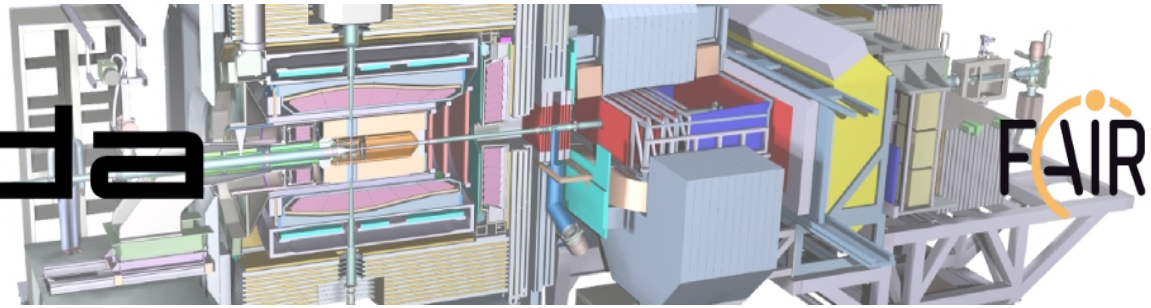
Status of Barrel EMC cooling system

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN



Thorsten Erlen

2nd Physics Institute, Giessen University, Germany

PANDA EMCM March 2022

PANDA Barrel EMC Cooling System Update

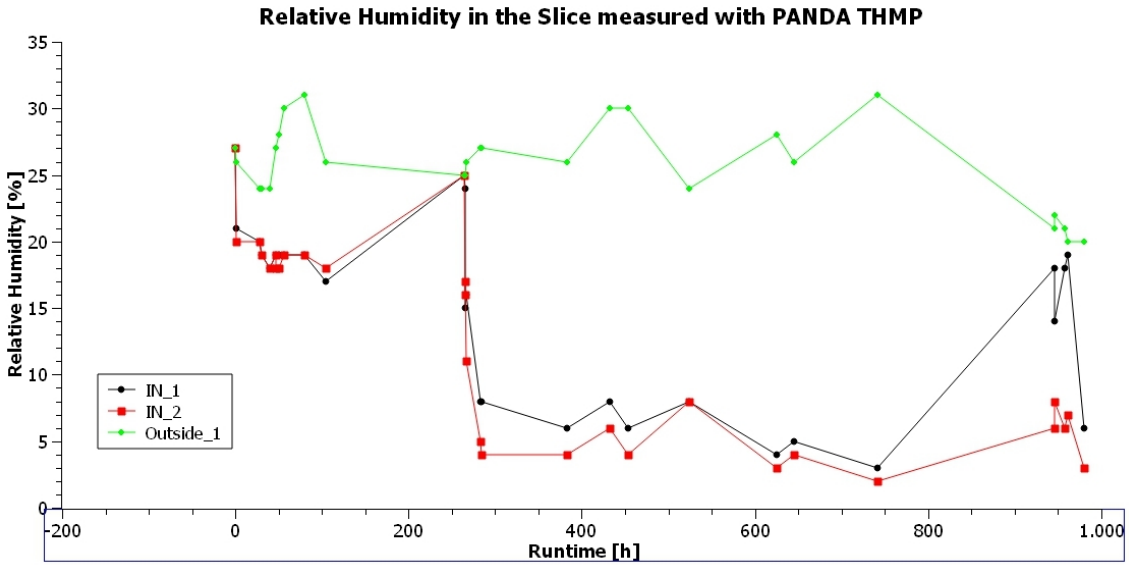
- The pre series slice is tested in an aluminum insulation box with 40mm of vacuum panel insulation
-
- 100-120 l/min dry air supply from compressor dry air is distributed with 6 flexible pipes of in the box
  Humidity measurement with PANDA THMP and commercial SHT21

- Panda ThinPT100 connected, approx half of them still usable

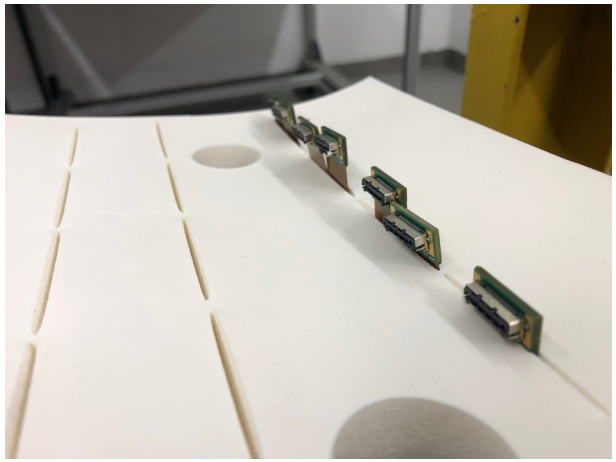
- Re-calibration is probably needed for old thinPT100

PANDA Barrel EMC Cooling System Update

- Long term testing in december showed that dry air support at 100-120 l/min might be sufficient to get humidity below dew point at -25°
- At 200h an air leak was fixed with additional foil
- Test was continuously run on ambient temperature with until 750h
- At 750h cooling system was turned on and inlet was set to -15°C
- Combined humidity/temperature senso SHT21 close to the cooling pipe read -14°C and THMP humidity sensor read max. 20% relative humidity which indicates a dew point of -32°C



- First iteration of insulation had cutouts matching the super module plate surface
- Paths for outside air clearly visible and not blocked by foam
- For ongoing tests the insulation material will be replaced by a version with 0.5mm cutouts instead of 20x50[mm]
- New insulation displaces more air-pockets in the contact area between cold and support beam volume.
- Since the pre-series supportbeam was subject to change, no longer needed cutouts were closed of with 0.75mm carbon fiber plates (alveole two component glue) to block air exchange



Ongoing and next steps

- Re-Assembeling of slice into test box and cooling test
- Re-Calibration of mounted PT-100 sensors
- Preparing readout chain (PANDA Backplanes) for a matrix of crystals in the pre series slice
- Using the same readout on single crystals testing the efficiency of prisms for lightpulser fiber coupling
- Replacement of old FlexPCBs
- Mounting the Slice in the Transport box