Barrel HCal: Slow Controls Strategy

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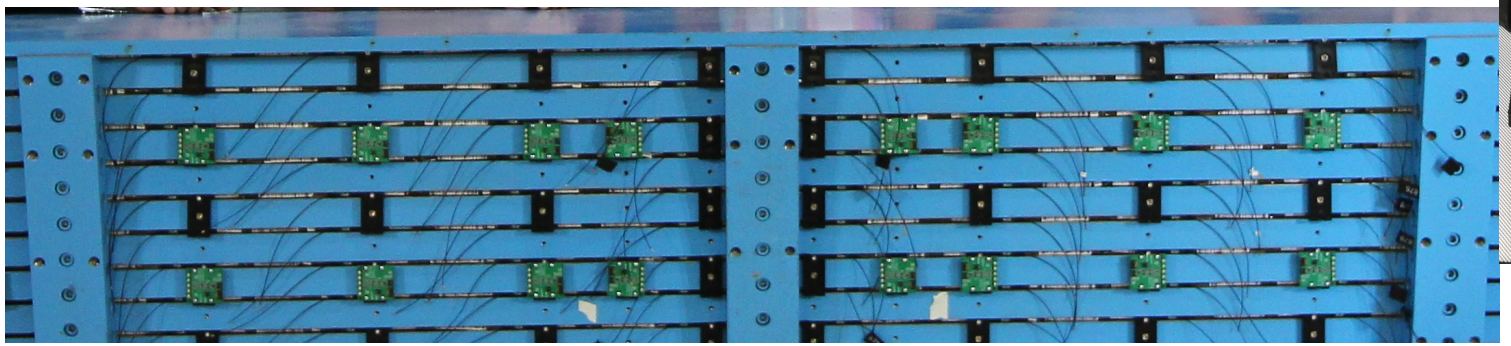
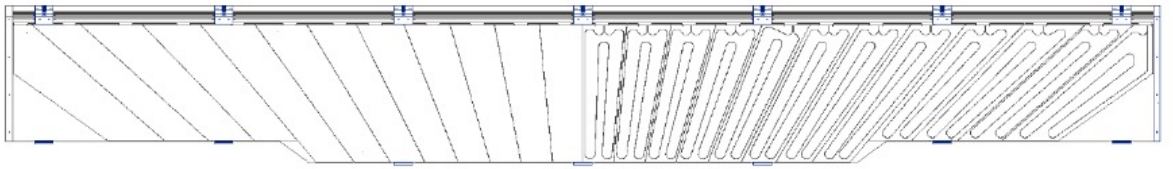
sPHENIX Outer HCal

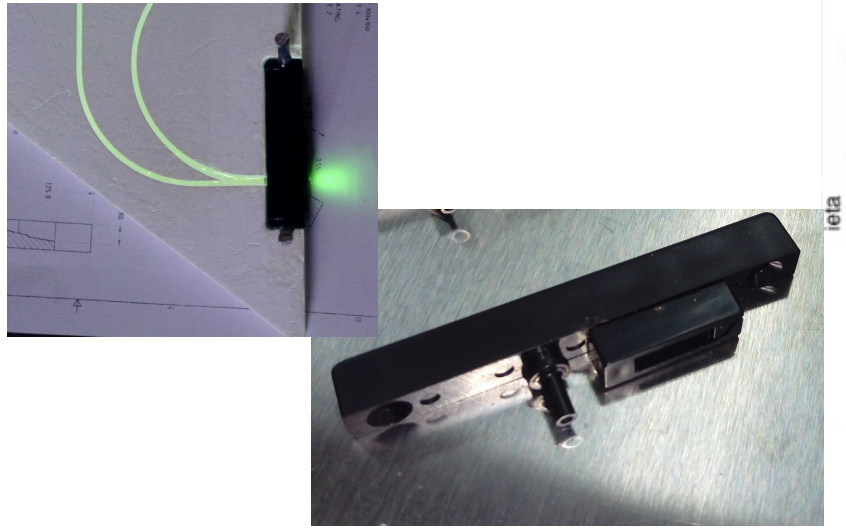
- 32 sectors
- 48 towers per sector (2 in phi, 24 in eta)
- 5 scintillator tiles/tower
- 7,680 total scintillator tiles

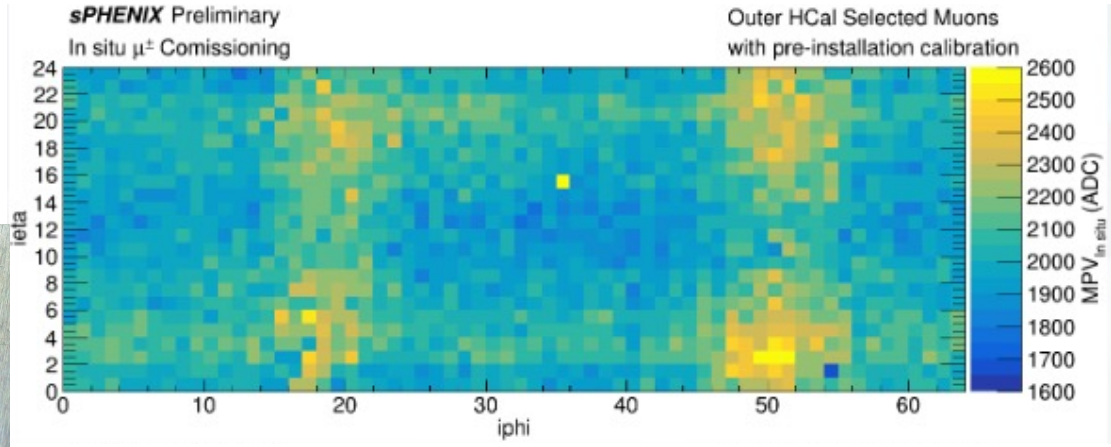




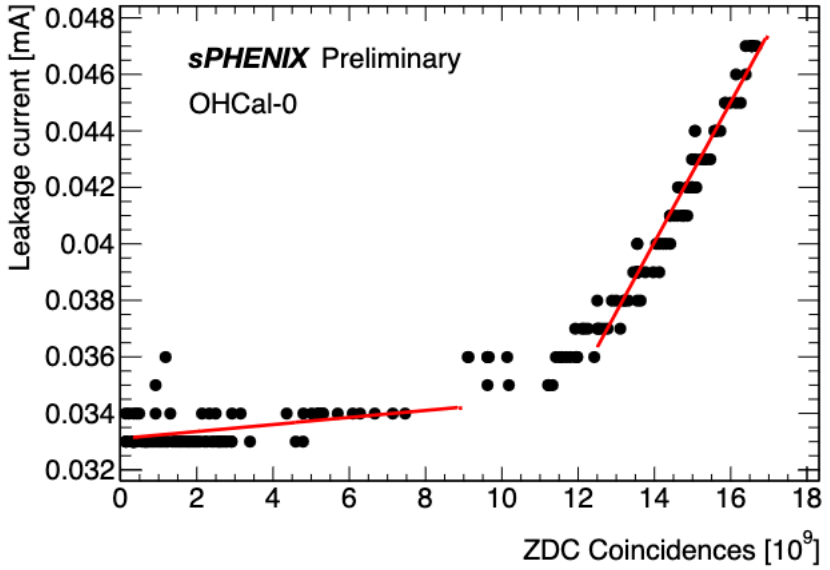
Monitoring the sPHENIX HCal

- Special runs for
  - LEDs
  - Cosmics
  - Test pulse





- Radiation damage and temperature affect SiPM performance so we also monitor for each tower:
  - Temperature
  - Leakage currents



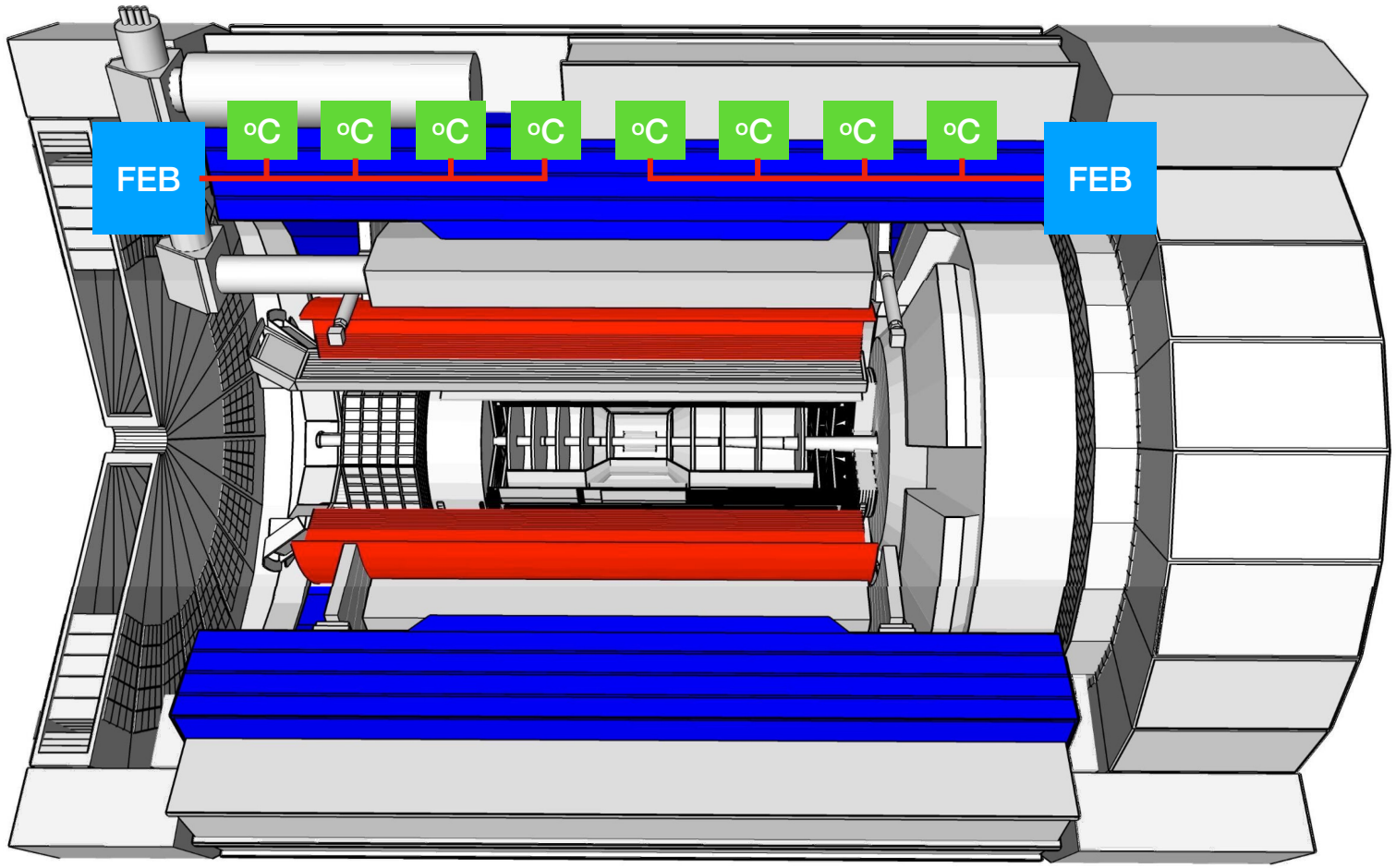
- All sPHENIX subsystems can be monitored with Grafana dashboard

Transitioning to ePIC

- Move from towers to tiles
- Move electronics to ends of the barrel
- Planning to use same electronics developed by Oak Ridge for LFHCal
  - See next 2 slides from Norbert
- Same general strategy for what to monitor as in sPHENIX

ePIC Barrel HCal Plans

Slow Control

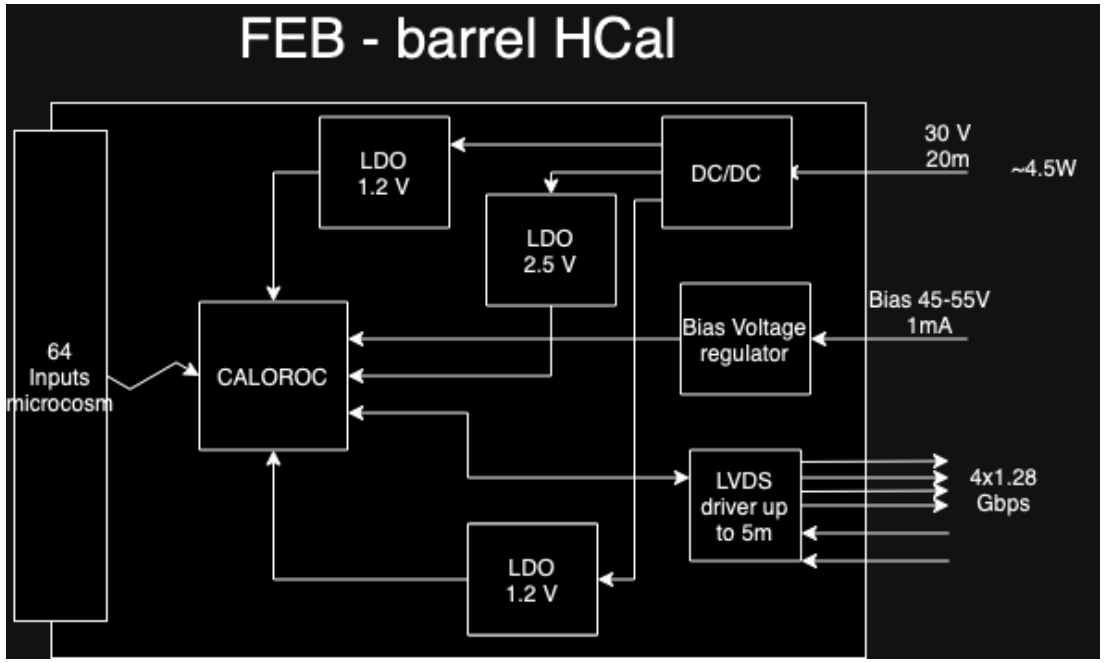


Inside detector volume:

- 4 Temperature sensor per FEB (total 512)
  - No heat inside the detector volume:
    - Only SiPM generated heat (in large steel heatsink)
  - Heat coming from FEB ~ 4 W
    - On the side of the detector
- Leakage current monitoring:
  - Asymmetric beam
  - It would be beneficial to monitor couple of specific SiPM leakage current as function of z:
    - Mostly if there is some weird beam condition (from sPHENIX experience)

ePIC Barrel HCal Plans

FEB and slow control



On FEB:

- 1 temp sensor
- 1 humidity sensor
- Overall bias voltage and leakage current
- LV power consumption

CALOROC:

- Many registers to set and monitor
- Most registers will be constant throughout the Run
- Some gains, calibration runs, etc can be adjusted

How the slow control will be read out:

- FEB-RDO connection: I2C
  - Plan to have all slow control on the I2C bus
- RDO->database:
  - Option 1: via FELIX and then log into DB
    - This might take too much resources from FELIX
  - Option 2: via dedicated ethernet port:
    - More cable from RDO