HCal Update

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Jefferson Lab
HCal Hall Layout

- Detect multiple GeV protons and neutrons.
Detector HV and PMT Cables

- Detector cabling completed.
HCal Front End Cont.
HCal DAQ Side

Disc-F1TDC

RR4

PP-Disc

PP10

PP9

PP8 2x16

PP7

PP6 4x16 BNC-LEMO (TDC)

Discriminators
18xLeCroy 2313

9 8 7 6 5 4 3 2 1

PP5

PP4

PP3

PP2

PP1 4x16 BNC-LEMO (fADC)

F1TDC SD

6xF1TDCs

fADC SD

2xFADC 250s

2xCPU

fADC SD

2xTI

16xFADC 250s

RR5

PP-fADC

Disc-F1TDC
Current Status

- **Detector:**
  - Cabling completed.
  - PMTs need gain matching (some measurements already made).

- **Front-End:**
  - Electronics are tested (some minor repairs outstanding) except summing modules.
  - Half of FE is cabled (several cables being repaired still).

- **DAQ Side:**
  - 3/4 cabled.
  - Electronics tested and operational.
  - 18 operational fADCs.
  - 5 operational F1TDCs.

- **Software:**
  - Decoder operational.
  - Still on CODA 2.
  - Preliminary event-by-event display.
  - Timing resolution analysis instituted.

- **Cosmic tests** are under way for calibrating the detector.
Event-by-Event Display

- Selected cosmic events. (Module 4-1 is a reference channel.)
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Timing Resolution Cuts

- Require cosmic to be nearly **vertical**.
  - Three vertical TDC and fADC signals.
  - No signals in surrounding modules.

- TDC time:
  \[ T_{\text{cor}} = T_{\text{meas}} - \frac{\text{TDC 1} + \text{TDC 2}}{2} \]

- Create histogram of all times and find standard deviation.
Events at zero are pedestals. fADC recorded when TDC fired.
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Timing Resolution Plots

- Average timing resolution is 1-1.5 ns for each module.
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Summary

- Half of detector cabled and operational with a few outstanding repairs.
- fADCs and F1TDCs are operational.
- Cosmic tests on one half of the HCal are under way and being analyzed.
- To do:
  - Finish repairing remaining broken cables on first half of HCal.
  - Cable and debug second half of HCal.
    - 95%+ cables made by DSG.
    - Installation to begin shortly.
  - Gain match PMTs.
  - Test summing module trigger.
  - Online analysis needs development.
  - Scalers to spot check rates still need to be acquired and integrated.