



# ICARUS DAQ Racks to pORC

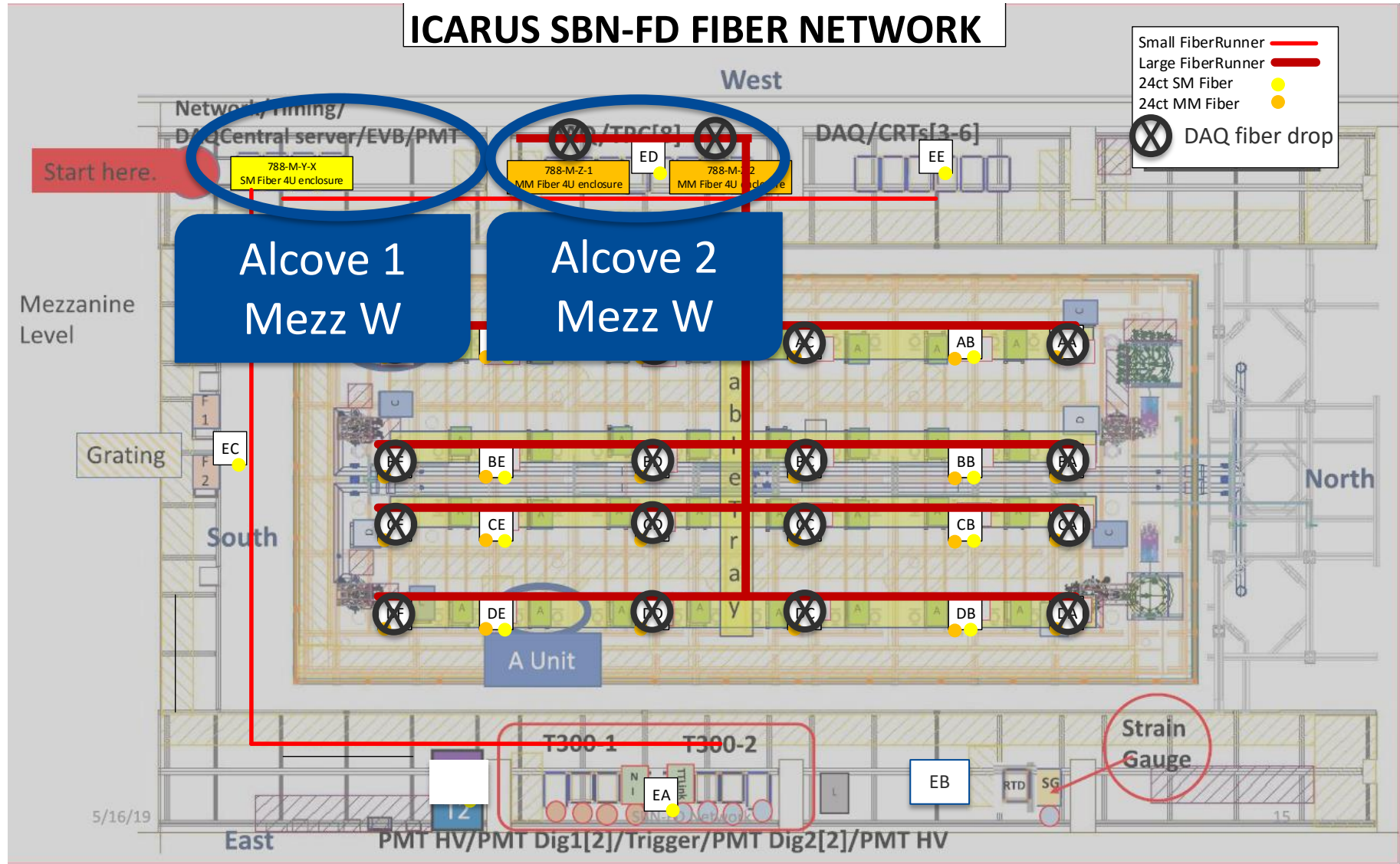
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# Overview

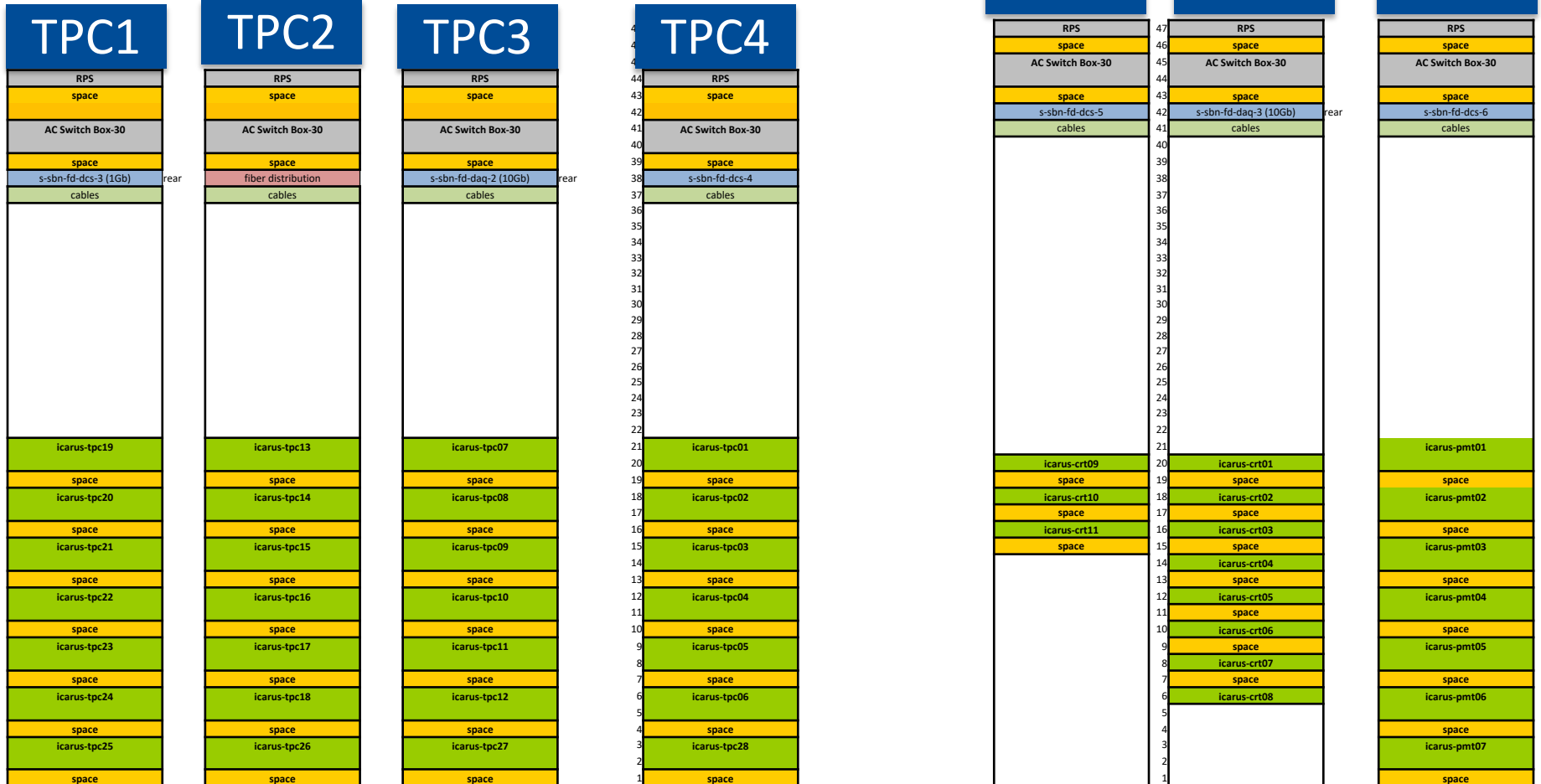
- Tasks needed to complete the installation of the ICARUS DAQ racks
  - pORC – partial Operational Readiness Clearance
- What are we talking about?
  - Physical location of DAQ racks at SBN-FD
  - DAQ rack layouts
- Computing summary
  - All DAQ racks installed in final locations
  - Right now computers are powered directly from the wall to the PDU
    - No rack protection
  - Computers are fully networked
  - All computers have operating systems installed
- Rack types – each type has different requirements
  - TPC (x4 racks)
  - PMT and CRT top
  - CRT side and bottom (x2 racks)
  - Central Servers/EVB
  - DCS/Clk
- pORC documentation needs to be written

# DAQ Rack Locations at SBN-FD





# Alcove 2 Mezzanine West – TPC/CRT/PMT



# Common Computing Rack Items

- Rack protection
  - AC switch box, rack protection system, and smoke detector
    - Items are at FD
    - Power cords from AC switch box to wall and AC switch box to PDU need to be routed
    - No holes in computing at the top racks to mount smoke detectors
  - Cover fronts and backs?
- Power cords
  - Right now the cords are pulling down and exposing ground prongs on plug
    - This is usually due to the weight of the cable.
    - Linda suggests strain relief and cable twist orientation
    - Skippy suggested flipping the PDU upside down so the two prongs are on top and the ground prong is on the bottom
    - Labels for power cords are in a spreadsheet which needs to be updated if there are PDU adjustments, then printed and affixed
- Network cables
  - All network cables are installed but not labeled
  - Labels for network cables are already printed
- Ground PDUs

# Requirements by rack type

- TPC (x4)
  - Common computing rack items
  - Trunk fibers and fiber pigtails to PCIe cards
    - Need a horizontal surface to store excess
    - Routing to PCIe cards
- PMT (x1)
  - Common computing rack items
  - DAQ fibers
    - Probably need a horizontal surface to store excess
    - These DAQ fibers are sturdier than the TPC DAQ fibers
- CRT (x2)
  - Common computing rack items
  - DAQ cat5 cables
- Central Servers/EVB/DCS
  - Common computing rack items



# Moving Forward

- Identify solutions to the other open issues
  - Routing of DAQ fibers
  - Power cord
  - Mounting holes for smoke detectors
- Apply solutions
- Attach network cable labels
  - Labels have been printed
  - Verify connections using link lights
- Label power cords
  - Decide on layout in racks
  - Make label spreadsheet
  - Attach labels
- pORC documentation



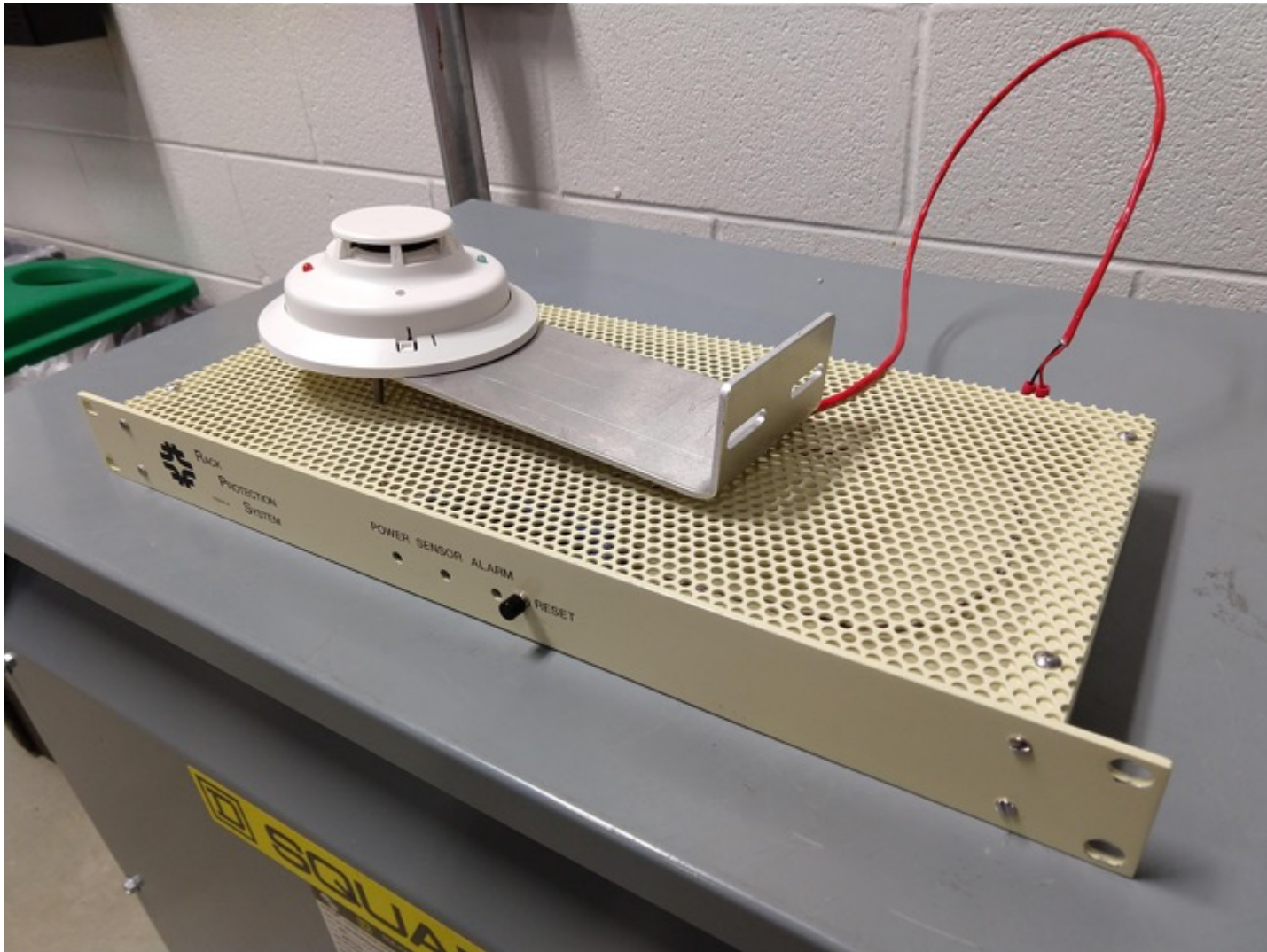
# Installation Requirements

- At least two people to meet the ODH 1 requirement
- Installation will take about 6 weeks of calendar time
  - Arrive at Fermilab – badge, training (ODH)
  - Installation is an iterative process
    - Discuss and refine installation tasks
    - Locate tools and parts
    - Perform installation
    - Review installation
  - Write documentation
  - pORC walk through
  - Resolve issues from pORC walk through
- Usually people coming to work at Fermilab also have other responsibilities that they can't ignore and must spend time on
- The ORC process for ICARUS for cabling and racks is directed and guided by Linda Bagby as the Electrical working group leader. The cabling must meet Fermilab standards. I am not aware of all the standards and consult with Linda as the task progresses.

# Installing Rack Protection

- Rack protection has three units
  - AC switch box – cuts power when smoke/over temperature is sensed
  - Rack protection system – Triggers power cut via AC switch box
  - Smoke/temperature detector -
  - Cables and power cords
- Installation
  - Install the three units
  - Connect cables and power cords
  - Rack will need to be powered off when connecting the AC switch box to the wall power
- Parts and Tools
  - M6 cage nuts and bolts
  - Screw drivers
  - Make some hanger parts for the smoke detectors because of the lack of holes in the top of the computing rack
- Rack protection needs to be installed in 9 of the 10 DAQ racks
- Andrea Scarpelli started this installation – mounted AC switch and RPS units

# Rack Protection w/ Smoke detector



# RPS and AC Switch Box in Rack (Front)





## RPS and AC Switch Box in Rack (Back)



## Installing Power Cords

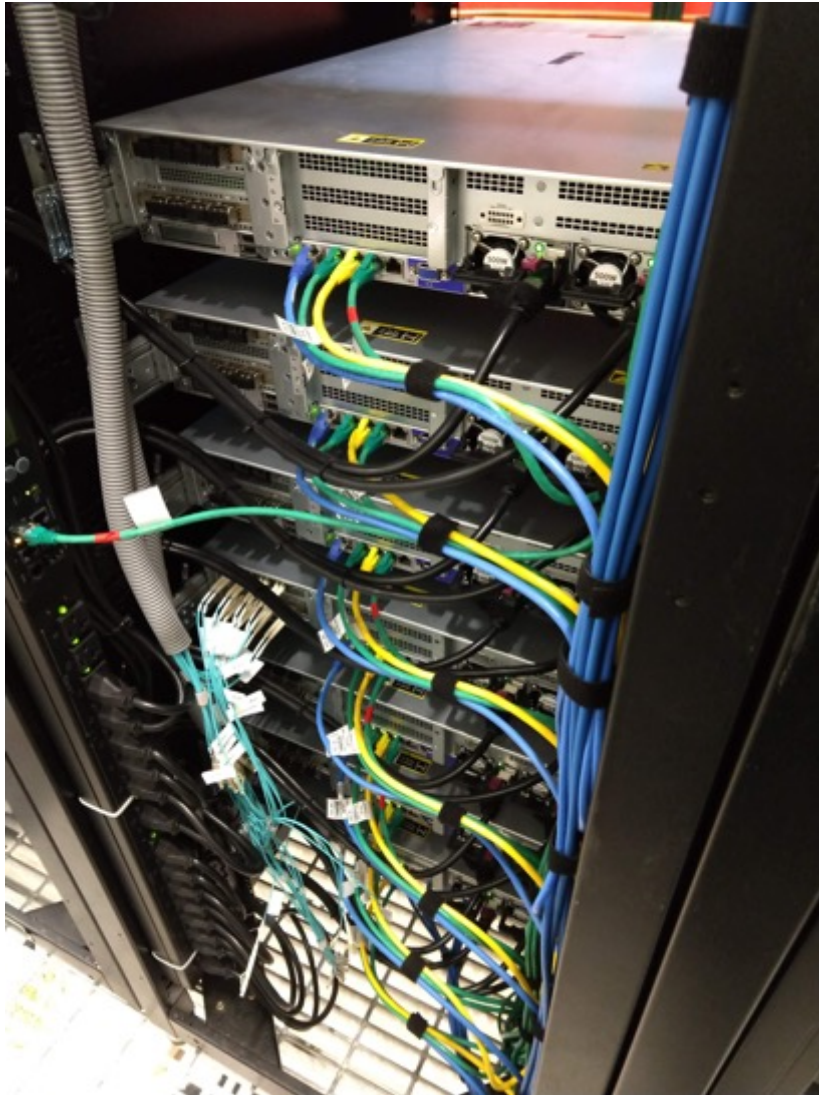
- Power cords are plugged into a vertical Power Distribution Unit (PDU) in each rack
- Right now the cords are pulling down and exposing ground prongs on the plug
- One suggestion is to flip the PDU upside down so the two prongs are on top and the ground prong is on the bottom
- We need to consult with others to determine the best way to resolve this item
- I recommend flipping the PDU in one rack and see if the plugs hold better
- Labels for power cords are in a spreadsheet which needs to be updated if there are PDU adjustments, then printed, and affixed
- This applies to all 10 DAQ racks

# Installing Networking

- All network cables have been connected
- Labels need to be attached to each end
- $61 \text{ computers} \times 4 \text{ labels/computer} \times 2 \text{ ends} = 488 \text{ labels}$
- Verify the connections
  - Disconnect one end and verify the link lights go off on both ends.
  - Need to organize a time when the DAQ is not used to do this
- Labels have been printed



# TPC3 Rear



# Network Connections



EVB

TPC/PMT

CRT

Key:

- Yellow – DAQ Cat6a
- Yellow/Green tape – Public Cat6a
- Blue – IPMI
- Green – Public
- Green/Red tape - DCS



# Installing DAQ Fibers

- TPC DAQ fibers
  - The DAQ fibers consist of three sections
    - Trunk cables with 24 fibers in one cable
    - Then on each end there are pigtails
    - Pigtails transition from the trunk fiber to individual fibers
  - Status
    - Trunk fibers are in place
    - Pigtails on the detector top will be installed next week (I think)
  - Pigtails in the TPC racks need to be installed horizontally
    - Shelves have been installed in the TPC and PMT racks for horizontal installation
    - Every individual fiber in the pigtail needs a label (already printed)
    - 24 computers x 16 fibers/computer = 384 labels
- PMT DAQ fibers
  - Status
    - Fibers are in place across the detector
    - Aiwu connected fibers to the DAQ computers
    - Right now the fibers are vertical, probably want them horizontal
  - Need to think about the positioning
  - Label these fibers if they are not labeled yet
- Parts and Tools
  - Tie wraps
  - Scissors
  - Inner duct
- There are four TPC racks and one PMT rack

## Installing CRT Racks

- The bottom and side CRT groups need to run networking cables between the readout and computers in their two DAQ racks.
  - They would probably accept help to get the cables managed in their two racks
- I have no information on the top CRT.