# DAQ system and its software

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# Outline

- DAQ system for HyCal
- DAQ system for GEM
- Software
  - Online software
  - Offline sfotware
- Cosmic tests
- Summary

# DAQ System for HyCal

- Based on previous PrimEx electronics
- 3 Fastbus crates with 30 ADC modules will read the 1728 channels from HyCal
- Total sum of energy as the physics trigger, a total of 52 UVA120A modules for the linear sum of dynode signal as the trigger
- Light monitoring system to monitor the gain for each channel



# DAQ System for HyCal



#### TDC/Trigger Crate

1x v1190 TDC

1x MVME 2436 ROC

1x JLAB TI (MASTER)

5x JLAB DISCRIMINATORS



#### 3x ADC Crates

10x LRS1881M ADCs 1x MVME 5100 ROC 1x JLAB TI (SLAVE)



#### 5x Linear Sum Crates

8x ~ 12x UVA 120A (52 output groups in total) Linear sum modules Mounted on HyCal box

# DAQ System for HyCal

- 2 more NIM crates for the logic and translation (from NIM to ECL) modules
- Total sum of all the channels as the trigger



# DAQ System for GEM

- Wait for Krishna's input
- Shows SRS system

# DAQ System Overview



# DAQ Software

- Standard CODA 2.6.2
- Modified readout list from previous PrimEx (since it was for HallB CODA, and configuration changed)

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# Online software

- The software for HyCal is based on previous primex software package, modified according to the new PRad DAQ configuration.
- Current online software
  - HyCal event viewer
  - HyCal gain equalizer
  - High voltage monitor and control
  - Temperature monitor
  - HyCal movement control and calibration scripts (needs updated coordinate input)
- Implementation ongoing
  - Other subsystem monitors (LMS, ROCs, Triggers, DAQ Crates)
  - Integrated alarm server

### Online software

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W82	W44	G132	G42	W12	W143									
G102	G12	W181	W116	W78	W11									
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#### **Online Event Viewer**



#### **Temperature Monitor**



# Online software for GEM

- Inputs from Krishna
- Shows CODA can read SRS data

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# Offline software

- Replay code for CODA file
- HyCal events reconstruction program
- HyCal offline events viewer, based on PrimEx event display

#### Offline events viewer (input from simulation)



# Offline software

#### • Reconstruction with simulation input



\*\* Phi coverage start to be < 2 pi

### Cosmic tests for HyCal

• Cosmic rays detected by HyCal and reconstructed by DAQ



# Cosmic tests for HyCal

- Pedestal is at 500 ~ 700 channels
- A few modules have low occupancy, but the gain for each modules is not optimized yet.



# Cosmic tests for GEM

- Test was conducted in the Lab at UVA
- Triggered by an scintillator on the top of GEM chamber, only covered the central part



# Summary

- HyCal is ready to take data, and has already taken some cosmic data in Hall B
- Integration of GEM will be finished in serveral weeks, we can read SRS data through CODA now
- Online software package is functioning, will be improved at the meantime

Month	Nov	v. 2015			Dec. 2015 Jan. 2016								Fe	b. 201	6		Mar. 2016					
Week	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	2 W13 W14 W15 W16 W17 W18 W							W20		
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# Thanks

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