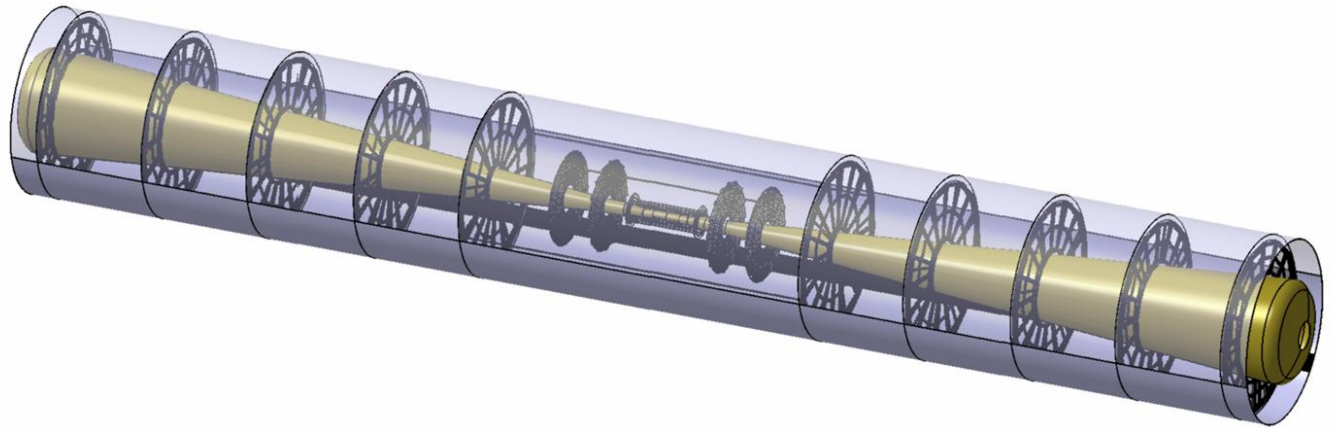


FTD Report

LCWS11, Granada, September 2011



A. Ruiz-Jimeno (on behalf of FTD group)

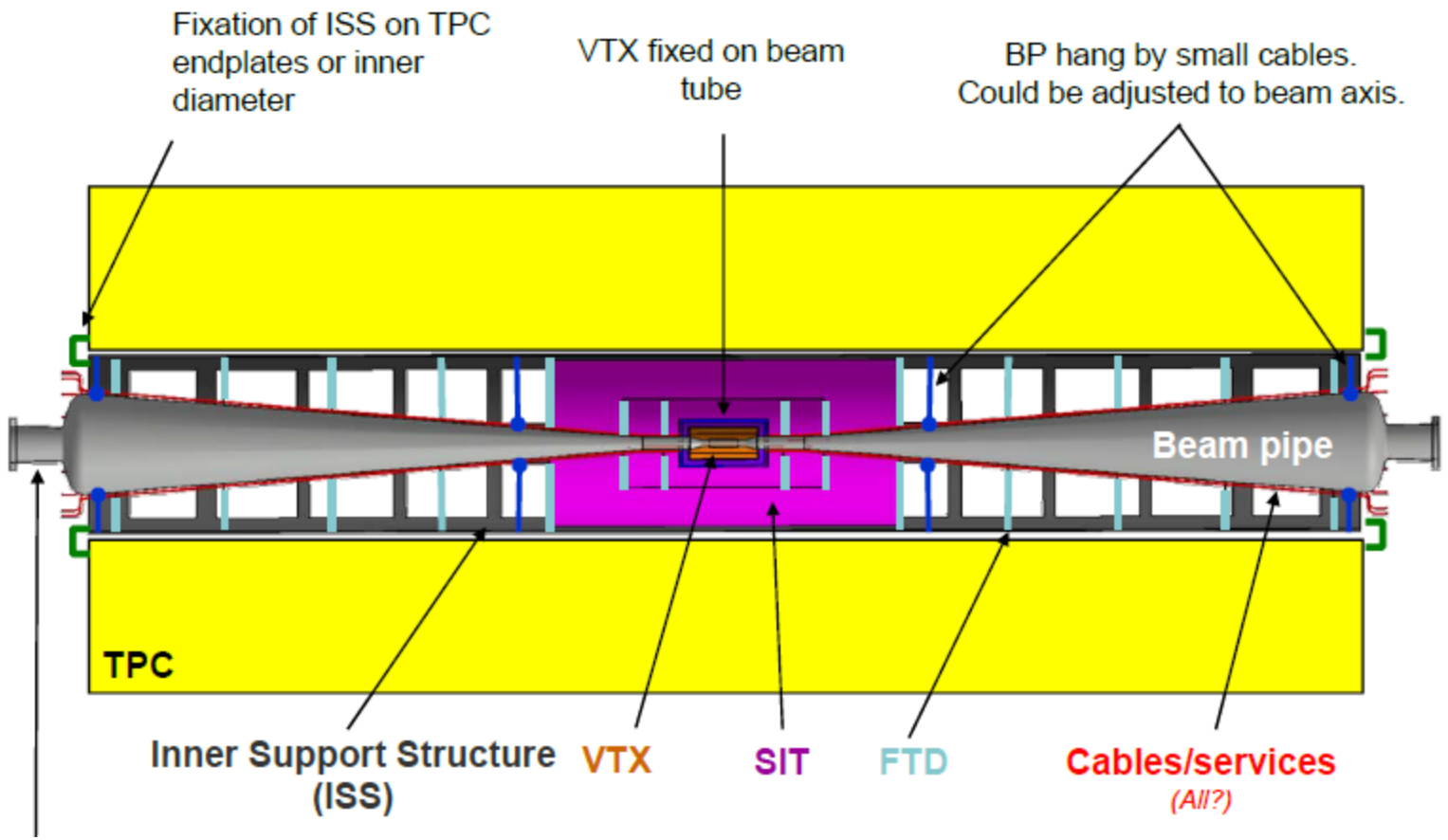
_Outline

- FTD progress on Integration.
- FTD Progress on Software modeling.
- R & D work lines

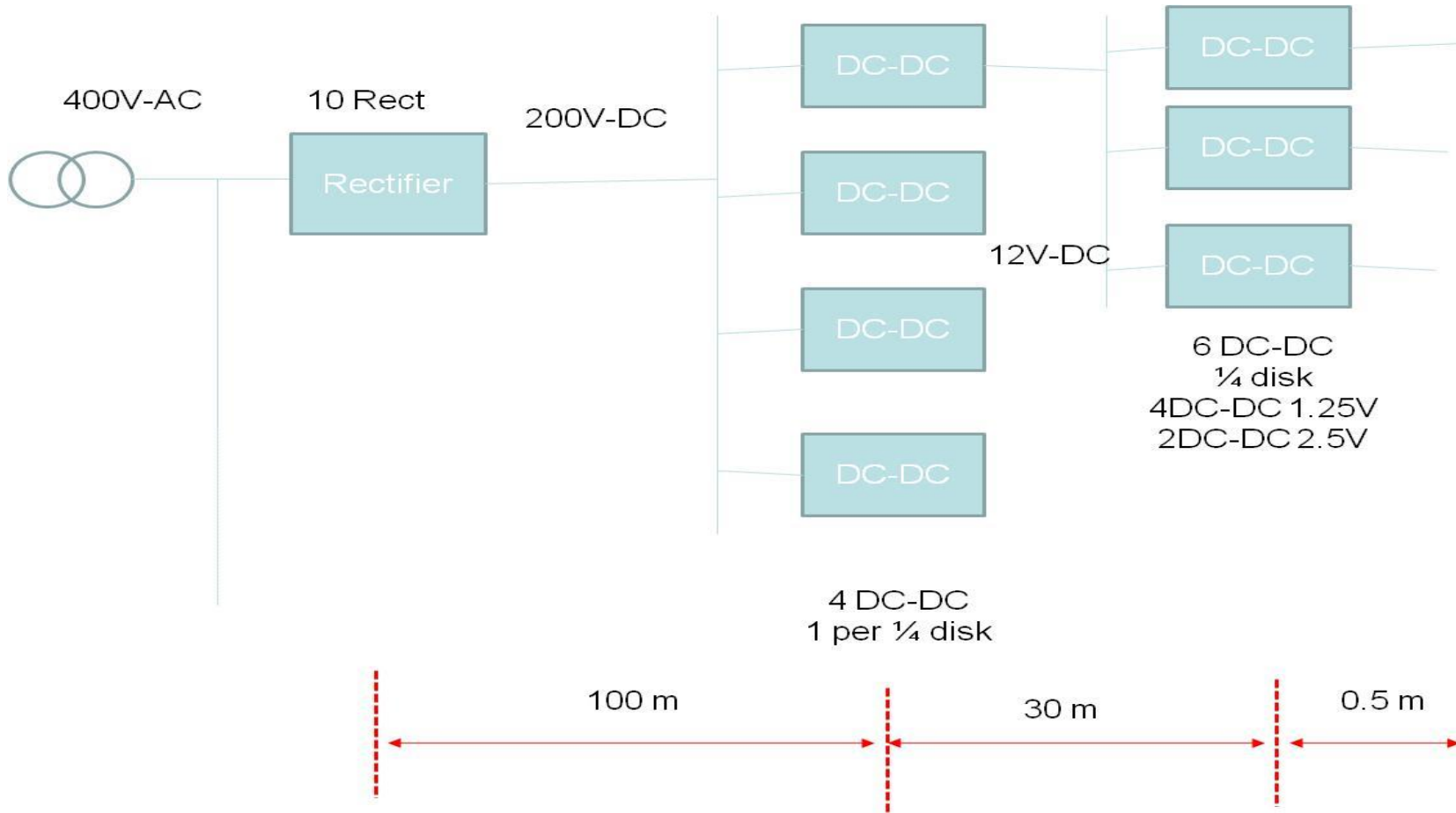
_Detector Integration (David Moya, Iván Vila)



– Integration of inner detectors: critical item.

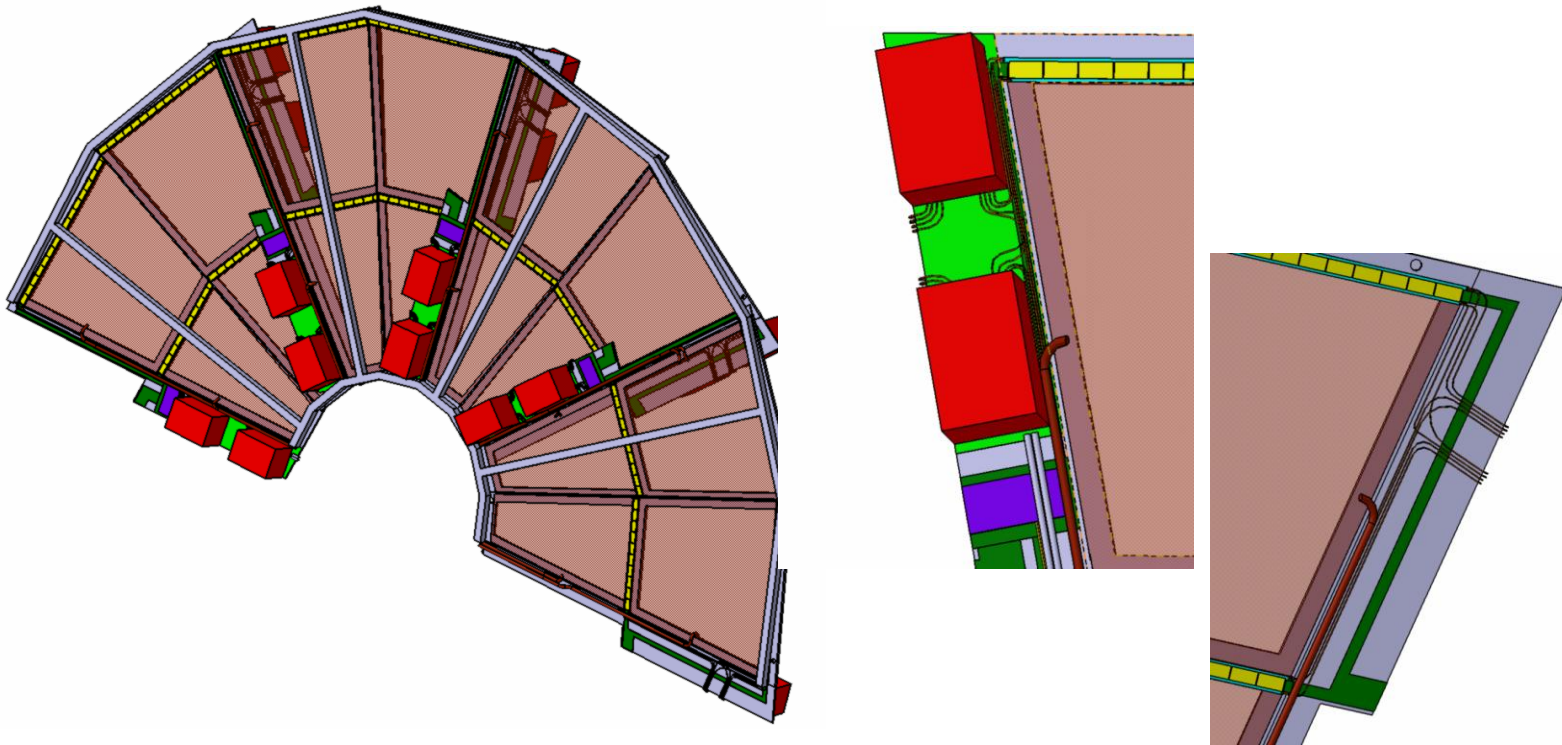


_Power supply topology



_Detailed mechanical designs

- Only realistic power performance (not material, cables,.. to be done)
- Including power distribution system, r/o electronics and cables and optical links.

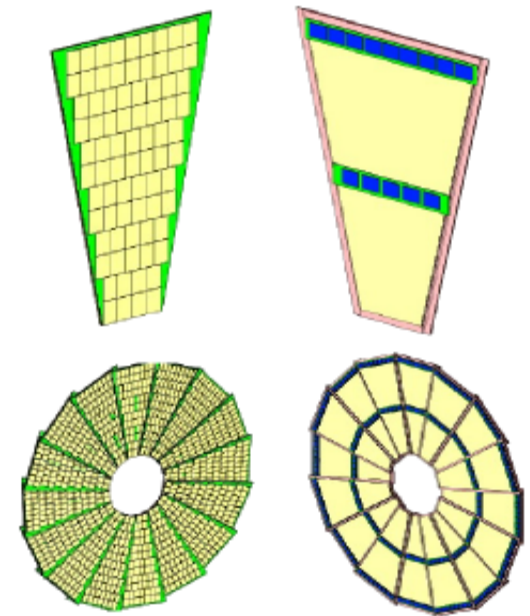




FTD Mokka driver

Characteristics

- Self-scaling driver: significant parameters and positioning defined w.r.t surrounding components (VTX, SIT, SET, beam pipe, ...) following the LOI specifications (see backup)
- Sensitive areas placed over petals generating a disk structures
 - Pixel disks: 1,2
 - Micro-strips disks: 3-7 (Included READ-OUT chips and hybrid)
- Two designs available:
 - Staggered design (database: ftd09) → PER DEFAULT
 - Turbine-like design (database: ftd08)
- Supports:
 - Inner cylinder: supports the whole disks structure w.r.t beam tube
 - Outer cylinder: supports the micro-strips disks (4,5,6,7) w.r.t TPC
- Cables located in the inner cylinder as a cone. **CABLING TO BE UPDATED**



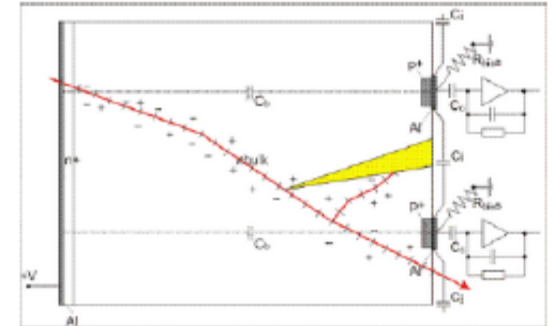
New GEAR Interface Implemented

Persistency for digitisation and reconstruction

Driver Tested and debugged: ready for DBD

FTD Digitisation

- Code kindly provided by Zbynek Drásal (Charles University Prague)
- Code currently in use for the digitisation of the *SVD* subdetector in *Belle II*
⇒ Algorithms tested and validated.
- Incorporates (see <https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=0Bxr58vjAs-zqM2EwZjk1NTEtYzkzYi00YTI5LTk3MWI0NWE0MDBjMDA2OWQ1&hl=ca>):
 - Digitisation of micro-strips:
 - adapted to barrel and forward geometries
 - drift in electric field
 - diffusion due to multiple collisions
 - Lorentz shift in magnetic field
 - mutual micro-strip crosstalks (dependent on AC/DC coupling)
 - electronics noise
 - Clustering: cluster finding algorithm based on COG (centre of gravity) method (cluster size is lower than 3) or on head-tail analog method (cluster-size is equal or higher than 3). Transform electric pulses into real hits
- Integrated in Marlin framework, two main processors:
 - SiStripDigi:
 - input processor parameters to change digitising algorithms
 - LCIO input collection: *SimTrackerHit*
 - LCIO output collection: *TrackerPulse*
 - SiStripClus
 - LCIO input collection: *TrackerPulse* (output of SiStripDigi processor)
 - LCIO output collection: *TrackerHit*

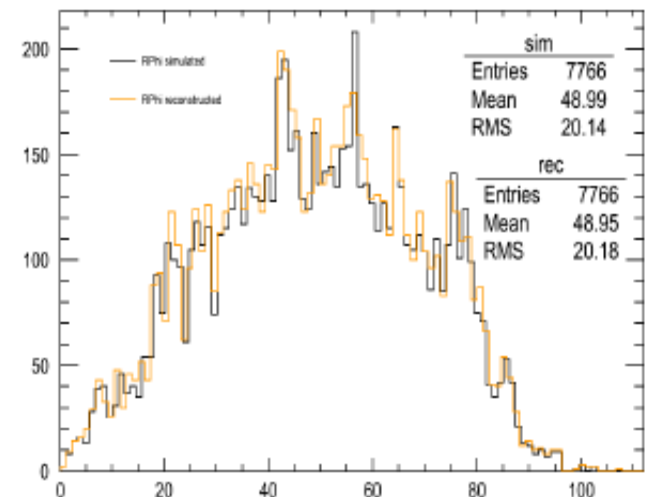
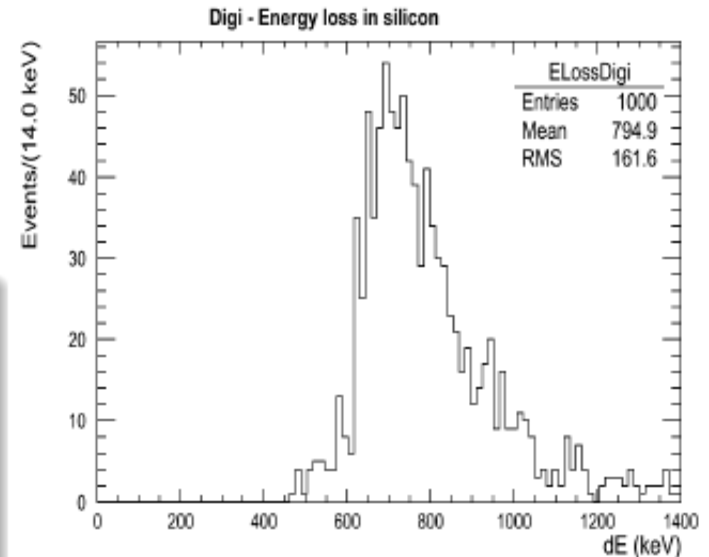


Software modeling of strip FTD

FTD Digitisation

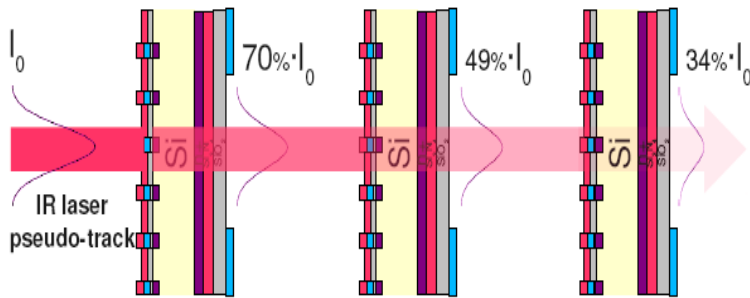
Current status

- Geometrical interface decoupled \Rightarrow Every micro-strip based detector POTENTIALLY could use the code
 - FTD geometrical description added and fully operative
- Code already DIGITISE and CLUSTERISE. **BUT**,
- We are at **debugging phase**: checking the behavior with the FTD disks
 - Using Single Side Sensors covering both faces of the support petal to obtain RPhi coordinates
 - Recently discussed the micro-strips orientation on the petal: stereo-angle design



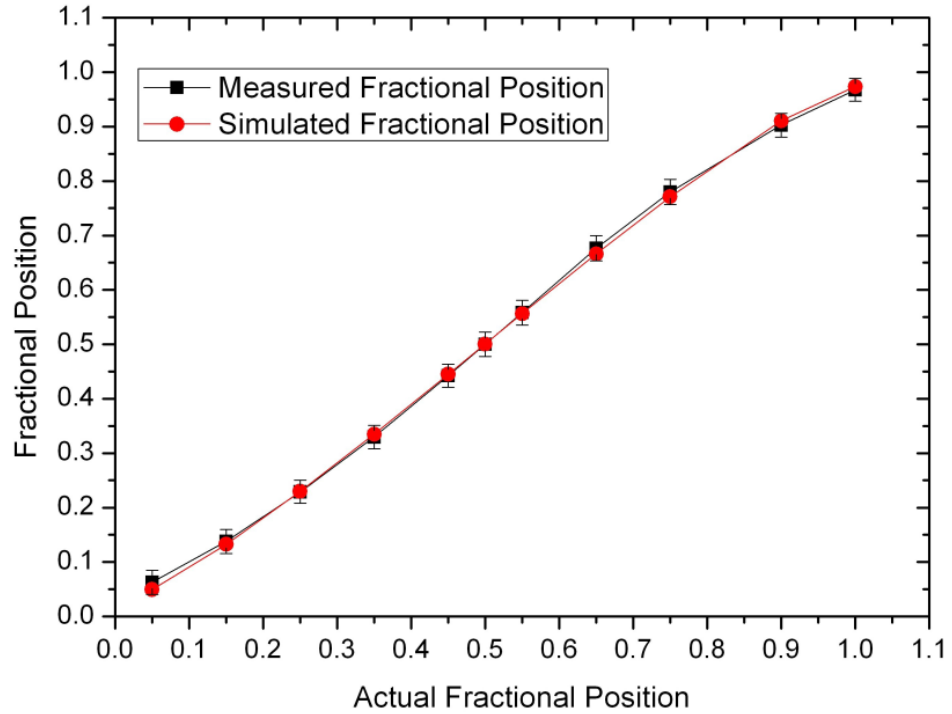
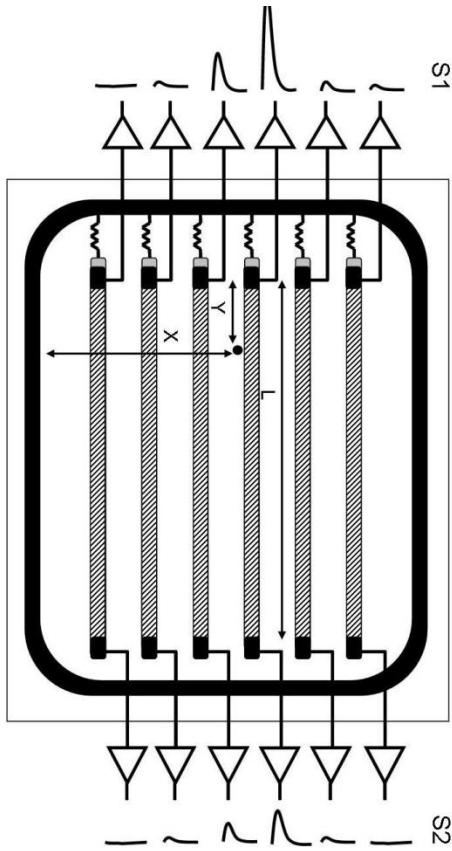
Plots **VERY PRELIMINARY**, just to show that the code is working and already do some work...

R&D work lines



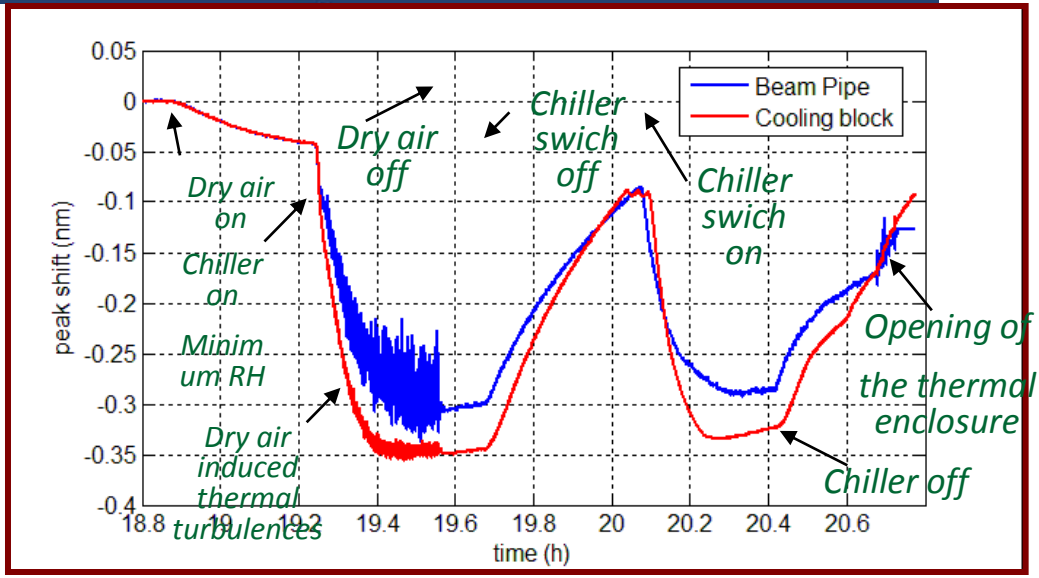
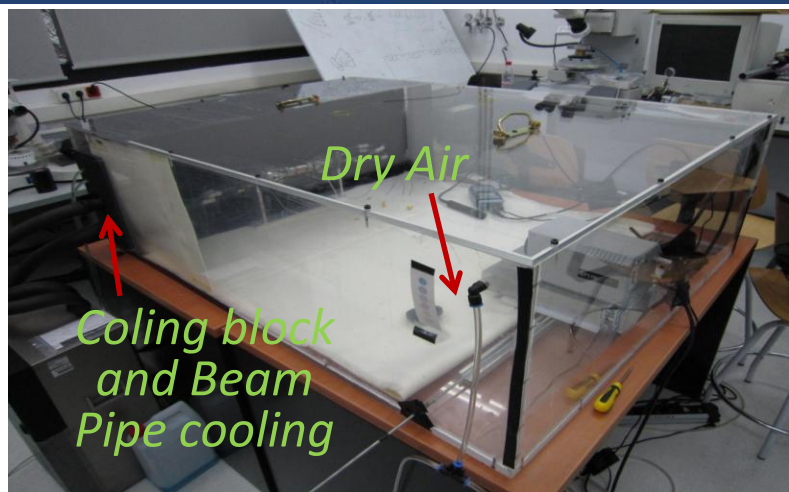
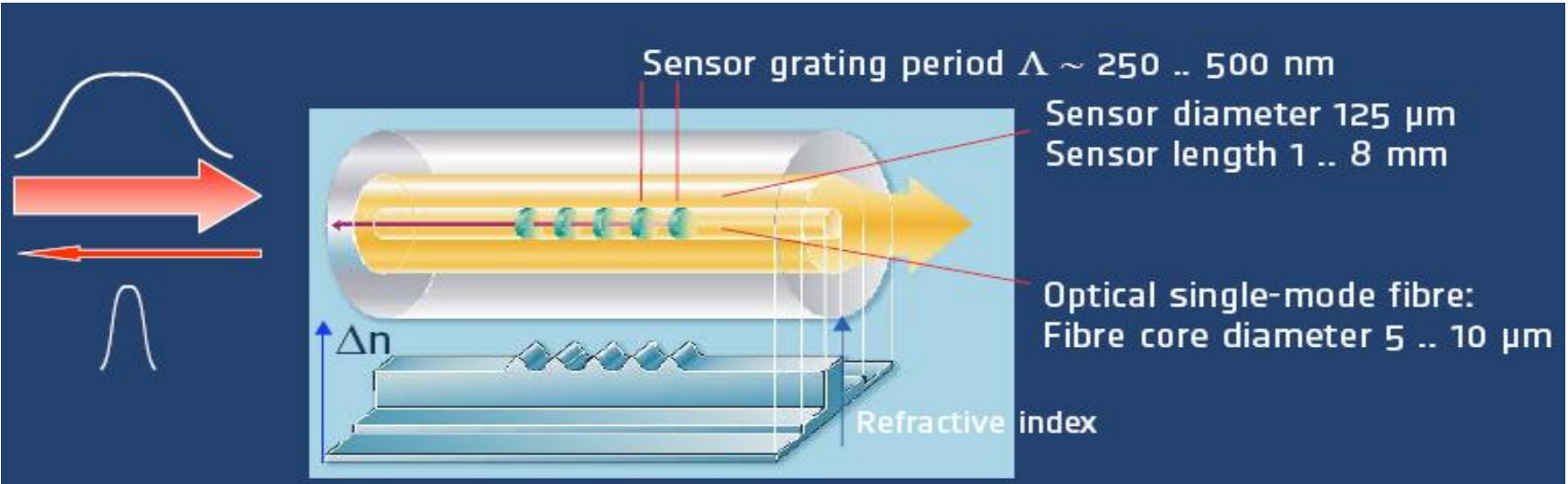
Improved InfraRed transparent microstrips detectors for tracker alignment

A novel 2D Position Sensitive Semiconductor Detector Concept (see Francisca J. Muñoz talk)



R&D work lines

Structural and environmental monitoring of tracker and vertex systems using **Fiber Optic Sensors** (see David Moya Talk)



CONCLUSIONS

- As agreed on the last meeting in Paris, an improved software modeling for the strip disks of the FTD

- Mokka-driver
- GEAR interface
- FTD strips digitization and clustering

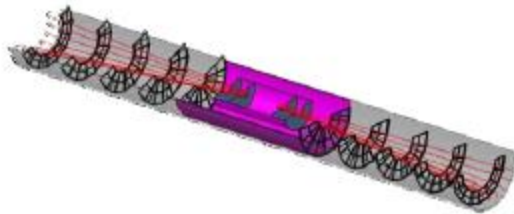
(Track finding and forward tracking → HEPHY Vienna, see Robin Glattauer talk)

- Second iteration on mechanical integration of power distribution system ongoing (still needed to study material reduction and cabling)
- R&D activities
 - **on microstrip sensors suitable for FTD**
 - **FOS for monitoring**

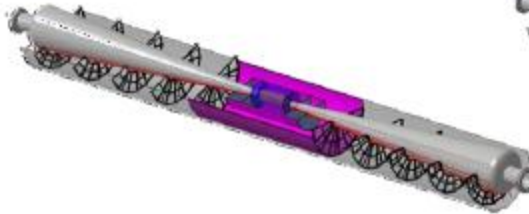
BACKUP

_Assembly procedure defined

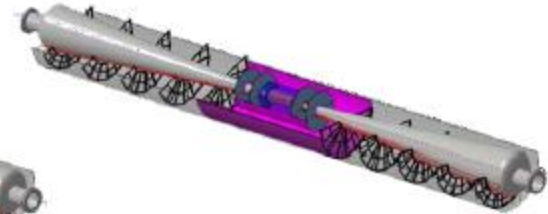
1



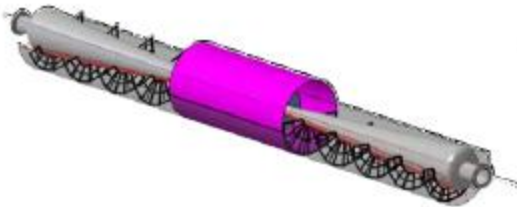
2



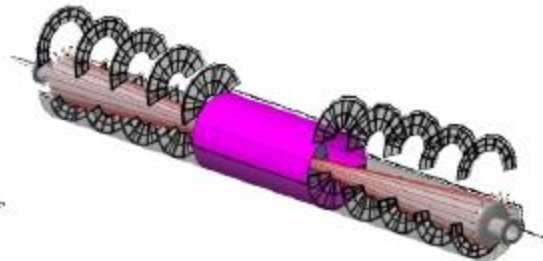
3



4



5



6



_Power distribution system



– Currents consumption of Strip – FTD

	MIDDLE PITCH									
<i>FTD</i>	<i>FTD3</i>		<i>FTD4</i>		<i>FTD5</i>		<i>FTD6</i>		<i>FTD7</i>	
	<i>TOP</i>	<i>BOT</i>	<i>TOP</i>	<i>BOT</i>	<i>TOP</i>	<i>BOT</i>	<i>TOP</i>	<i>BOT</i>	<i>TOP</i>	<i>BOT</i>
<i>Nº STRIPS PER Module (2sensors)</i>	4096	2560	4096	2560	4608	3072	4608	3584	4608	3584
<i>Chips per petal</i>	52		52		60		64		64	
<i>Optical links per petal</i>	1		1		1		1		1	
<i>I2.5 (A) per Petal</i>	2.56		2.56		2.8		2.92		2.92	
<i>I1.25 (A) per Petal</i>	1.18		1.18		1.34		1.42		1.42	
<i>I per petal</i>	3.74		3.74		4.14		4.34		4.34	
<i>I per disk</i>	59.84		59.84		66.24		69.44		69.44	
<i>TOTAL Mstrip- FTD Current</i>			649 A							

