BigBite shower and preshower current status

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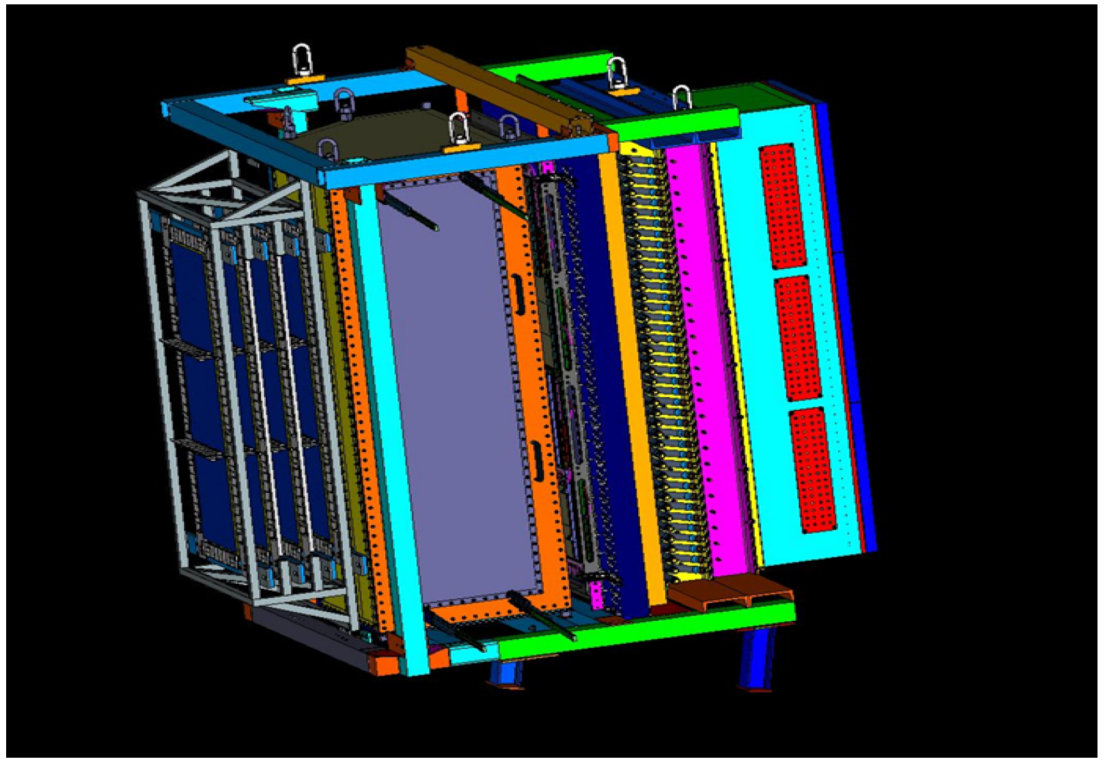
BigBite spectrometer

<u>Major upgrade to 6 GeV version of BigBite</u>

- 4 GEM chambers
  - INFN
- GRINCH Cerenkov
  - W&M
- 1 GEM chamber
  - UVa
- Preshower
- Scintillator plane
  - Glasgow
- Shower

- Will be the electron arm



Purpose of shower and preshower

- 27 layers of blocks
- 7 blocks per each layer
- Shower and preshower will be the trigger for all these experiments
- Lot of changes made since the last collaboration meeting

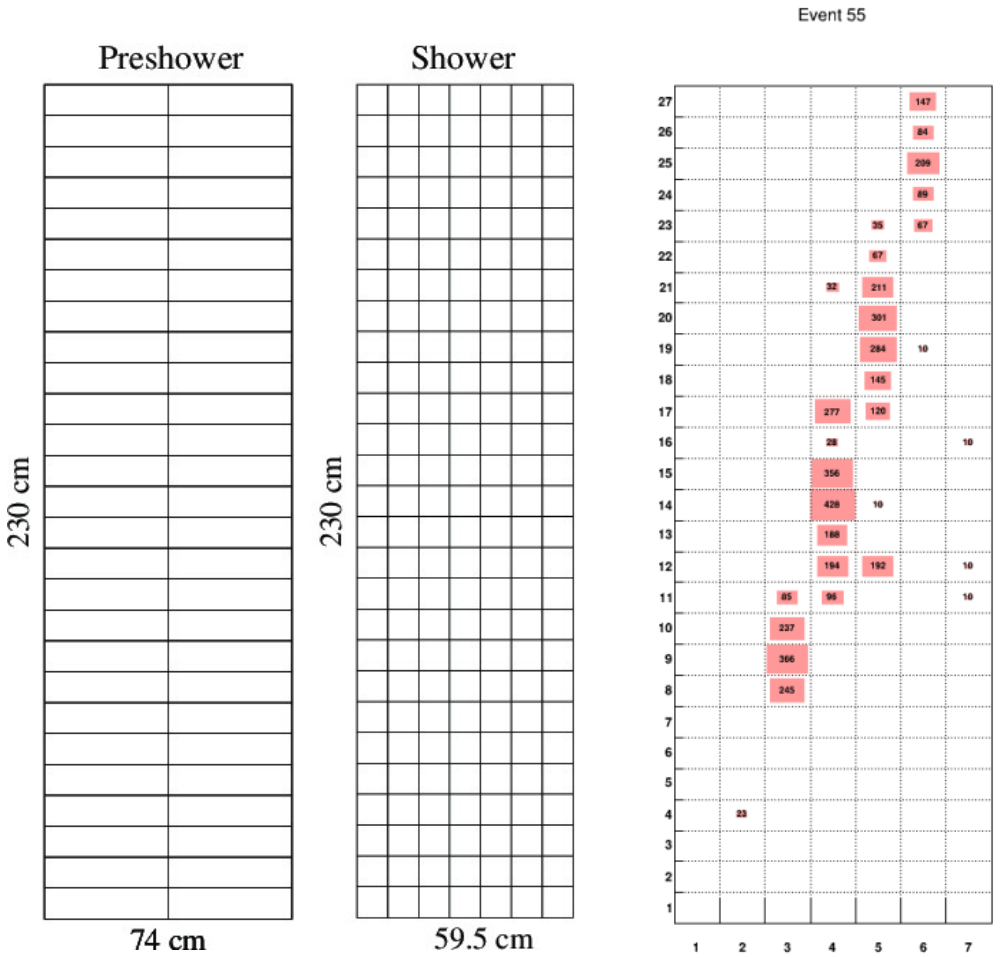
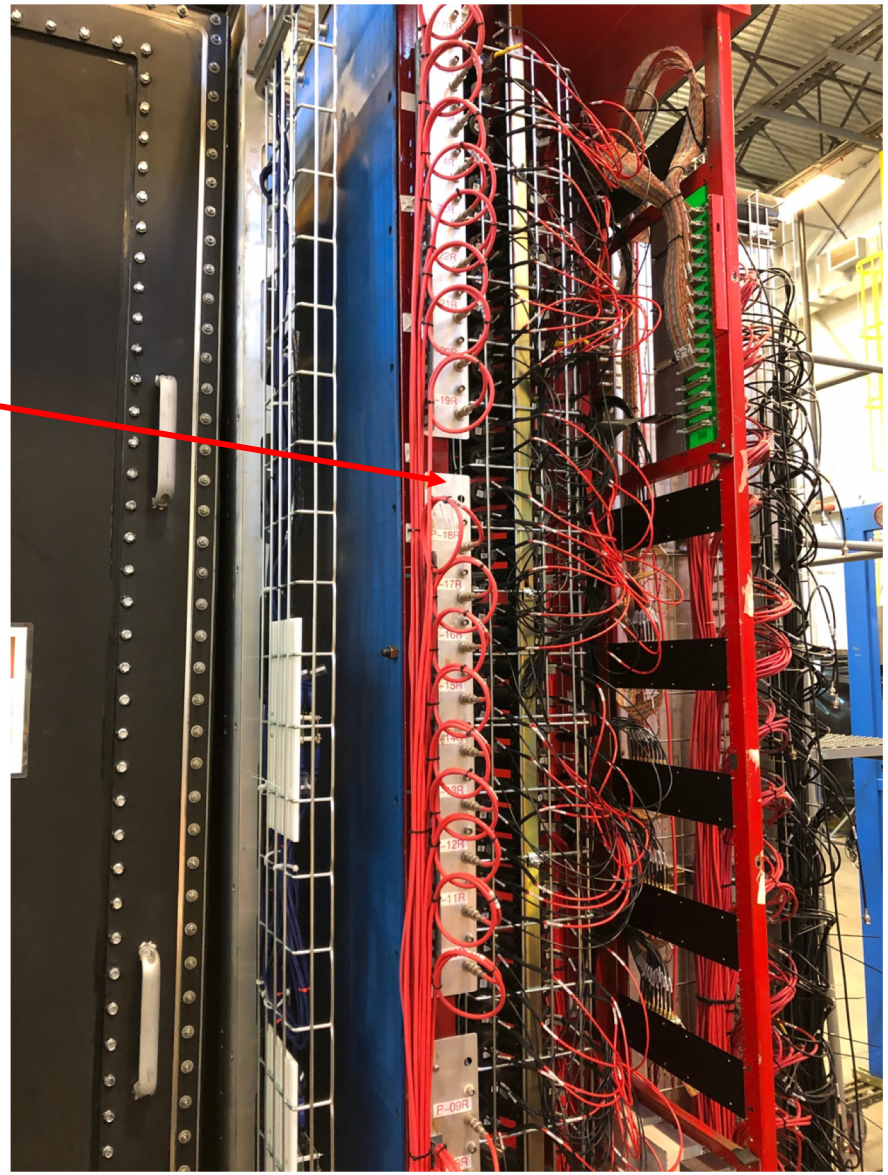
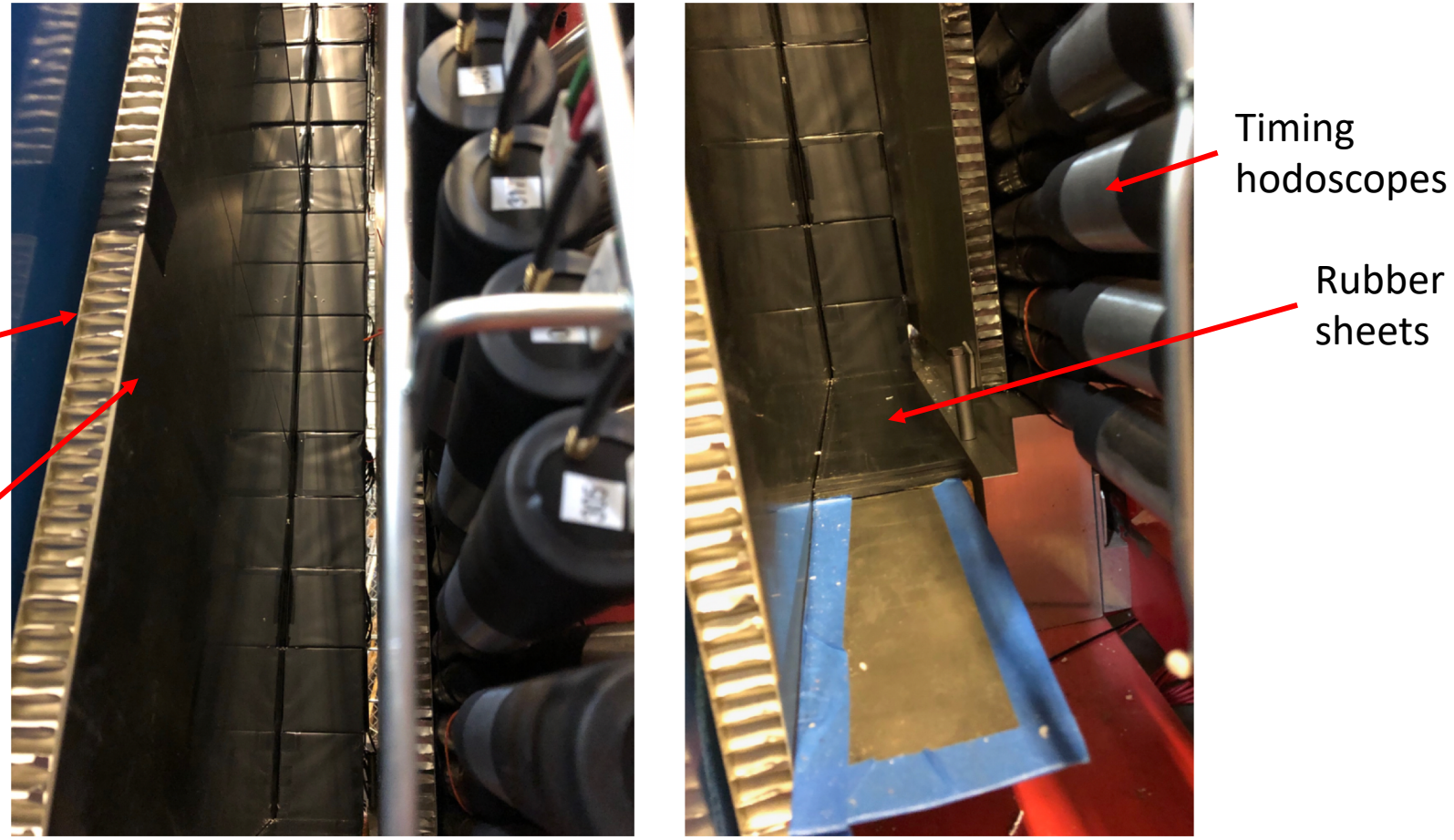


Figure credit: Nandhu

Before de-cabling and disassembling preshower

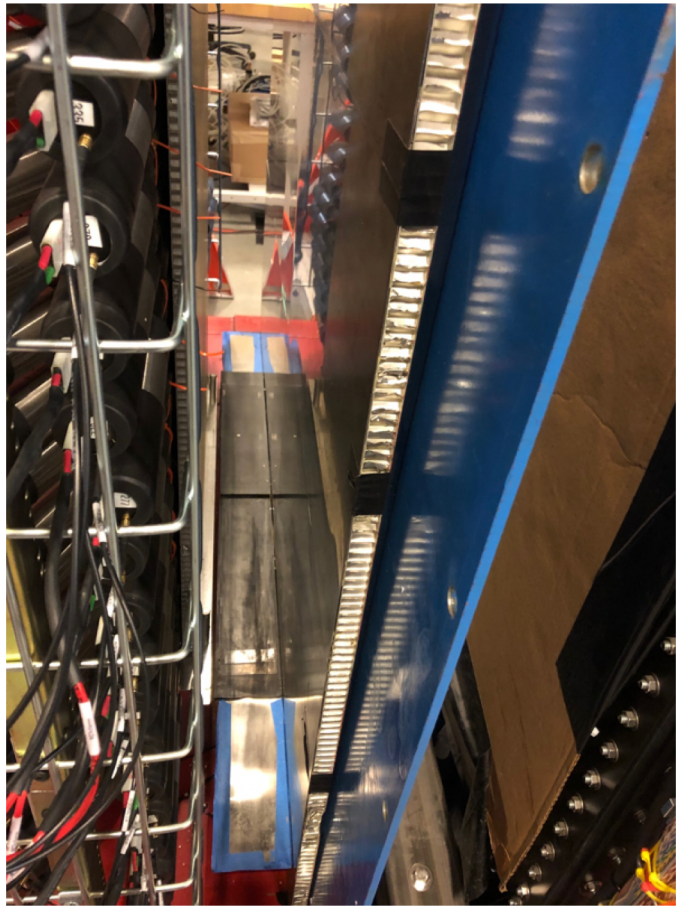


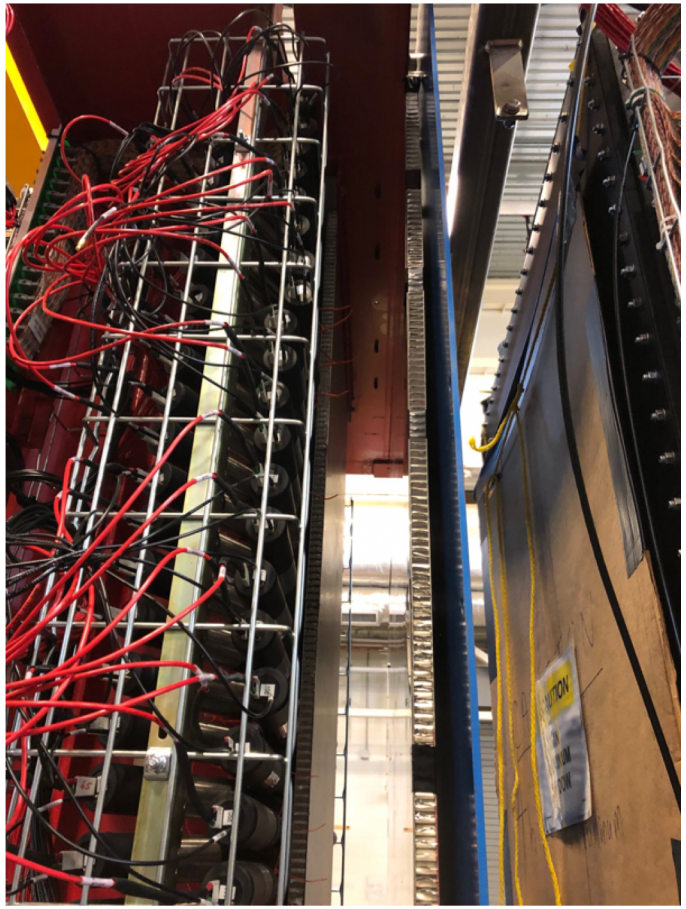
Right side removed



*left-right convention when looking downstream

Left side removed





Current status

- Blocks were cleaned, tested and painted (the square side that is opposite to the PMT)
- Albert has been working on wrapping up the blocks
- Needs to be installed and cabling needs to be re-attached
- DAQ cables need to be attached
- Cosmic commissioning needs to be done

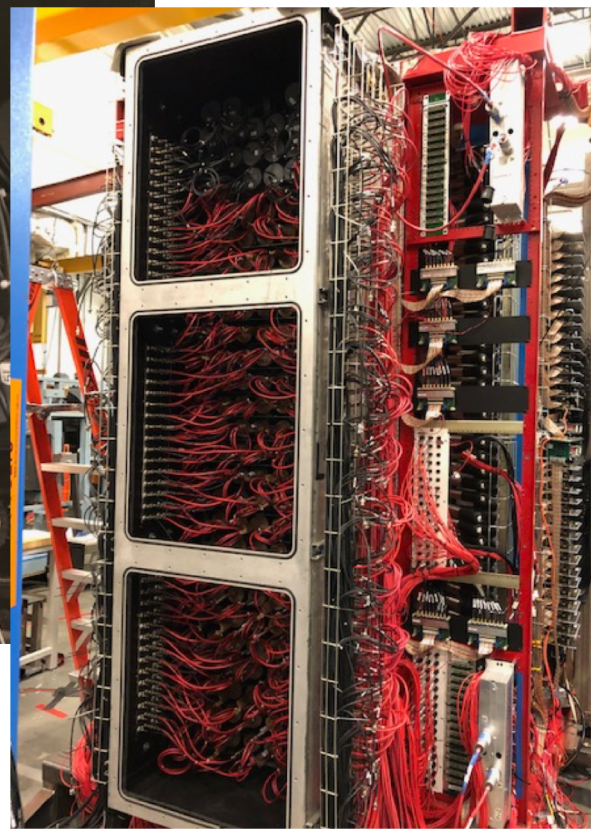
Work on shower

- Replaced the inefficient shower blocks with more efficient shower blocks
- Installed alternating layers of thick and thin mu-metal sheets in between different layers and on the side
- Re-attached the PMT bases

Shower status and plan

- Replaced (previously adjusted) top layers of inefficient shower blocks with good preshower blocks

- The HV bases for the shower have been installed

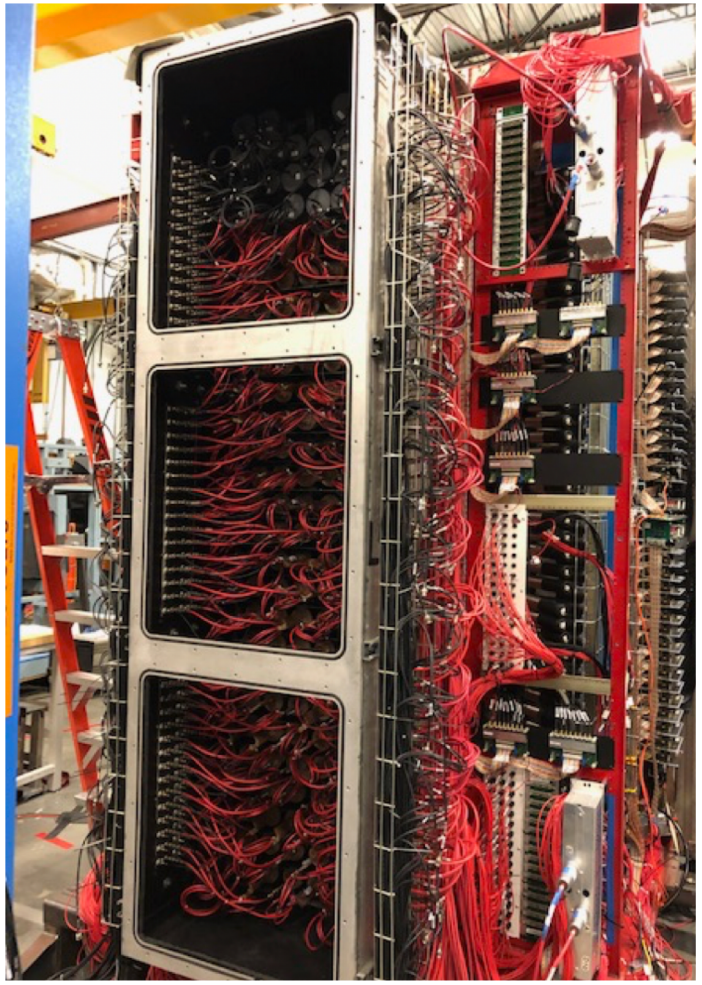


Shower status

- 100 m long BNC cables for shower completed
- Next step is to start cabling up the front end shower electronics
- Install the cosmic counter on top of the shower

List of remaining tasks - shower

1. Ask Hall C technicians for help with making whatever cables we need
2. Attach the cables for the updated trigger logic from the patch panels
3. Check for any light leaks
4. Make sure that all the cable connectors are intact
5. Cosmic counter connected but HV connection need to be labeled and identified in the software
6. Check if the cables are connected properly
7. Make sure the current on the HV bases are ok by turning on one layer at a time and observing the base current. Make sure that they are mapped correctly by checking the signals from the DAQ side
8. Check the shape of the amplitude distribution from each module
9. Take data at different high voltage settings
10. Perform gain matching studies for the shower (Mark's code) and make sure that the α value is satisfactory
11. Make documentation

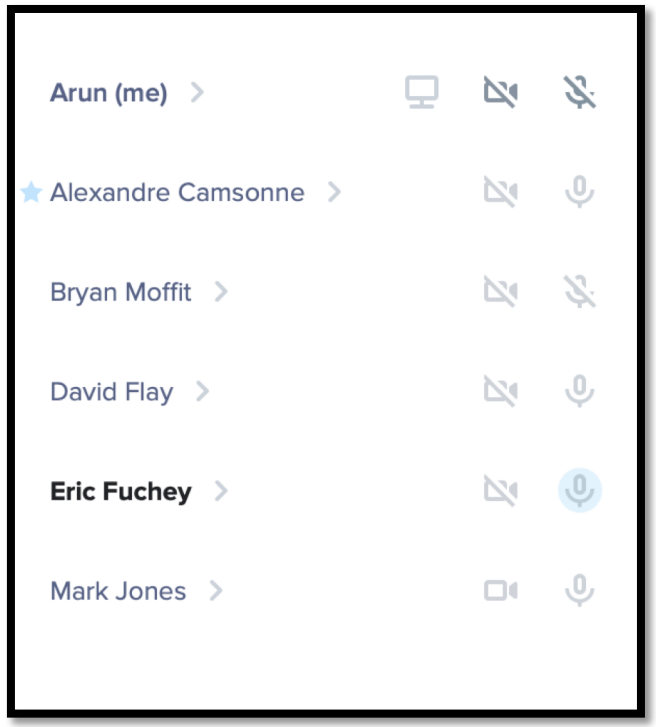


List of remaining tasks - preshower

1. Install the magnetic shield items (blue plate, smaller plate and spacers)
2. Make inlet for gas flow for each preshower block housing
3. Move preshower blocks from EEL building
4. Install the preshower modules in place (rubber piece goes at the bottom*)
5. Install the red u-channel and cable support angle bar
6. Attach the cables
7. Steps are identical as mentioned in the previous slide (steps 1 - 11)

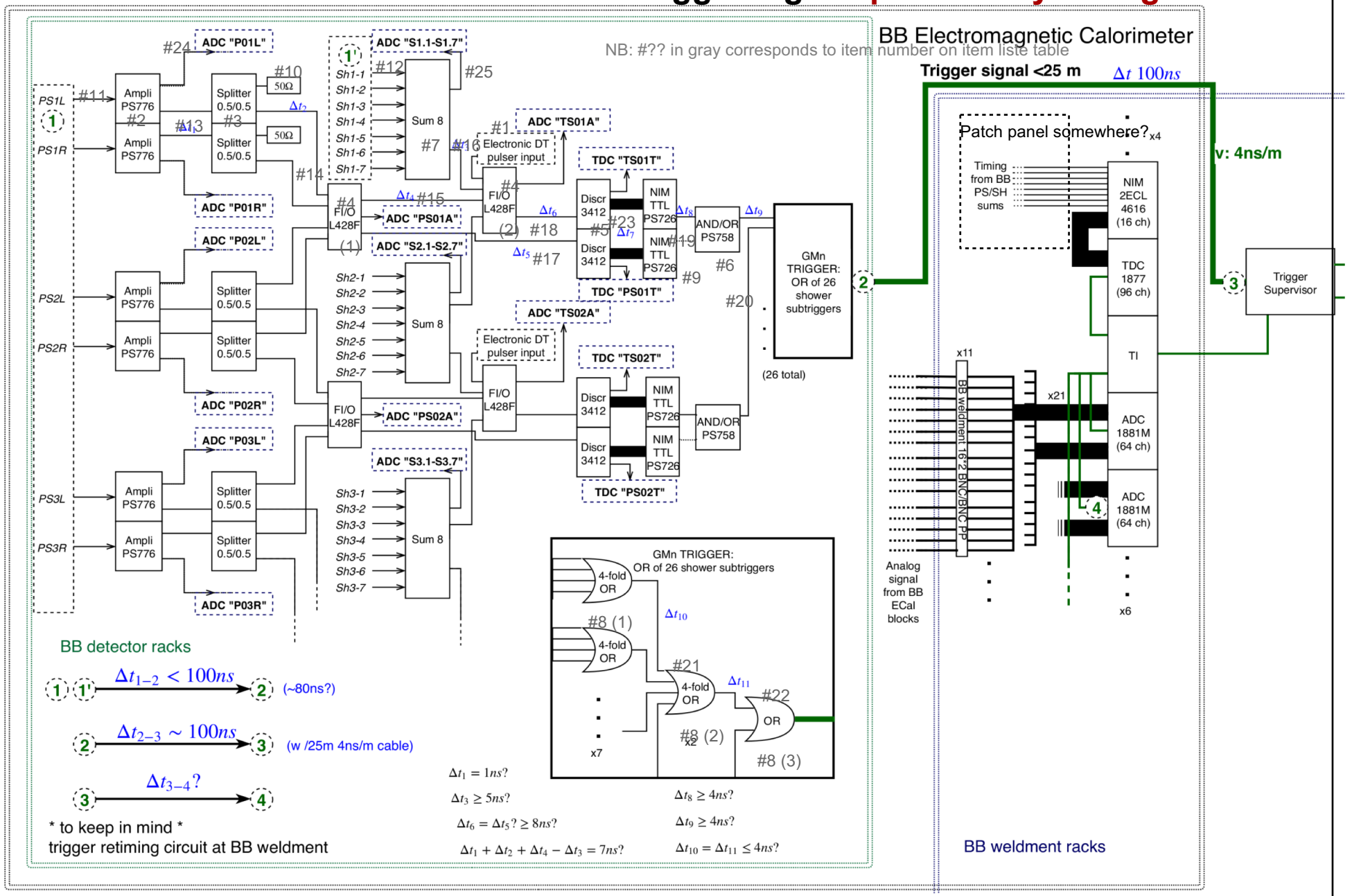
DAQ for shower and preshower

- Switch to CODA 3 (B. Moffit)
- Setup TS and TD in VXS crate (B. Moffit, A. Camsonne, M. Jones)
  - Setup fast clear for the FASTBUS ADC/TDC
    - Need to run optical fiber from TD to FASTBUS TI. Fiber carries the readout signal and crate busy signal
    - Fast clear ECL cable from TS to FASTBUS back plane card
    - ADC Gate/TDC stop cable from TS to FASTBUS back plane card
- Pedestal readout with pulser trigger to test system (E. Fuchey, A. Tadepalli, M Jones)
- Cosmic data for shower (E. Fuchey, A. Tadepalli, M Jones)
  - Use shower sum of two layers as the trigger.
- Cosmic data for preshower (E. Fuchey, A. Tadepalli, M Jones)
  - Use separate scintillator paddles as trigger



Thank you

Global scheme: BB Ecal and trigger logic + preliminary timing



If $\Delta t_{3\text{-}4}$ <250 ns (to be measured), we can use 500 ns cables to delay ADC.