ADC integration

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March 3rd, 2009

Idea

ADCs placed in the cold part of the Endcap

Advantages

- more compact design
- less cables to the outside
- less noise due to shorter cables from preamp to ADC

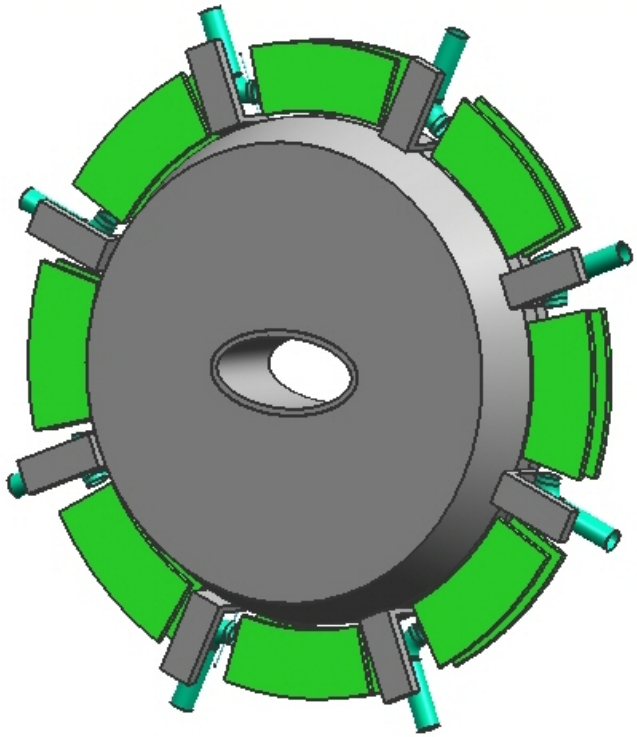
Possible problems

- increased cooling load
- temp. instabilities
- space available
- operation at -25 °C
- radiation conditions

Cooling design

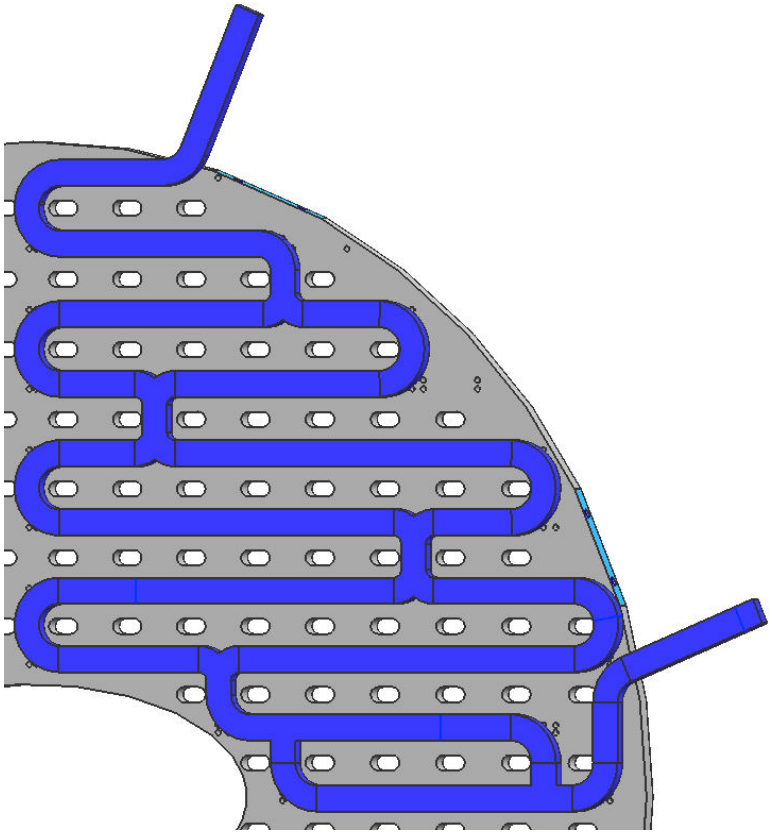
Respected heat loads:

PreAmps	360 W
ADCs	1440 W
Outside	84 W
Cables, Supports	116 W
Total	**2000 W**

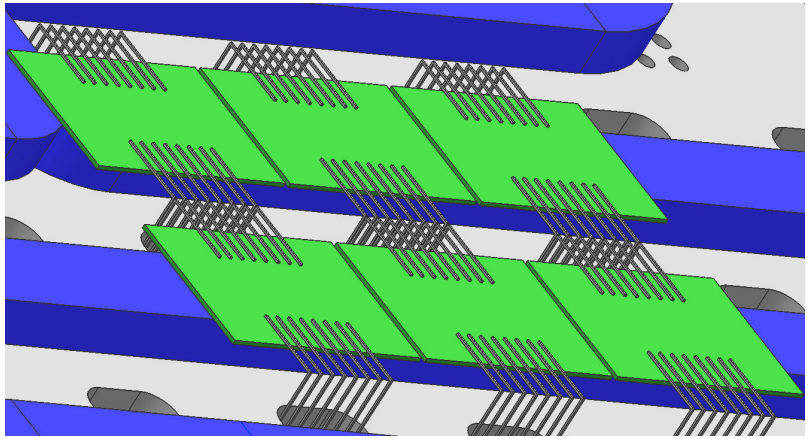


Cooling design

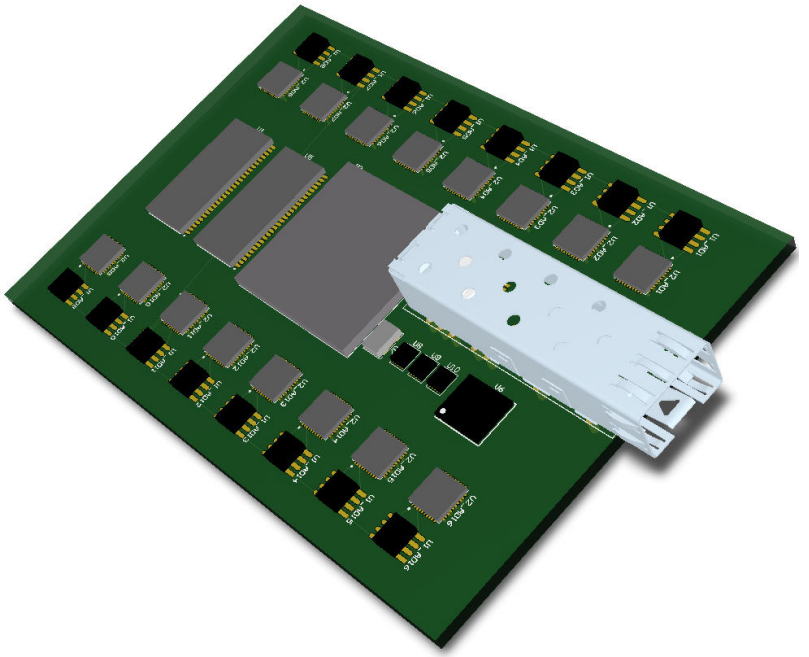
- $T_{middle} - T_{coolant} = 0.1\ \mathrm{K}$
- $T_{inlet} - T_{outlet} = 1\ \mathrm{K}$
- $flow = 100\ \mathrm{l/min}$
- channel size 25 x 45 mm^2
- $\Delta p \approx 0.3\ \mathrm{bar}$



Available space



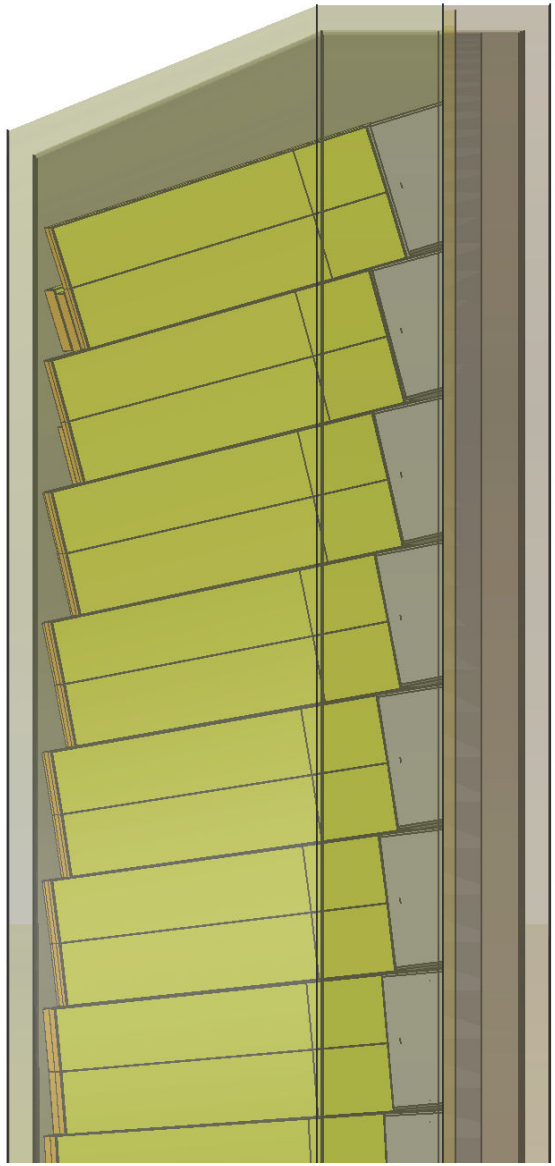
- Maximum board size 110 x 75 mm^2
- Height up to 18 mm
- 2 x 8 channels per board



Pawel Marciniewski

Available space

- Just 30 mm space for cooling, cables ...
- Vacuum shield in the back would lead to 45 mm space
- Cooling circuit requires 25 mm
- At least 20 mm space for ADCs and cables

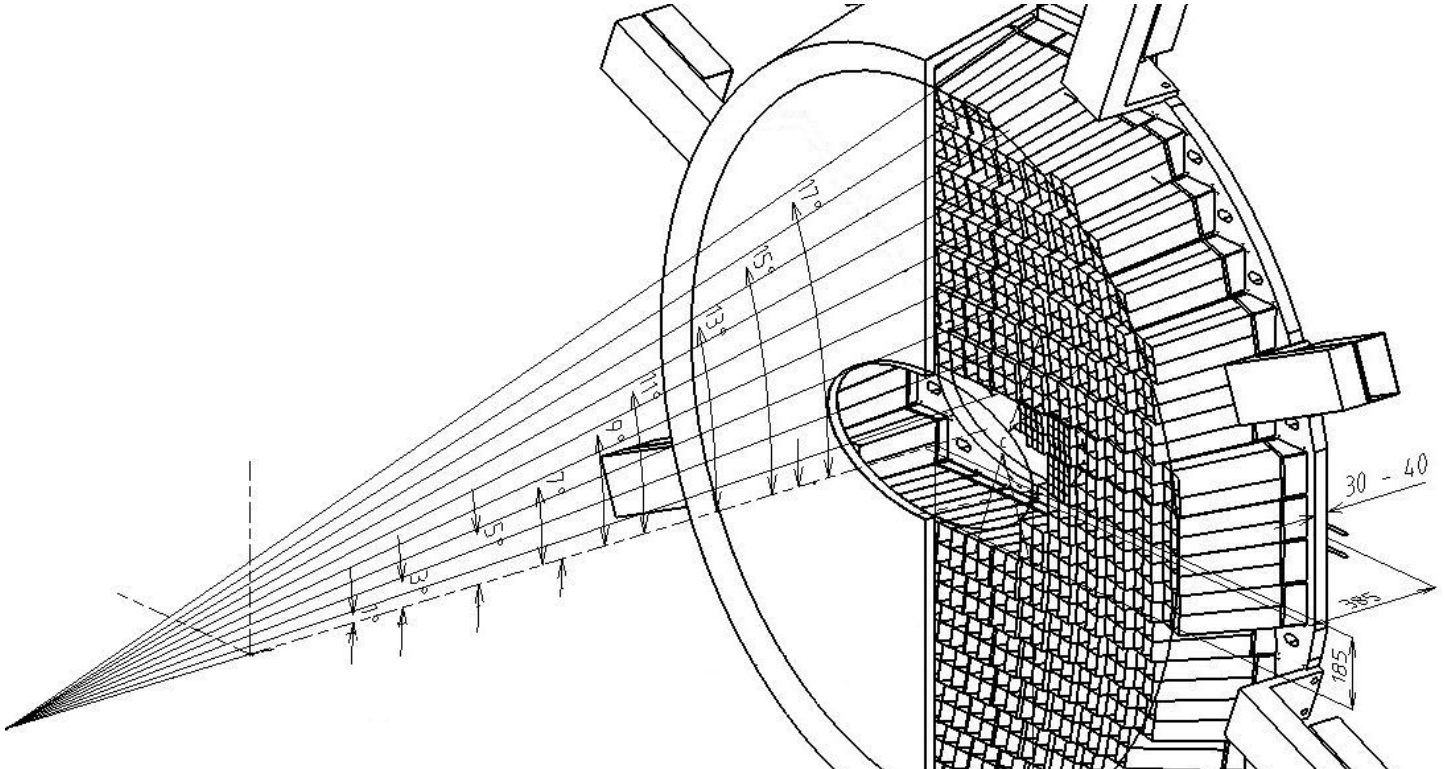


Radiation studies on ADCs

Number of simulated events: 0.6M at 15 GeV

theta [degree]	ADC 5.2	ADC 13.4	ADC 21.1
rad. dose [mGy/h]	10.05	0.91	0.29
10 years $\overline{\text{P}}$ANDA [Gy]	386	35	11

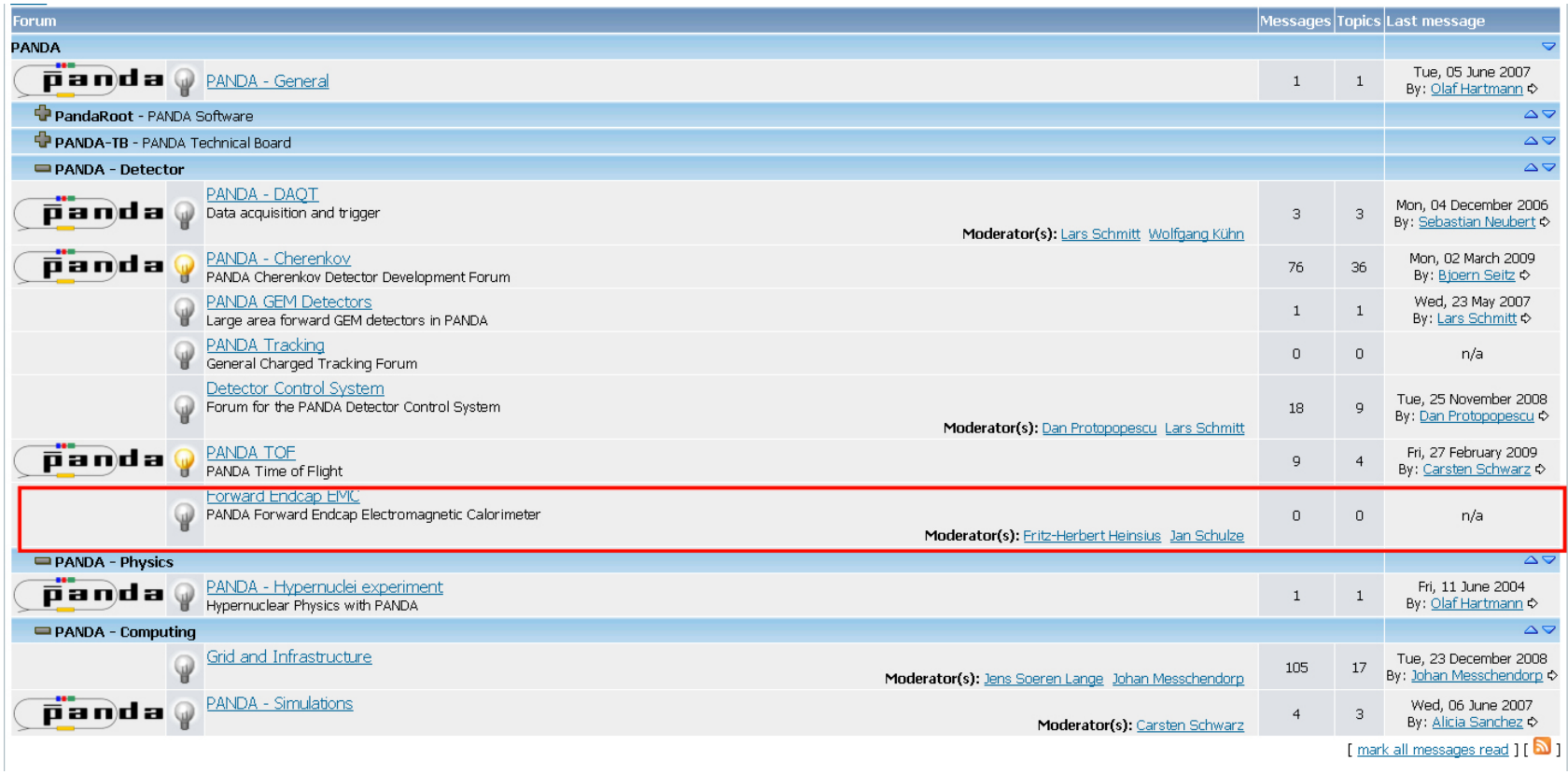
(simulations by Bernhard Roth)



Summary & Outlook

- Further development and verification of the cooling circuit by engineers
- Integration of ADCs in the cooling area could be an option
- Cooling circuit and available space will be discussed with H. Smit and H. Löhner (KVI) at end of march
- Prototype of a 16 channel ADC board is going to be designed
- Radiation studies indicate the need of radiation hard electronics

Forum



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