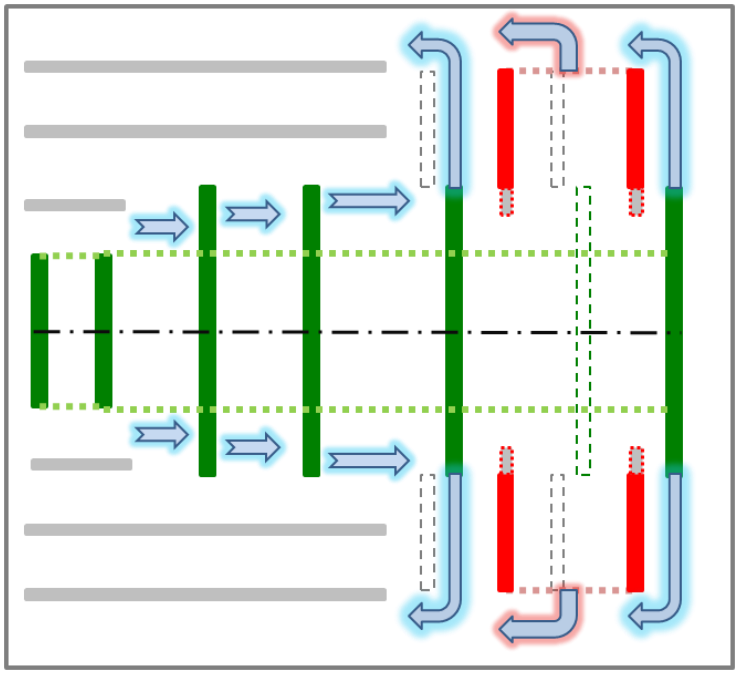
- Modified concept for forward part implemented

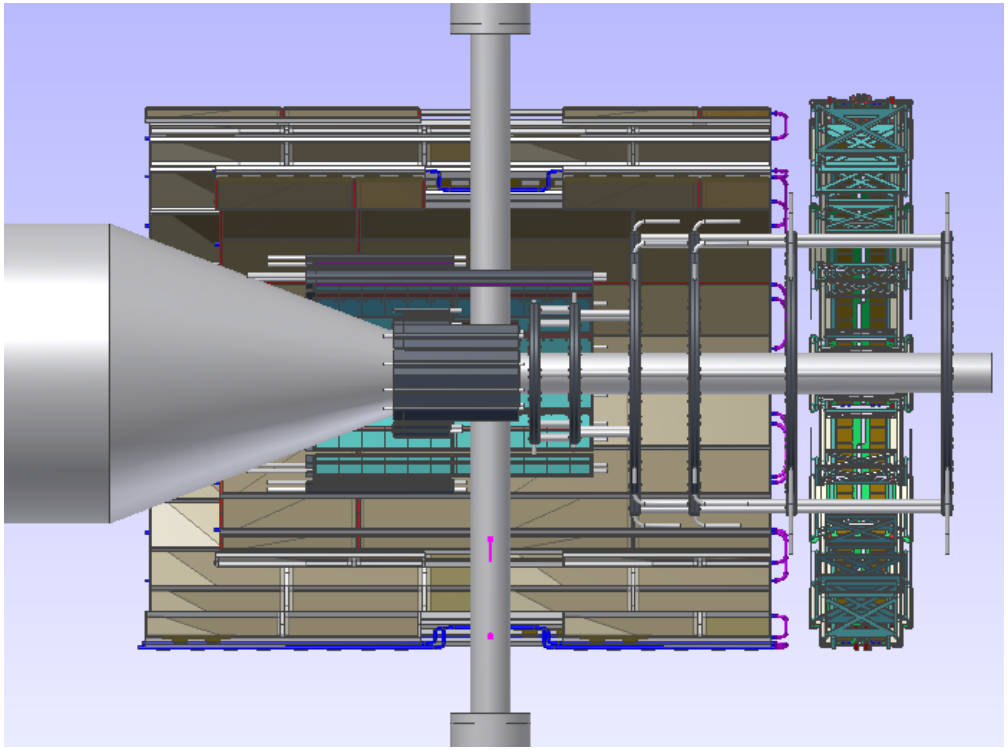




New model: Forward part

- Modified concept for forward part implemented

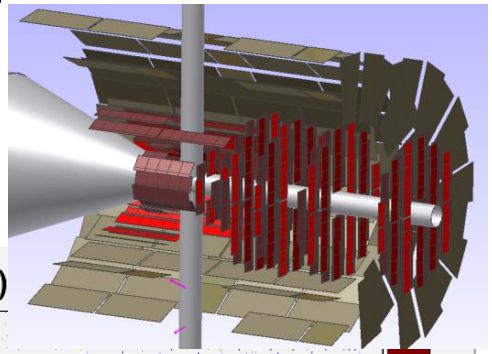


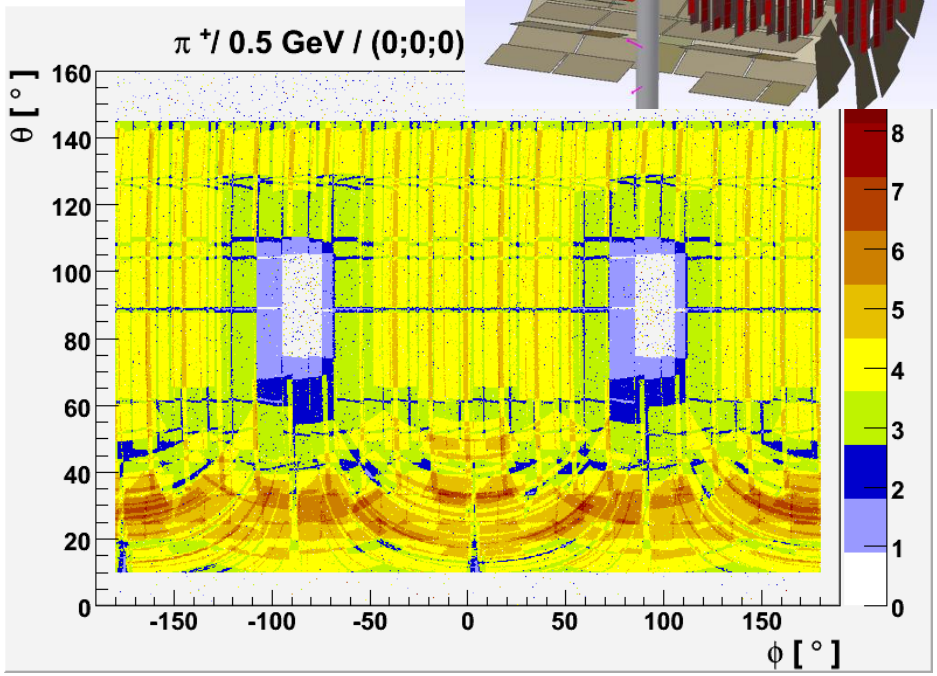


New model: Simulation

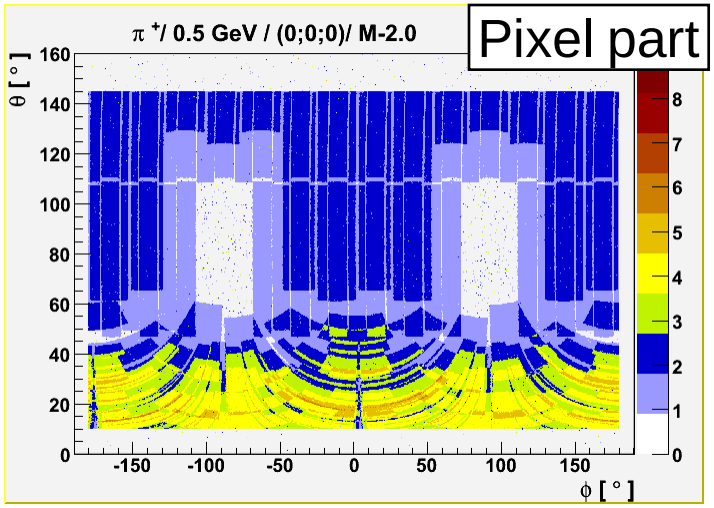
- MVD track points

Full model
(active sensors)

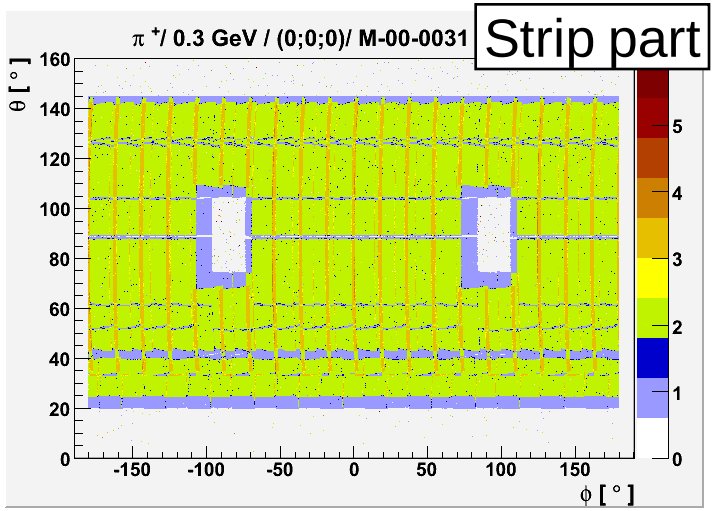




Pixel part

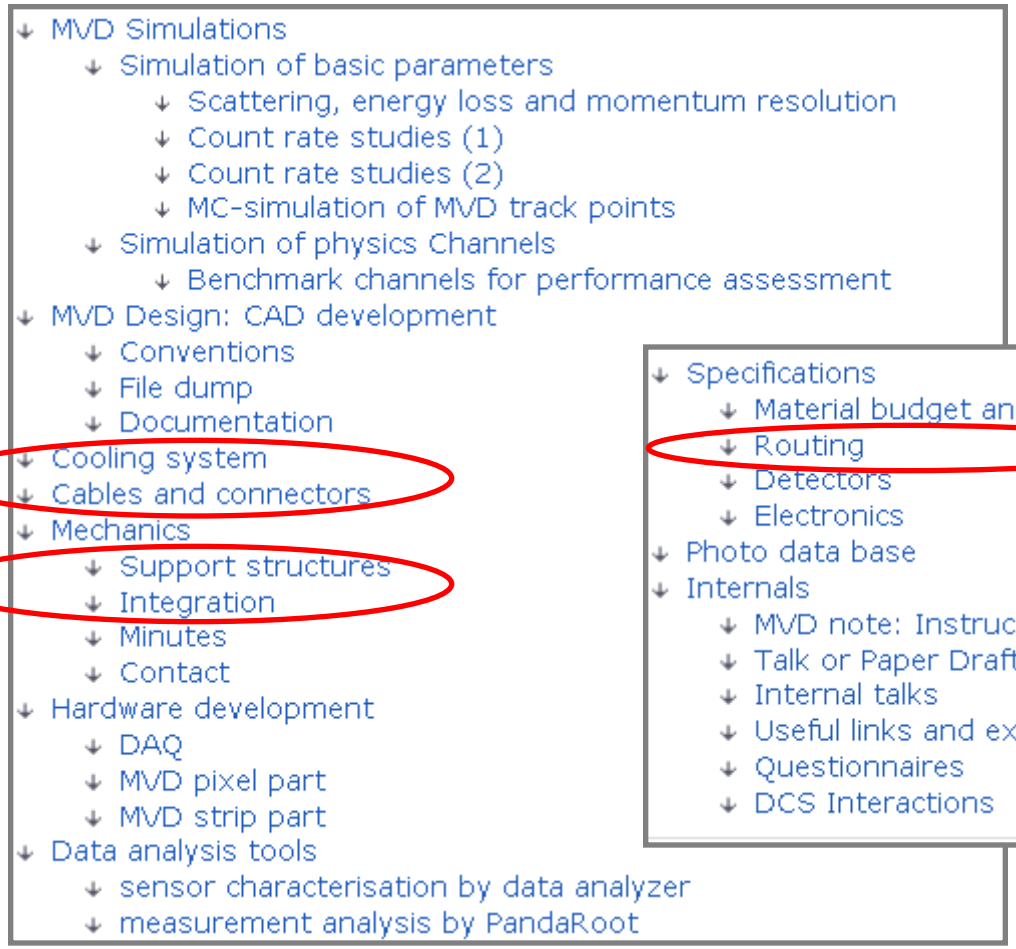


Strip part



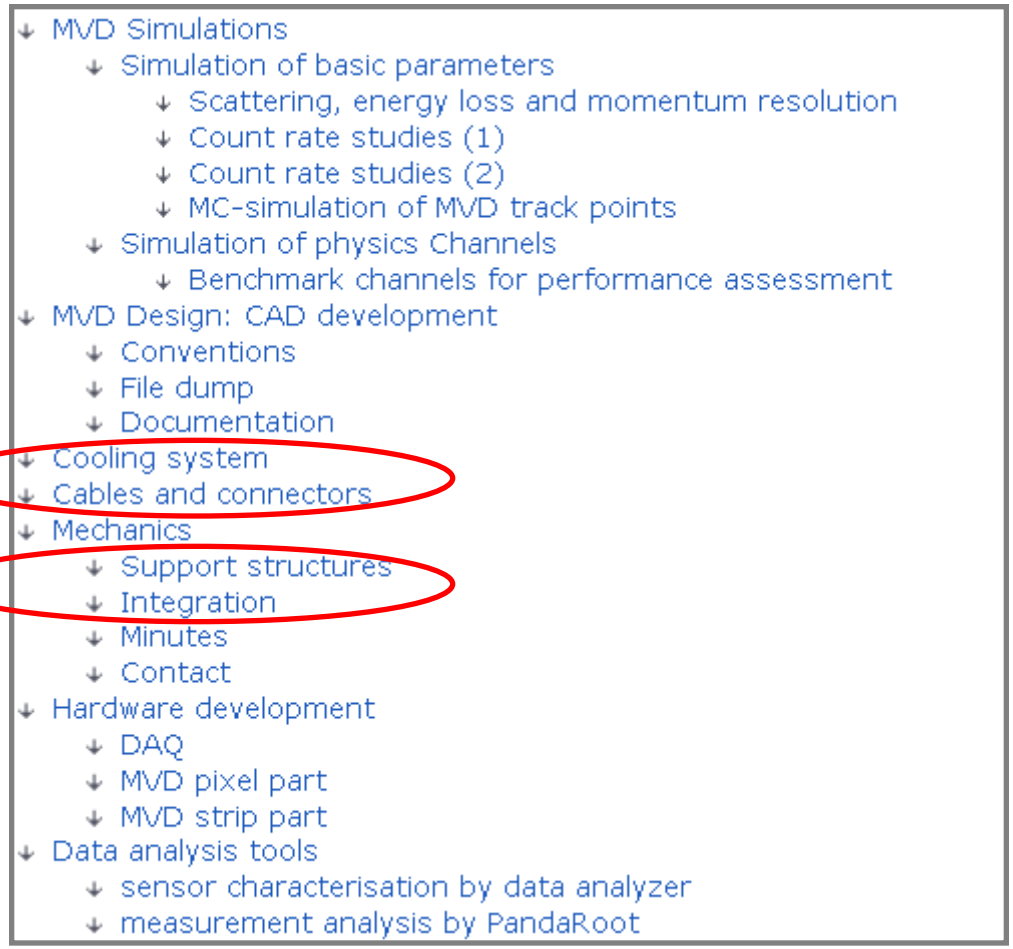
MVD Wiki modifications

- Modified structure of MVD developer's area



MVD Wiki modifications

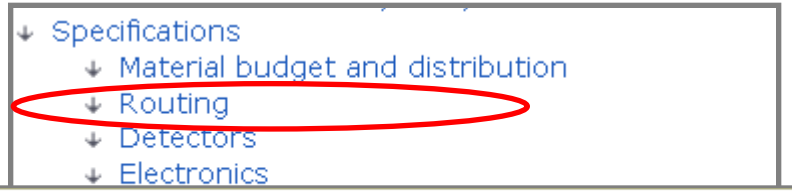
- Modified structure of MVD developer's area



- New issues:
  - ✓ Cooling system (General ideas, dimensioning, simulation)
  - ✓ Cables and connectors (Specifications, simulations, tests)
  - ✓ Mechanics subsection

MVD Wiki modifications

- Routing issues



Specifications

Material budget and distribution

All specifications refer to the **MVD detector** itself, namely all components within the defined MVD volume.

- Material budget considerations

Routing

All specifications refer to the **overall MVD routing** in regions **outside the defined MVD volume**.

Pages restricted only to persons directly involved in the MVD development.

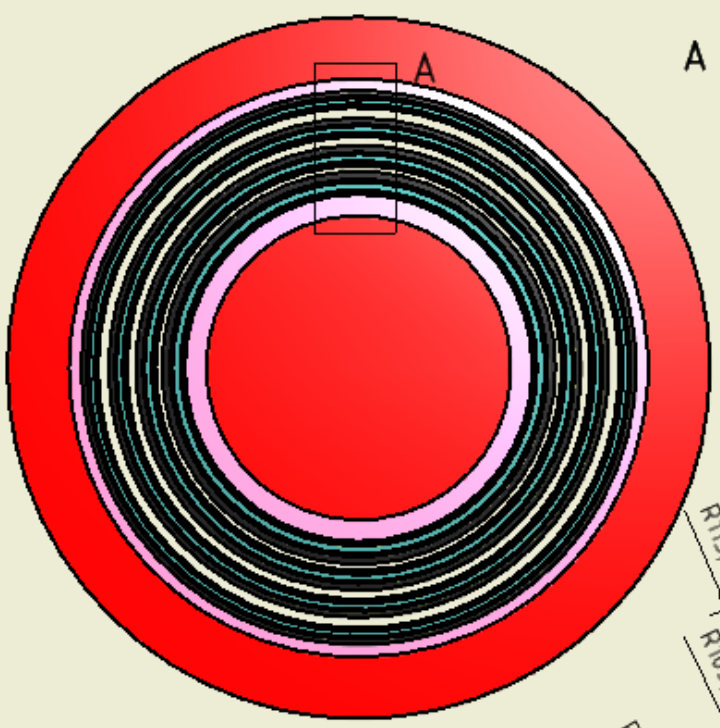
List of parameters summarized in an attached EXEL-table accessible on the public page

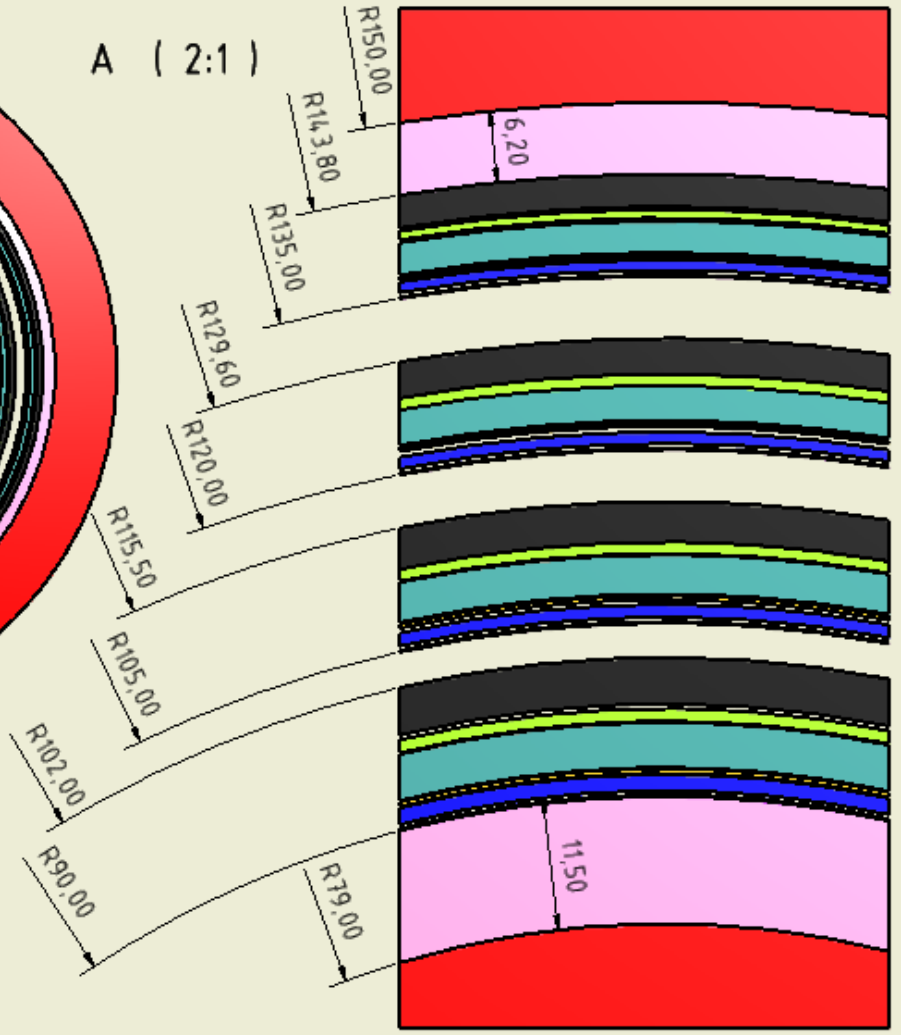
- Space requirements
- Material occupancy estimates

Routing issues

- Estimates based on area cross section we gave at last Workshop
  (to be sure again: MVD request is a maximum **radius of 150 mm** !)
- Re-iterated on Monday's meeting:
  - Introduction of 4 generalized layers
  - Elements: Steel, water (cooling) / Insulation, Copper, Aluminium (cabling) / carbon (support) ... and mechanical safety margins
  - Material equally distributed (in terms of area cross section) to all 4 layers

Routing issues





- Simplified onion shell model

Routing issues

Parameters for the simplified model

- Radial occupancy **layer 1**:

	Inner Radius	Outer Radius
Stainless steal	90	90,150
Water	90,5	91,900
Aluminium	92	92,400
CH	92,5	96,400
Copper	96,5	97,600
Carbon	98	102,000

- Radial occupancy **layer 2**:

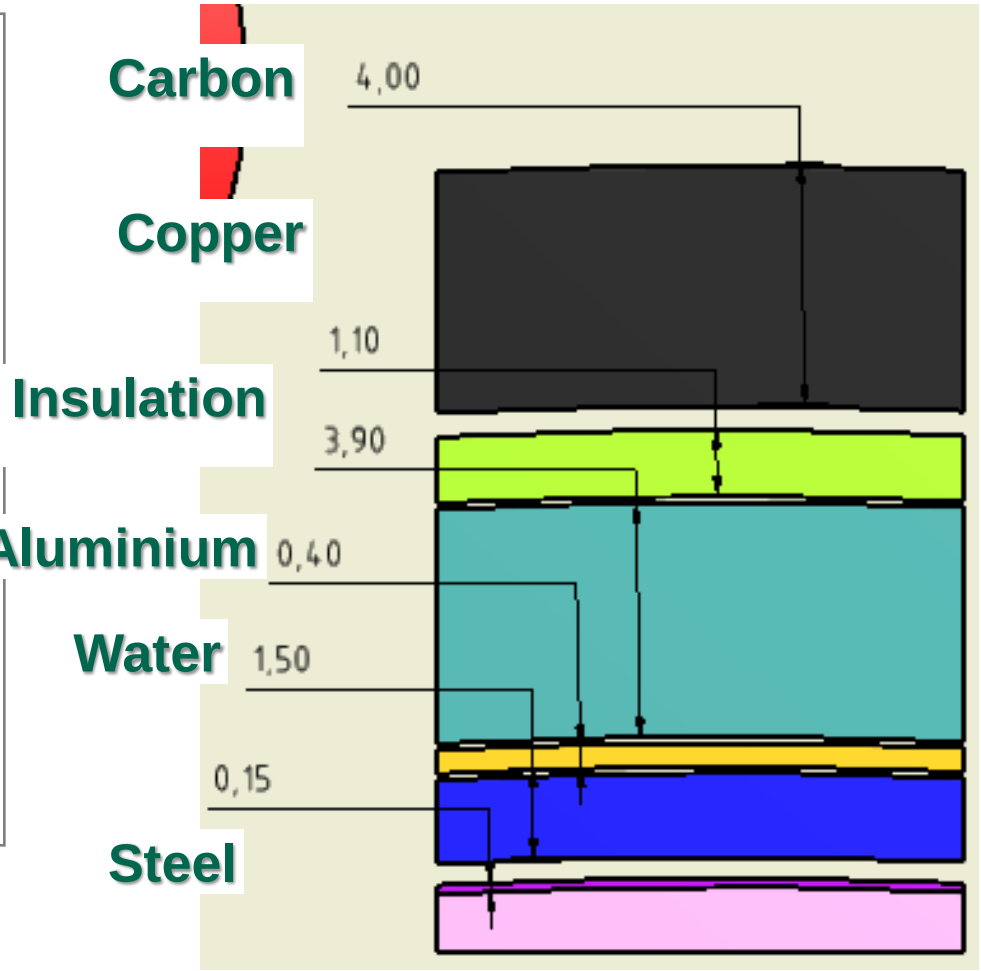
	Inner Radius	Outer Radius
Stainless steal	105	105,125
Water	105,5	106,600
Aluminium	107	107,350
CH	107,5	110,900
Copper	111	112,000
Carbon	112	115,500

ancy **layer 3**:

er Radius	Outer Radius
120	120,100
120,5	121,500
122	122,300
122,5	125,500
125,5	126,350
126,5	129,600

ancy **layer 4**:

er Radius	Outer Radius
135	135,100
135,5	136,400
136,5	136,800
137	139,750
140	140,750
141	143,800



http://panda-wiki.gsi.de/cgi-bin/view/Mvd/RoutingMaterialBudget

Summary

- Updated MVD model available
  - **Detailed documentation**
  - **First implementation to simulations**
- MVD-web of Wiki-pages stays most important platform to exchange information within MVD group
- MVD routing: Tables and drawings are ready to be linked to the public pages
  - Current official statement of our group
  - **If** further updates necessary → internal discussion and revision at closed wiki pages!!

... ??? ...

Open question:
... How to outline the MVD mechanics workshop ...