



Micro Vertex Detector of PANDA Strip Detector

MVD Mechanics

LNF Frascati 09.09.2014

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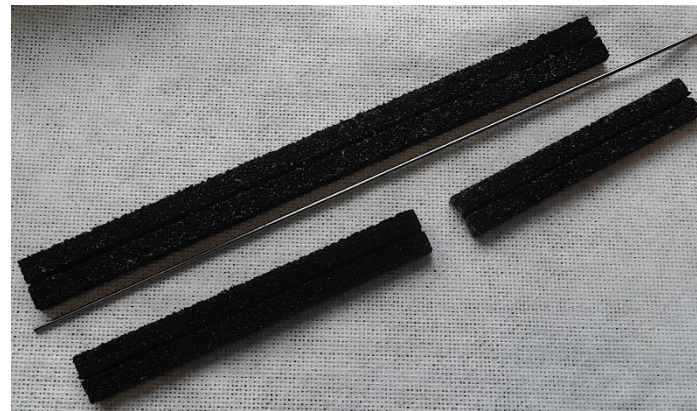
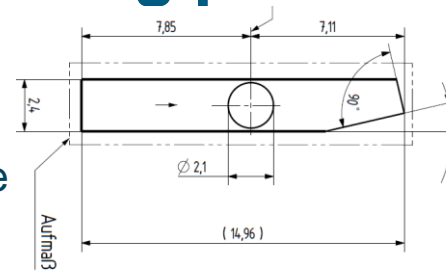


- **Design: no significant changes.**
 - All discussed points were integrated
 - The Work is ongoing to optimize the support and connections points.
- **Manufacture implementation**
 - One focus of the work was to find a method to processing the geometry of the cooling module (inserted cooling pipe on Carbon foam strips)
- **1/2 3 D Model**
 - is in progress
- **Thermal investigation**
 - is in progress
- **Thermal Hydraulics tests**
 - No activity at the moment
- **FEM Validation**
 - is in progress
- **Cable Routing**
 - No activity at the moment

Investigation of manufacturing process

cooling module

One focus of the work was to find a method to processing the geometry of the cooling module (inserted cooling pipe on Carbon foam strips)



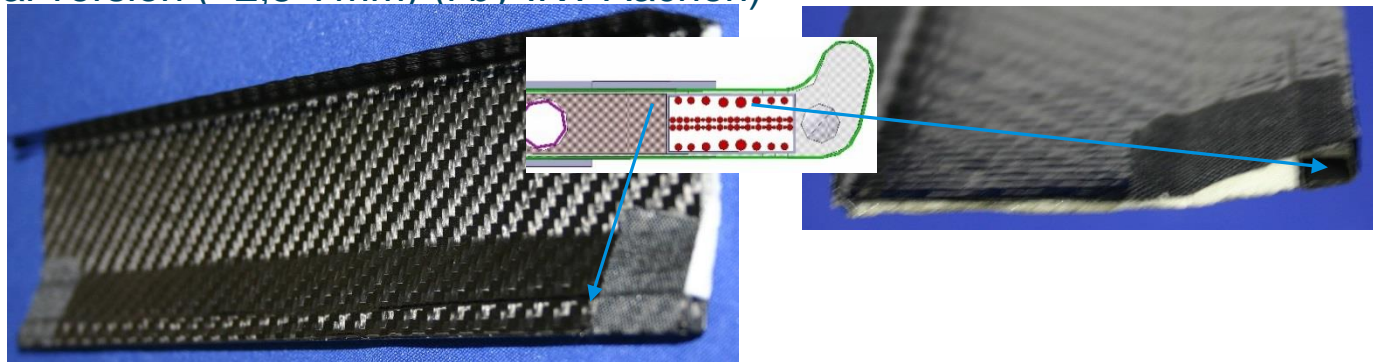
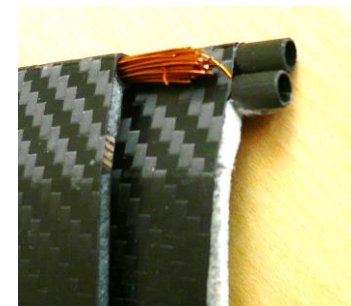
The first step was to produce the carbon foam strip about 311 * 15 * 4 mm with a 2 mm hole. After a number of test runs we have done this with wire eroding.

Now we are experimenting to find a manufacturing process to produce the final and exact geometry. The corresponding device (apparatus) must be made. So that the cooling module, can be sanded to the finished size.

Investigation of manufacturing process

New Stave Prototype (IKV Aachen)

- One tube, or two tube (short version ~200 mm di=4mm)
- canal version (~2,5*7mm) (i by IKV Aachen)



There is to decide which geometry we have to choose (the rectangular channel or the 4 mm round tube)

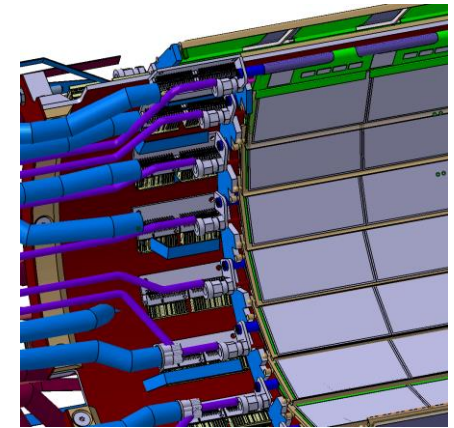
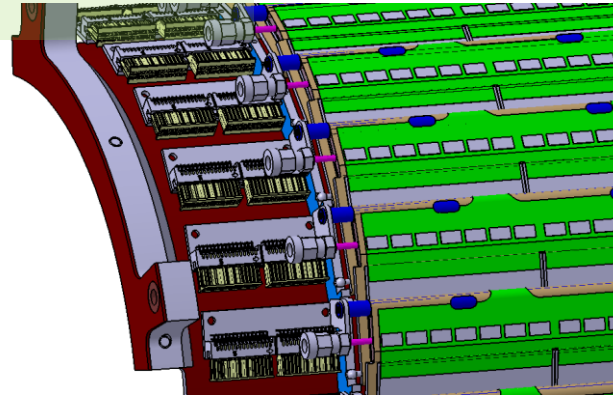
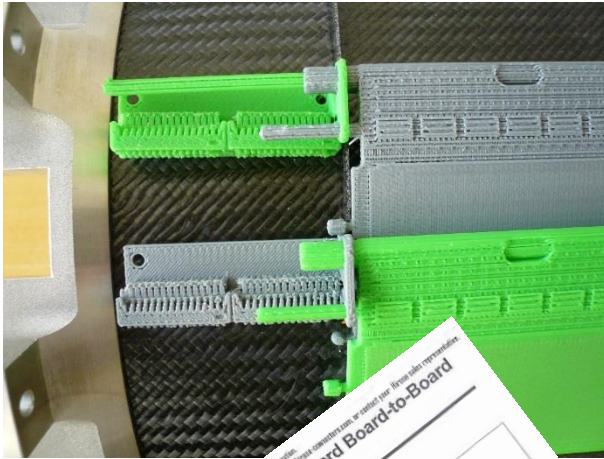
Test structure for ¼ Strip Disc

- (divice in Plastic will be tested at IKV Aachen)
- Aluminium device for parallel manufacture of disc structure at ZEA 1



Cable connector

First proposal for a 60-pin cable connector developed from ZEA 2

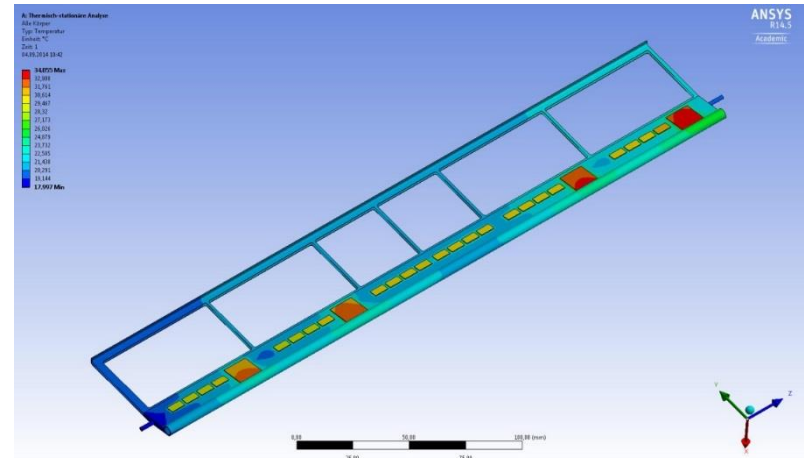
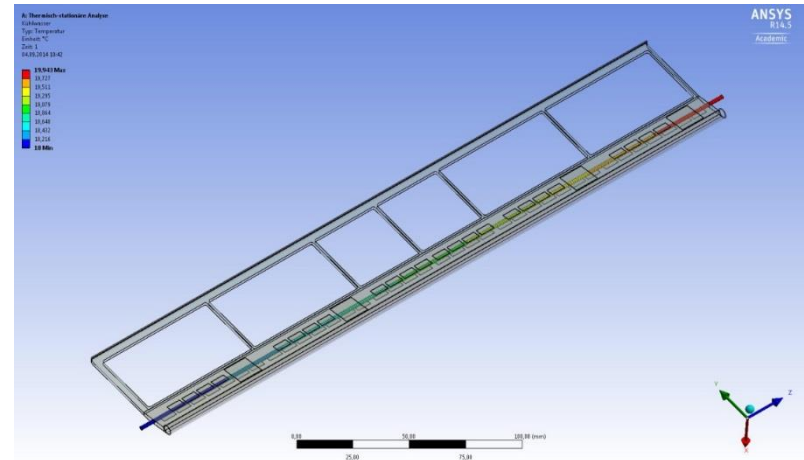


Alternative cable connector (Possible used for Pixel part ?)

Strip part: The power for these type of connector are too high

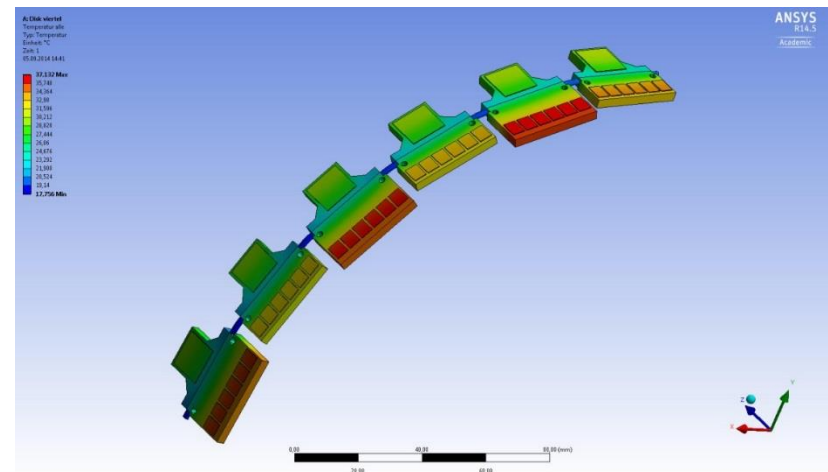
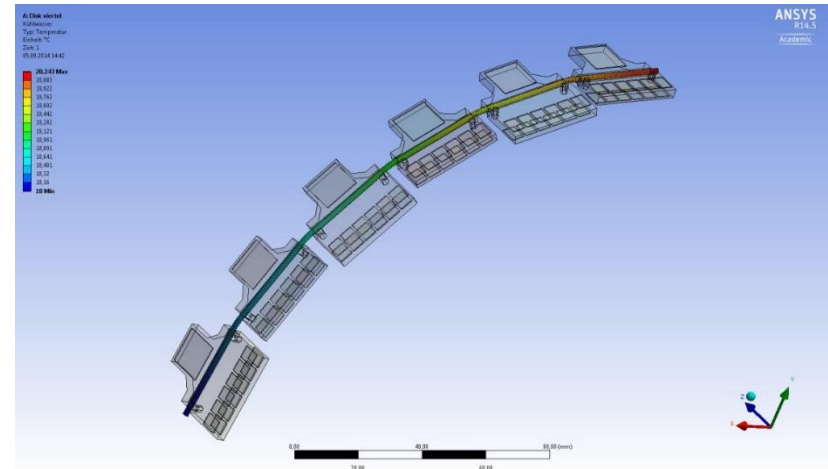
Stave – Typ D – BL 4

	Specification		Result
Electrical Power	1,80 Watt / cm ²		0,018 W/mm ²
MDC Chip - Width	12,00 mm		
MDC Chip - Length	12,00 mm		
		MDC Chip - Area	144,00 mm ²
		MSR Chip - Electrical Power	2,59 Watt
FE Chip - Width	7,00 mm		
FE Chip - Length	4,00 mm		
		FE Chip - Area	28,00 mm ²
		FE Chips - Electrical Power	0,50 Watt
Number of MDC Chips	6,00		
Number FE Chips	60,00		
		Area- Total	2544 mm ²
		Stave D - Electrical Power	45,79 Watt
Cooling water			
Specific heat capacity 20°C	4183,00 J/(kg K)	$1 \text{ J} = 1 \frac{\text{kg m}^2}{\text{s}^2}$	
Volume flow	0,30 l / min		
Density of water(20°C)	1,00 kg / Liter		
		Mass flow	0,30 kg / min
		$\Delta Q = m \cdot c \cdot \Delta T$	
		delta T	2,19 Kelvin

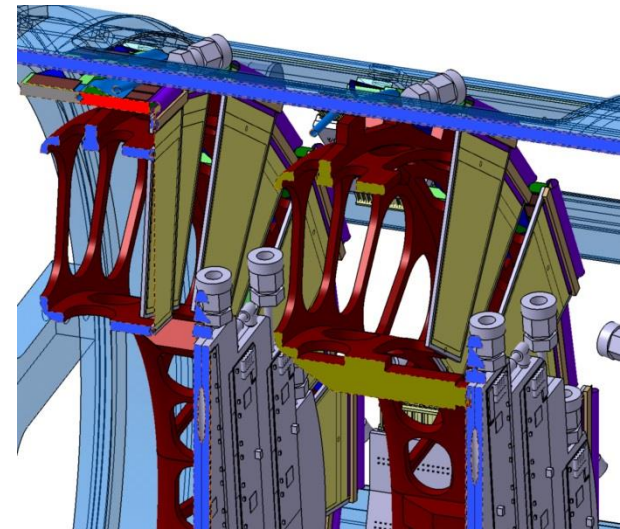
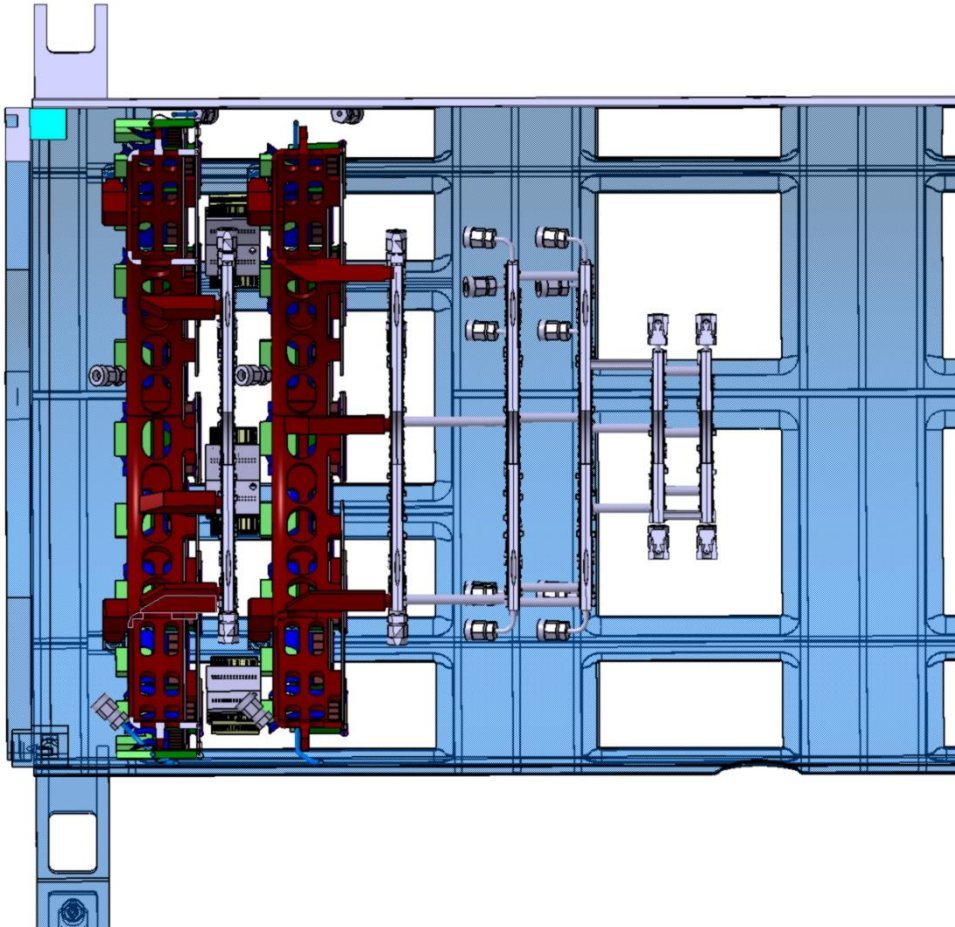


Disk - Quarter

	Specification		Result
Electrical Power	1,80 Watt / cm ²		0,018 W/mm ²
MDC Chip - Width	12,00 mm		
MDC Chip - Length	12,00 mm		
		MDC Chip - Area	144,00 mm ²
		MSR Chip - Electrical Power	2,59 Watt
FE Chip - Width	4,24 mm		
FE Chip - Length	5,70 mm		
		FE Chip - Area	24,17 mm ²
		FE Chips - Electrical Power	0,44 Watt
Number of MDC Chips	6,00		
Number FE Chips	72,00		
		Area- Total	2604,096 mm ²
		Stave D - Electrical Power	46,87 Watt
Cooling water			
Specific heat capacity 20°C	4183,00 J/(kg K)	$1 \text{ J} = 1 \frac{\text{kg m}^2}{\text{s}^2}$	
Volume flow	0,30 l / min		
Density of water(20°C)	1,00 kg / Liter		
		Mass flow	0,30 kg / min
		$\Delta Q = m \cdot c \cdot \Delta T$	
		delta T	2,24 Kelvin



Disk – Support Structure



In progress!!!