

Forward Endcap

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Chiller Prototype

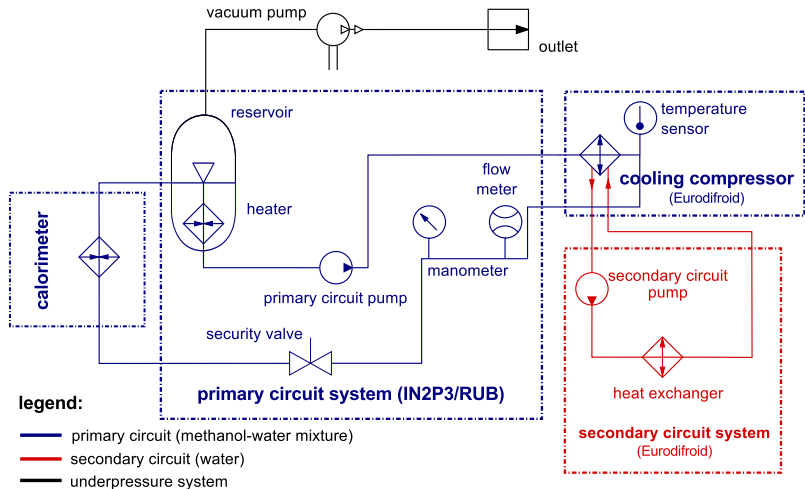
- Cooling system intended to be used for testing of the Forward Endcap EMC at RUB and FZ Jülich
- Capable of cooling the complete endcap and one barrel slice
- Cooling system for the complete EMC: Scaled-up version of this system (if everything works as intended)
- Hardware designed and built by IN2P3 Orsay
- Control software created in Bochum (Tobias)
- Chiller and heat exchanger: Eurodifroid



Chiller Prototype

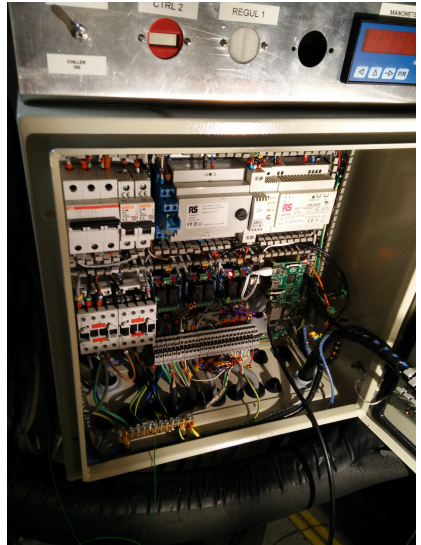
- Power of cooling compressor: 5 kW
- Power of main pump: 1.5 kW
- Underpressure system (leakless)
- Two circuits connected to chiller:
 - Primary circuit: Coolant flowing through calorimeter
 - Secondary circuit: Transports heat from cooling compressor to facility heat exchanger
(Alternative: Direct connection to cooling water supply of experiment hall)
- Primary circuit: Methanol-water mixture
- Operating temperature: -32°C
- Regulate individual calorimeter sections by heating
- Reservoir of $\approx 330\text{ L}$

Chiller Prototype



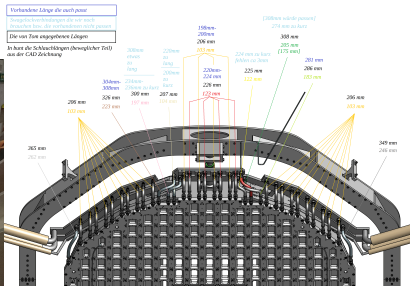
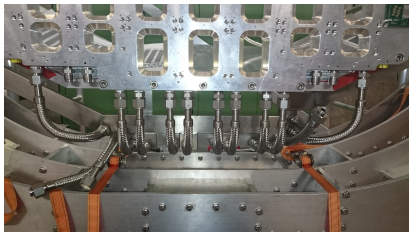
Chiller Prototype

- Raspberry Pi in switchboard
- Relais connected to its GPIOs
- USB-RS485 adapters connected to USB
- Control of pump, flow meter, chiller
- EPICS (DCS software) running on Raspberry Pi
- Connection to rest of DCS via network



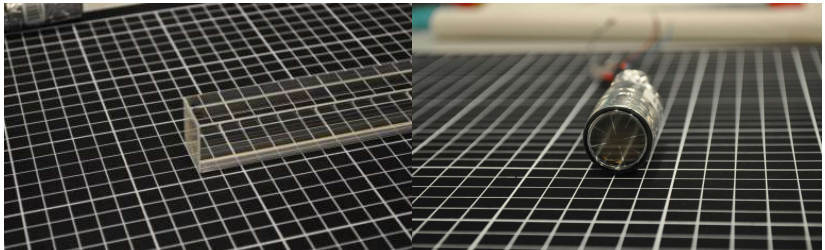
Chiller Prototype

- We now need to connect the backplate tubes to the chiller and test/adjust the flow balancing
- Distribution 'bones' under construction (two pieces from KVI already installed)
- Swagelok connecting hoses ordered



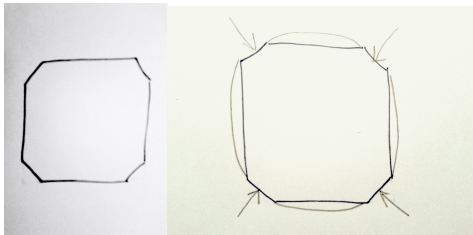
VPTT Subunits

- As already reported for the APD 'final' subunit we recently also lost VPTT couplings
- Two tubes lost their connections to their crystals
- As with the APD subunit the glue pad always sticks to the detector
- We never observed failings of the coupling in our tests in the past
- There is a special Dow Corning cleaning fluid recommended we will test for surface cleaning



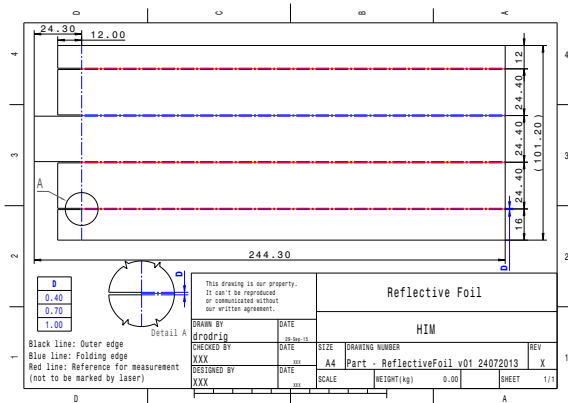
Crystal Cover Foil

- As mentioned on last CM: Problems with mirror foil surrounding crystals
- Non-uniform 'touching' of crystal surfaces
 - Broadens spread in response distribution of channels
 - Flaws cosmics precalibration of subunits
 - May be (major) source of differing APD signals on same crystal
- Tests with additional extra thin shrinking foil: no progress
- Main problem: Crystal shape, most of all the chamfered edges (0.3 mm)



Crystal Cover Foil

- Backward endcap guys are going to account for chamfers
- Special foil cut design with 'double kink lines'
- Is it manufacturable with necessary precision (folding)?



Summary

- The chiller prototype has been transferred from Orsay to Bochum
- Thanks to Philippe, Michael, Tobias the system is working and waits for connection to endcap
- There is an ongoing problem with falling off photo detectors (APDs and VPTTs)
- New cleaning procedure with manufacturer recommended solvent
- Remaining crystal cover foil problem:
 - Chamfered edges of crystals prevent foil from firmly touching surfaces
 - Backward endcap: Will new design help?
 - Forward endcap covers already produced
 - Tape stripes on cover foil?