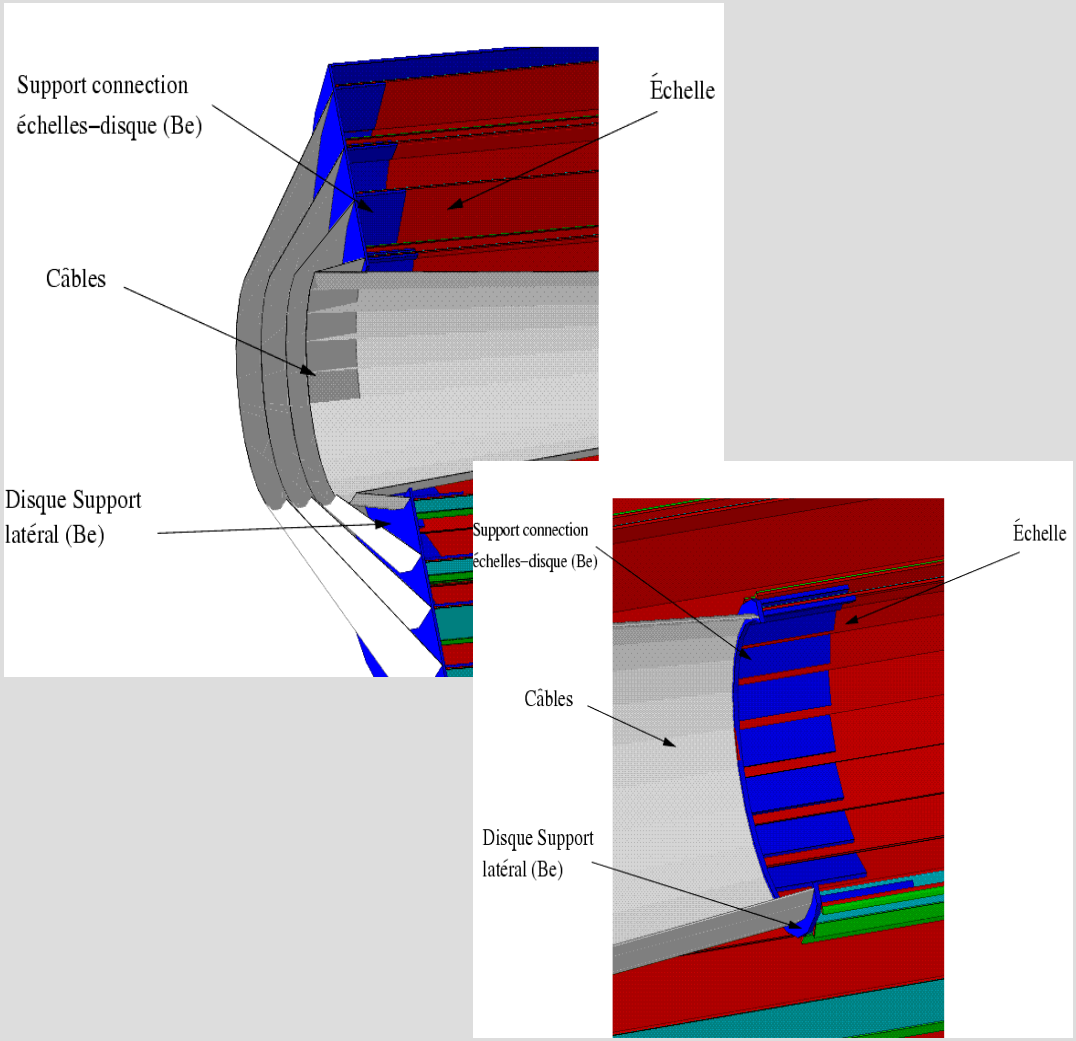
Two new VTX geometries in Mokka

- Reminder earlier VTX geometry version
- Consensual ladder geometry for LOI
- LDC 5 layer like geometry
- GLD 3 double layer like geometry
- high flexibility of the VTX geometry
- outline and conclusions

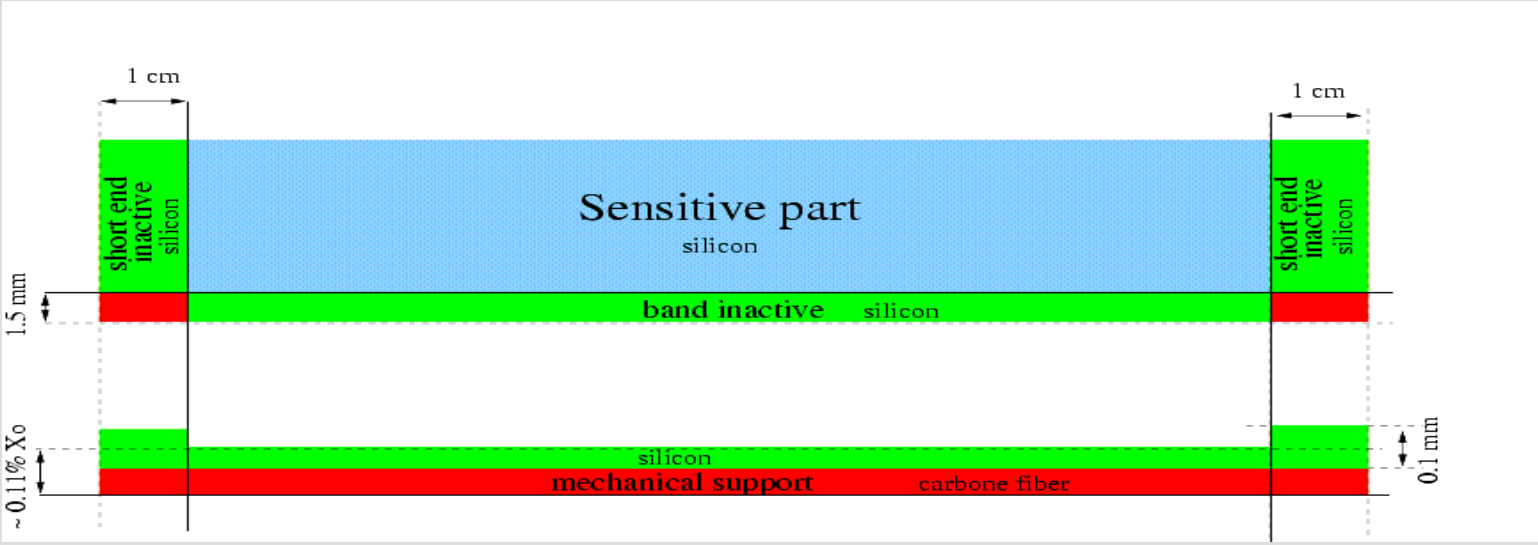
Reminder earlier VTX geometry version



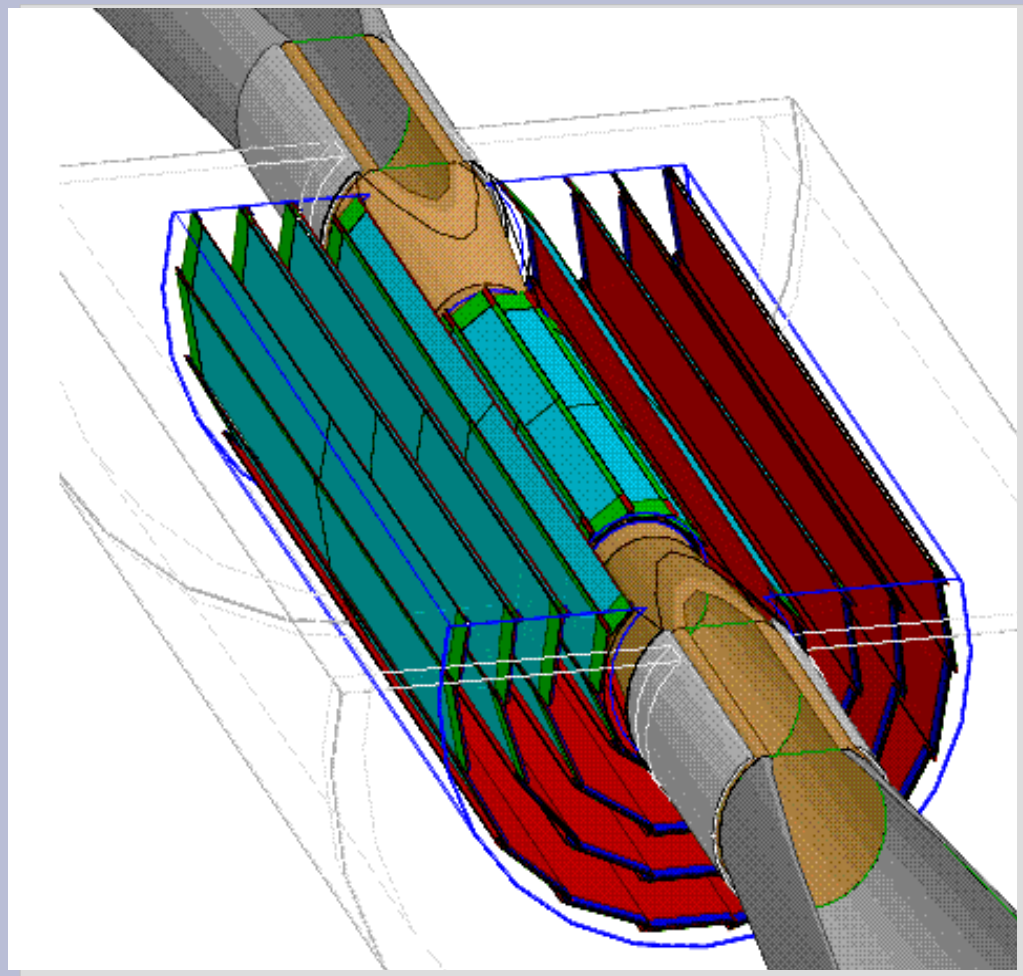
- VXD01 VTX TDR TESLA geometry inside the model D14
- VXD02 CMOS VTX geometry inside the model D14_CMOS
- realistic and flexible geometry
  - layer composed of ladder
  - realistic mechanical support
  - few geometry parameters tunable thanks to the Mokka steering file

Consensual ladder geometry for LOI

- VTX optimization process should be carried out in a “technology neutral” way
- description of a consensual geometry ladder
  - electronic at the end and along the ladder
  - ladder thickness ~0.11% Xo (Si + CF)

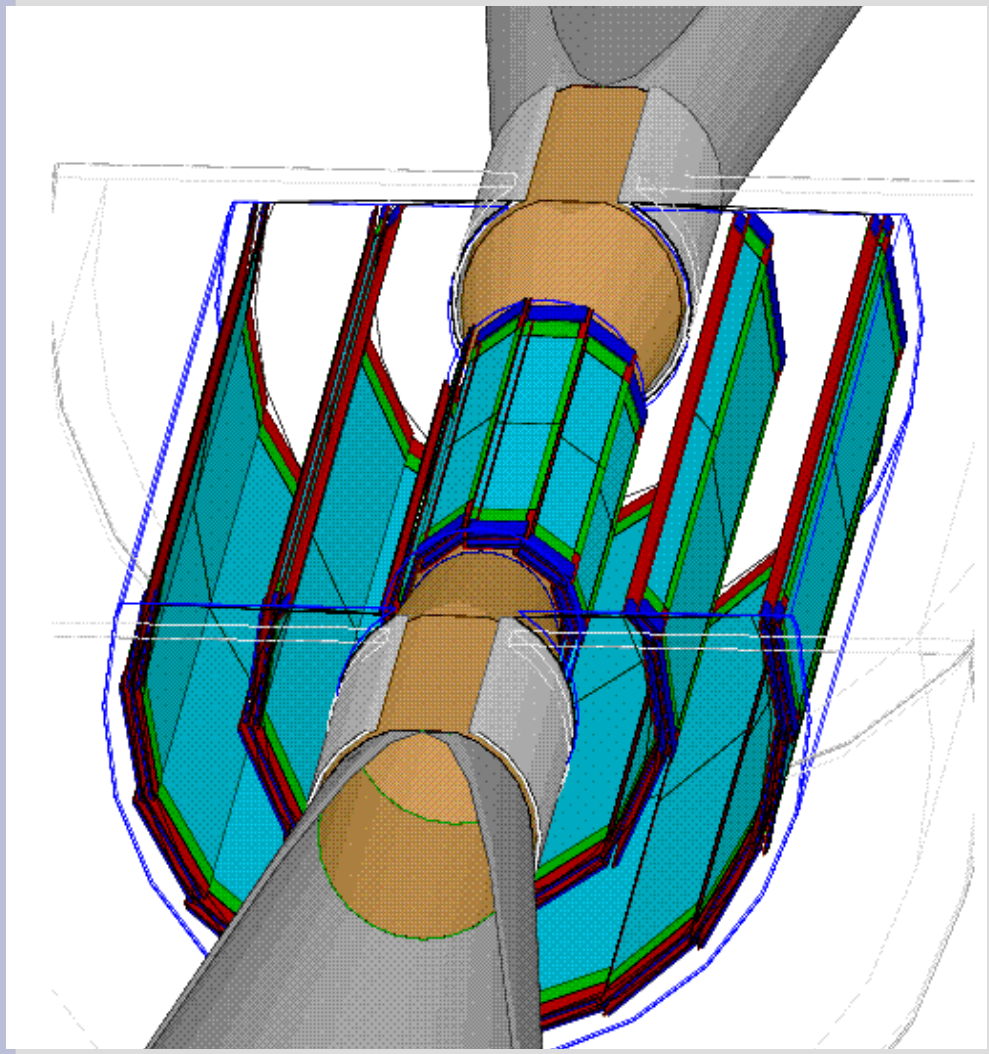


LDC 5 layer like geometry (VXD03)



- layer radius (mm): 1.5, 2.6, 3.7, 4.8, 6.0
- ladder length
  - inner layer : 125 mm
  - outer layers : 250 mm
- ladder support structure :
  - Carbone Fiber 50 μm thick
- ladder sensitive part width :
  - layer 1: 5.5 mm
  - layer 2: 7.5 mm
  - outer layers : 11 mm
  - Si active 50 μm thick
- electronic ladder end :
  - 1 mm long
  - 100 μm thick
- structure along ladder
  - 1.5 mm width
  - Si 50 μm thick
  - this part can be sensitive for overlap studies

GLD 3 double layer like geometry (VXD04)



- layer radius (mm):
  - 1.6/1.8, 3.7/3.9, 5.8/6.0
  - gap between paired layer 2 mm
- ladder length
  - inner layer : 125 mm
  - outer layers : 250 mm
- ladder support structure :
  - Carbone Fiber 30 μm thick
- ladder sensitive part width :
  - layer 1/2: 5.5 mm
  - outer layers : 11 mm
  - Si active 50 μm thick
- electronic ladder end :
  - 1 mm long
  - 100 μm thick
- structure along ladder
  - 0.5 mm width
  - Si 50 μm thick
  - this part can be sensitive for overlap studies

High flexibility of the VTX geometry

- user can modify the geometry thanks to a lot of free parameters in the Mokka steering file
- common free parameters for both geometry:
  - thickness of the Be beampipe
  - length, width, thickness of the sensitive part
  - thickness, material of the support ladder
  - length, thickness of the electronic at the end of the ladder
    - you can construct or not this part (technology dependent)
  - width, thickness, sensitivity of the side band structure
    - you can construct or not this part (technology dependent)
  - cryostat surrounded the VTX or not

- 5 layer VTX geometry
  - radius of the 5 each layer can be set

- 3 double layer VTX geometry
  - radius of the 3 layer can be set
  - the gap between paired layer can be set (default value 2 mm)

- modifying width of sensitive part and radius of the layer change the number of ladders per layer
  - the number of ladders with an optimal overlap is calculated automatically
- the gear file is update automatically
- user is free to modify the geometry to choose the sensor technology and optimization studies but by default the consensual ladder geometry is constructed

outline and conclusions

- these 2 new flexible geometries are ready for LOI mass production and VTX optimization studies
- There are implemented in the new Mokka release Mokka-06-06
- It will be useful to insert these two geometry in a full detector model
- Remarks and questions are very welcome