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# Coordinate Detector Update

Peter Monaghan

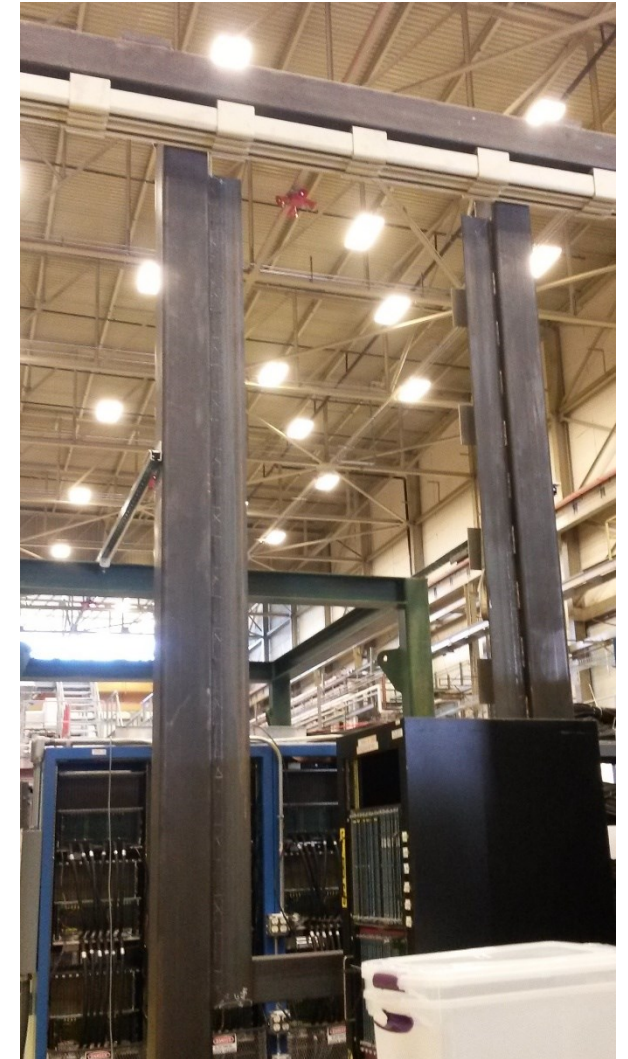
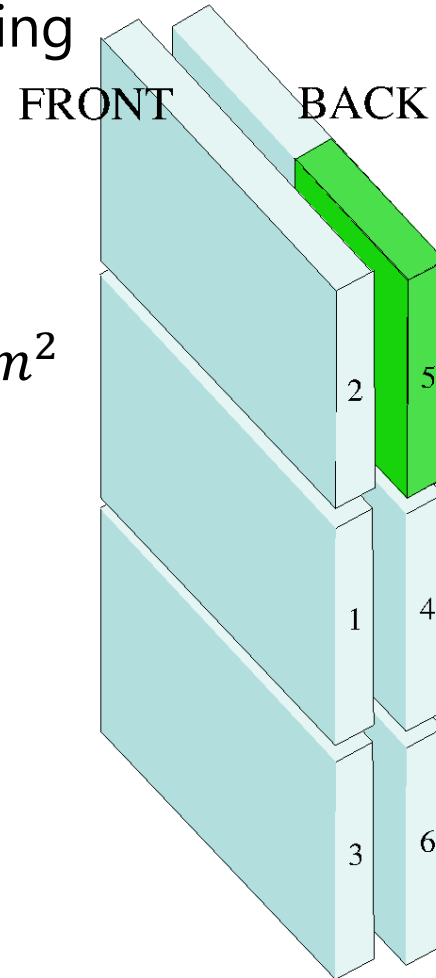
Ralph Marinaro, **Jacob Bird, May Degilio, Gabriel Womelsdorf**

Christopher Newport University

SBS Collaboration Meeting, 12<sup>th</sup> September 2024

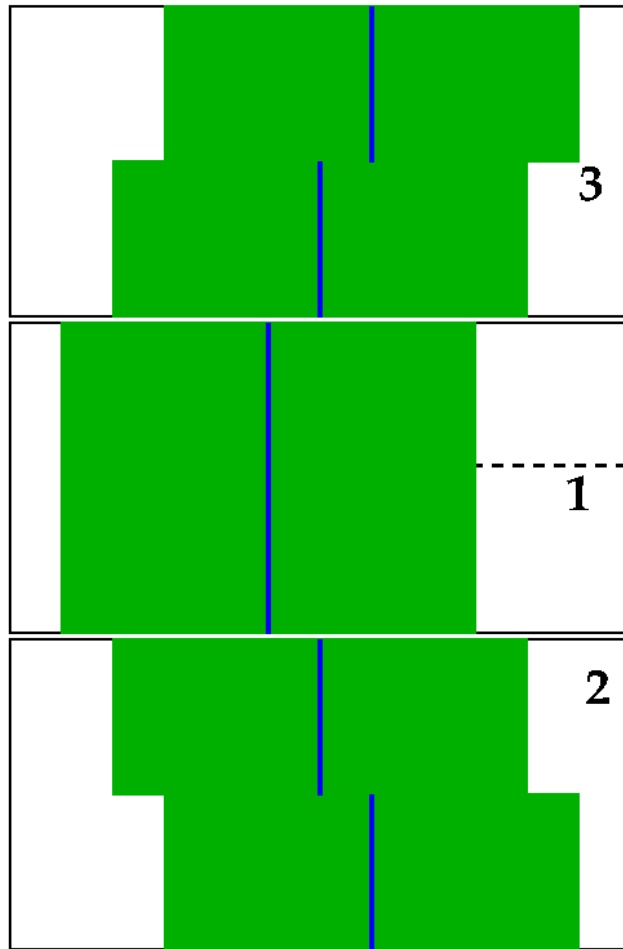
# Coordinate Detector Status Update

- Scintillator detector with wavelength shifting fibers used as lightguides
- Left/Right split by mirror
- Paddles have angular spread  $\pm 17^\circ$
- Detector over 3 m tall; active  $104 \times 294 \text{ cm}^2$
- 6 modules; 14 maPMTs per half module
- 2352 channels in total

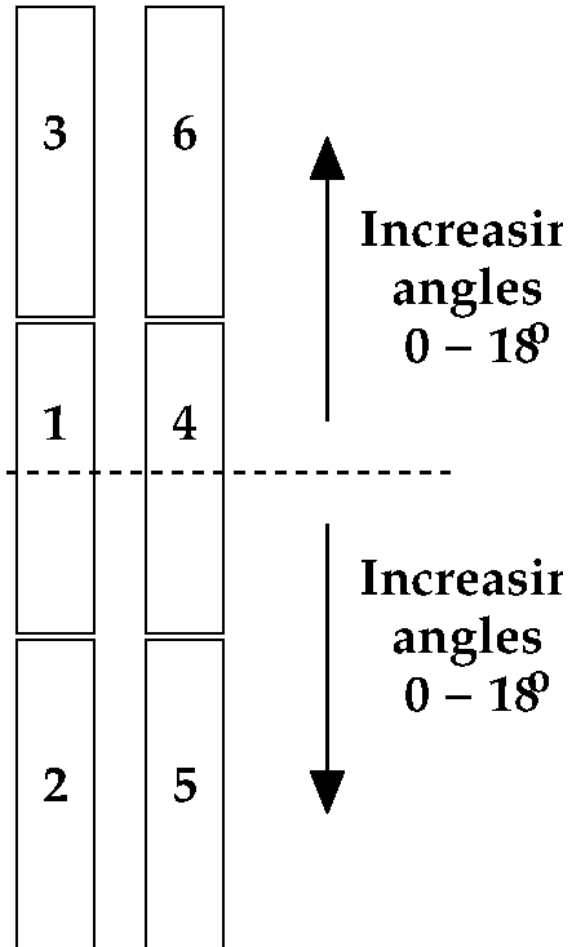


# Detector Configuration

View from target to CDet

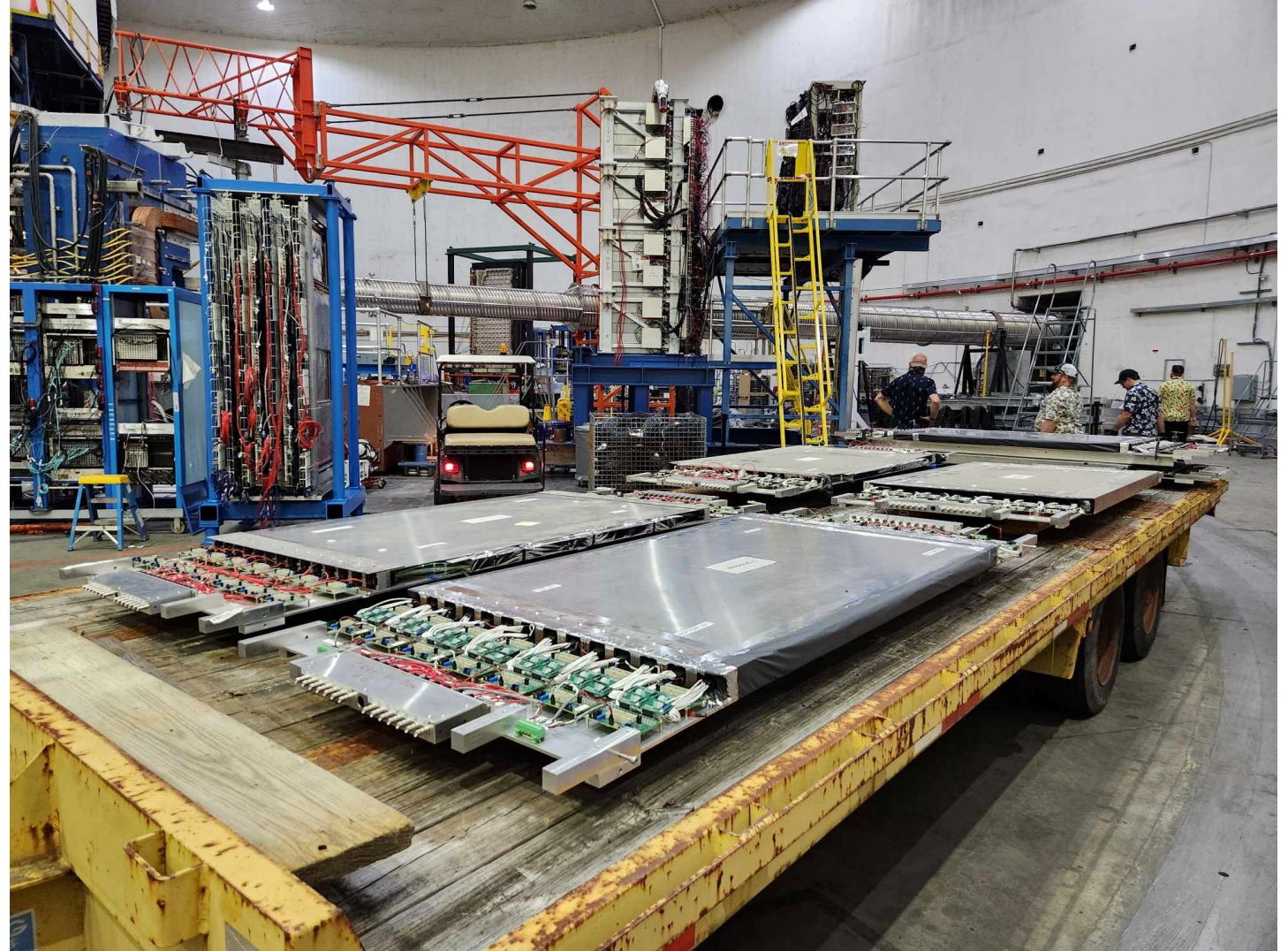


Side View



- Detector is fully symmetric
  - can rotate by 180°
- 168 PMTs; 168 NINO cards
- Acceptance matched to being on beam left
- Commissioning of all six modules completed in test lab.
- Detector moved in to Hall A

# Moving Out of Test Lab to Hall A

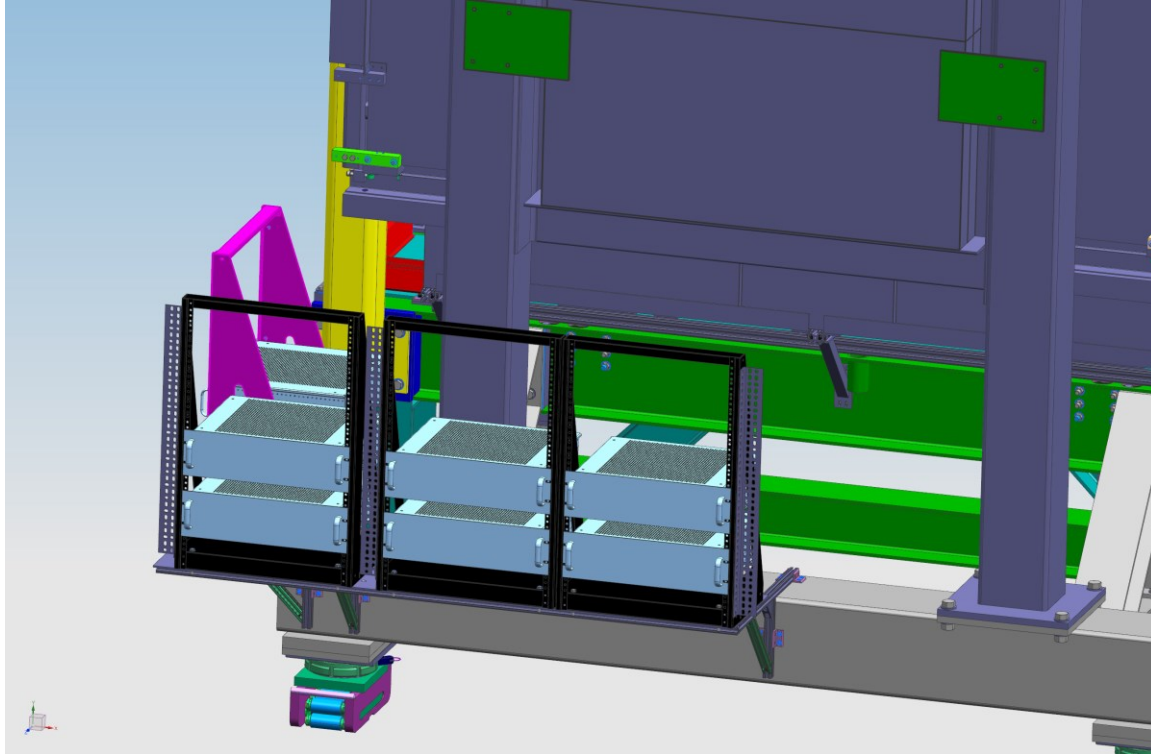


# Workspace in Hall A



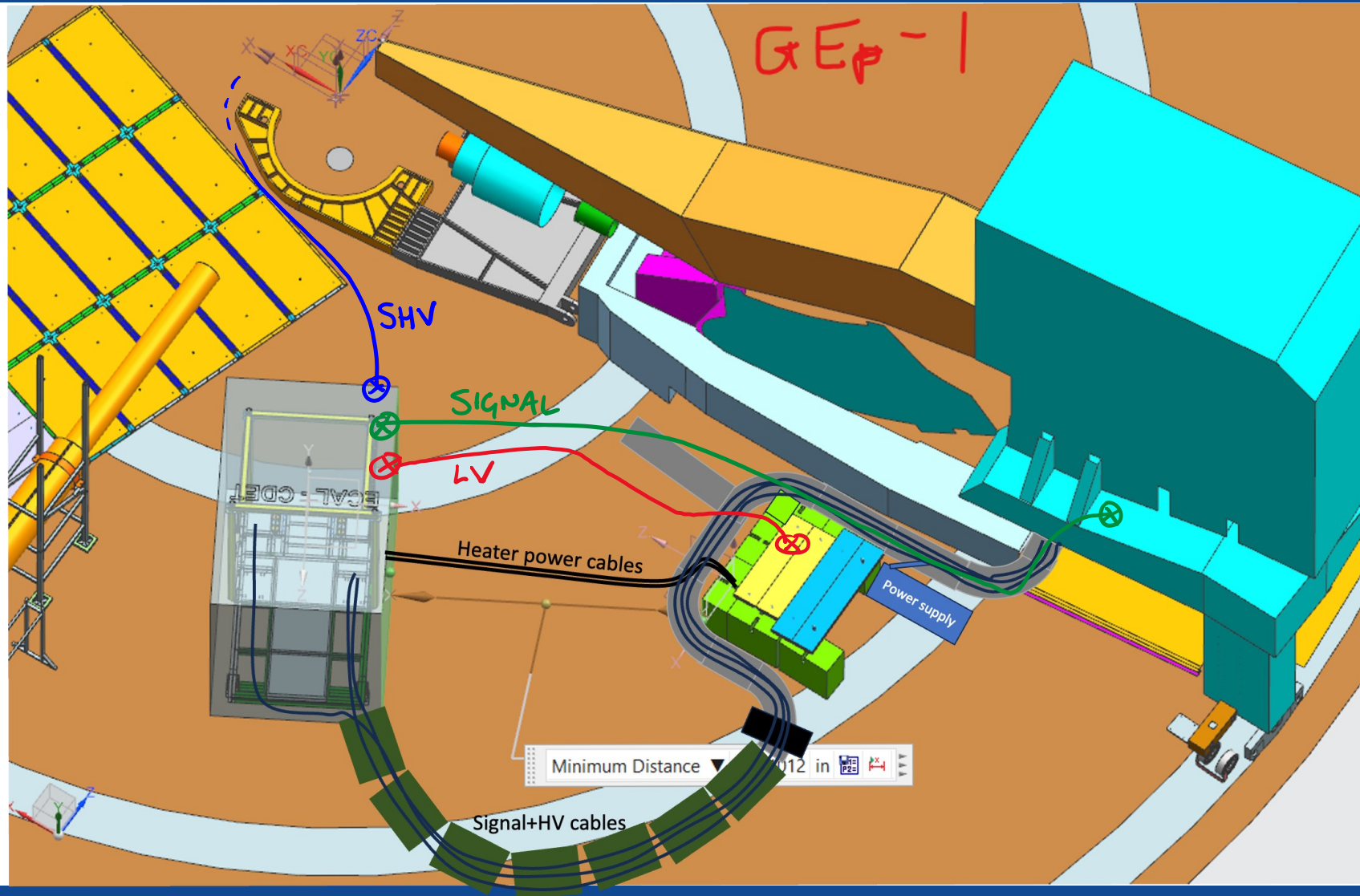
- Finishing light-tightness, magnetic shield and cable installation in the hall.

# CDet Installation



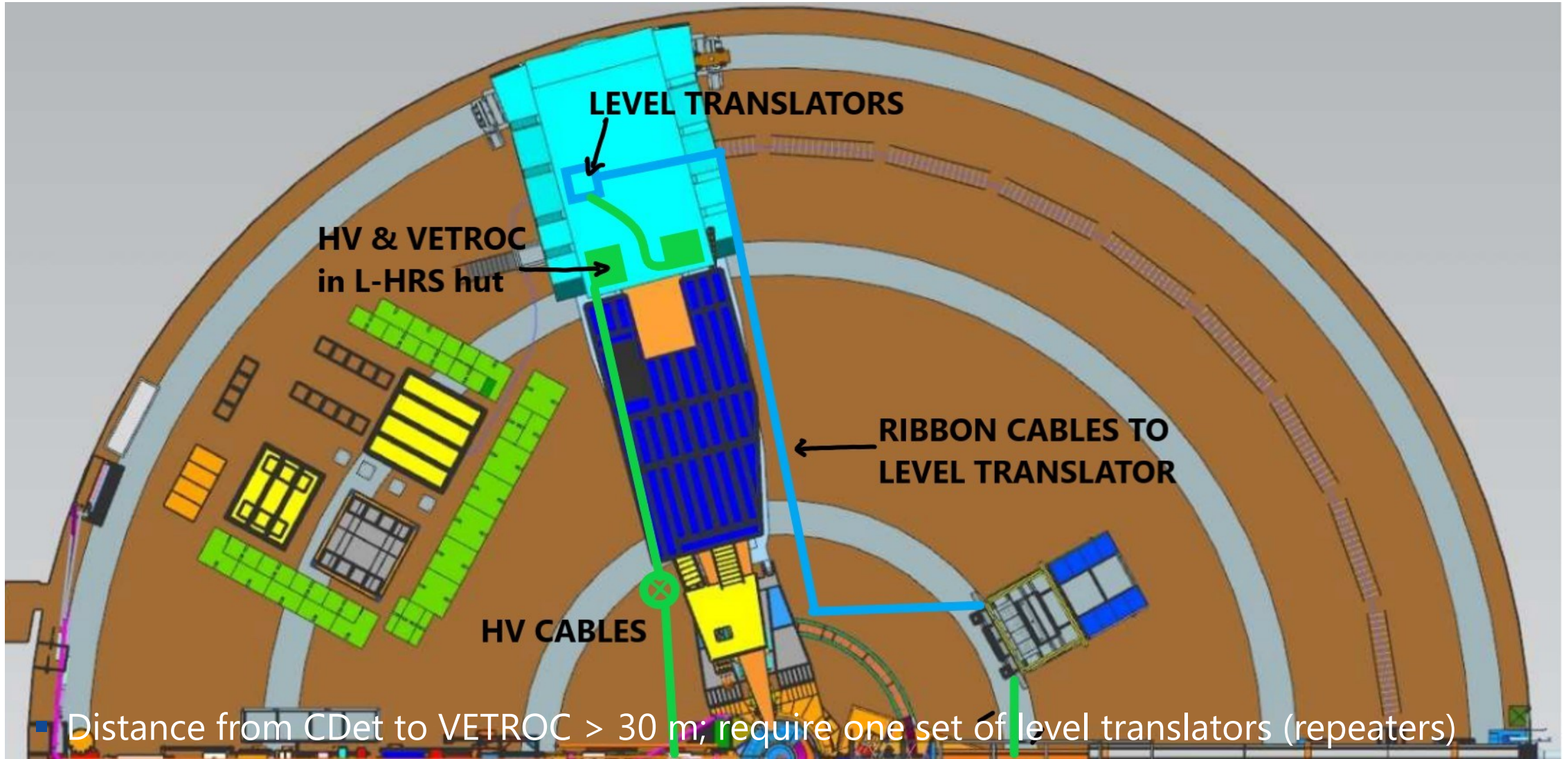
- CDet will be attached to Ecal
- Preferred arrangement for ease of moving during kinematic changes
- Required a rethink of cable installation
  - Twice as many cables required now!
- Install patch panels on four racks
- Located to account for interference at pivot.
- Three modules will be installed on an engineered assembly as single plane.
- Assembly will be installed on the full detector frame (which is attached to ECal).

# CDet Cable Layout



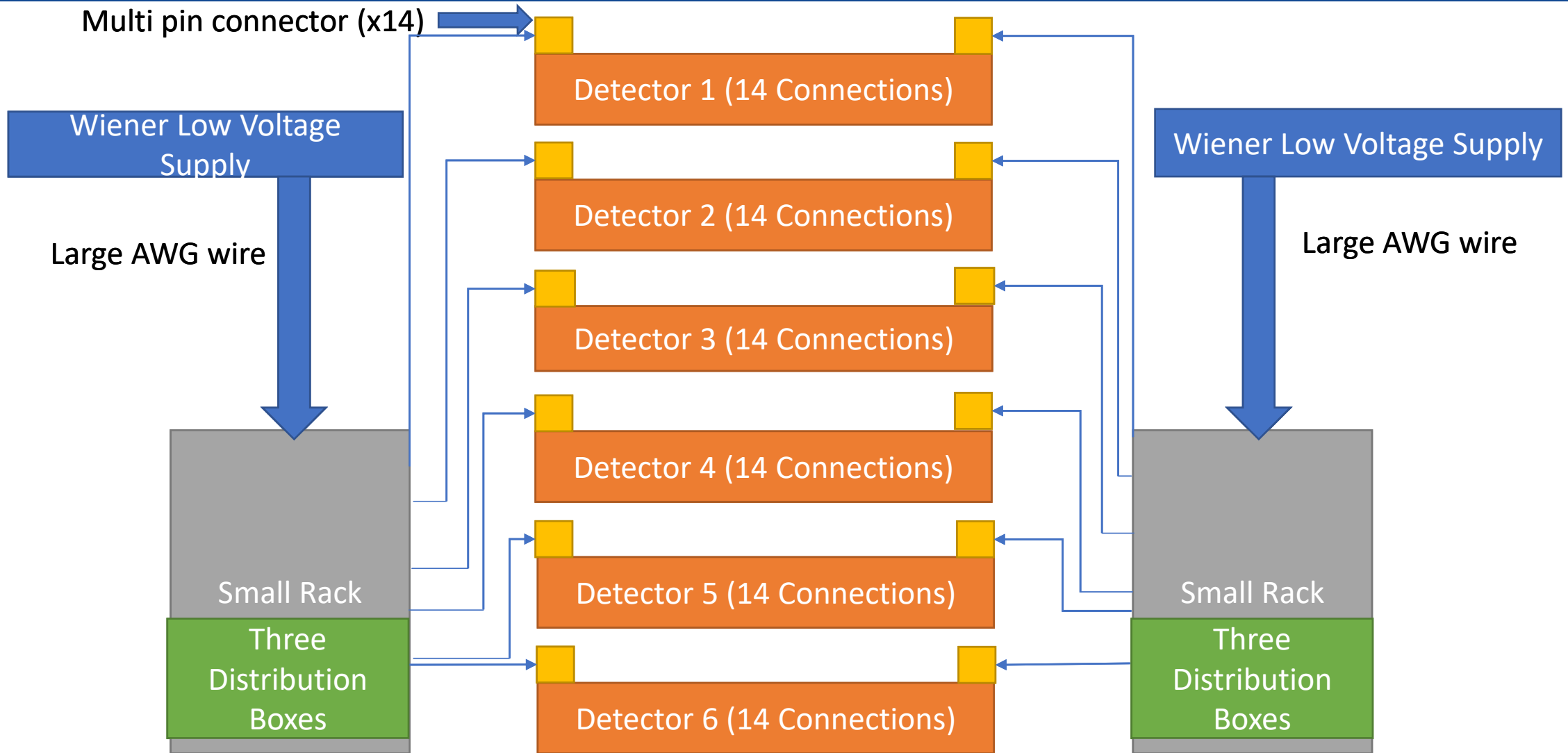
- **BLUE** : SHV
- around and under pivot, up to LHRs.
- **GREEN** : Signal
- run to lower platform
- **RED** : Low Voltage
- NINO power supplies in small bunker.
- External SHV and signal cables prepared.

# Equipment Layout in the Hall





# Modular Low Voltage Power Supply



# Internal Cables Complete

- SHV for PMTs



- Signal from NINO card



- NINO power for half module



- Individual NINO power



# Software Development

- Working on update of CDet in G4SBS
- Evolution of standalone CDet G4 code developed by Ed Brash
- Use simulation to generate pseudo-data to test the analysis software
  
- Develop calibration code
- Timing calibration; HV adjustment; gain matching and efficiency;
- Determination of reaction plane angle (with ECal)
  
- Code for analysis of detector performance
- Online replay plots for shift workers

# Status Summary

- Ralph Marinaro (CNU Postdoc) leading day-to-day project management at JLab
- Students have been very busy making LOTS of cables
- Internal cables – patch panel to module/PMT/NINO – complete
- External cables – mostly complete
- 84 Robinson-Nugent splice ribbon cables (VETROC connection – UConn supplied connectors) under construction
- Detector modules now in hall → light-tightness, magnetic shield and cabling.
- Engineers have design for assembly frame, absorber and attachment to ECal.
- Software development ramping up.
- Thank you to Lawrence, Zak and the rest of Hall A Tech Staff!