mRICH Update (on hardware)

Xiaochun He, William Roh and Xu Sun

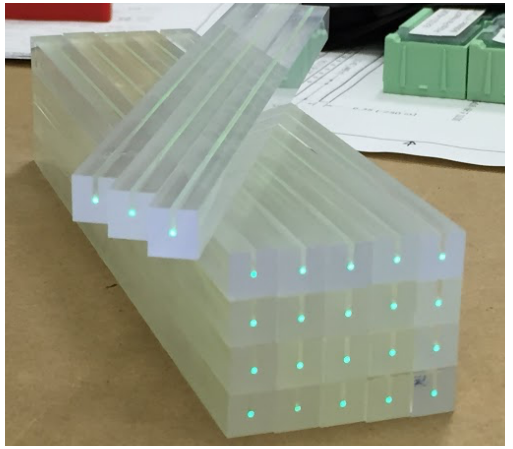
4/18/2018

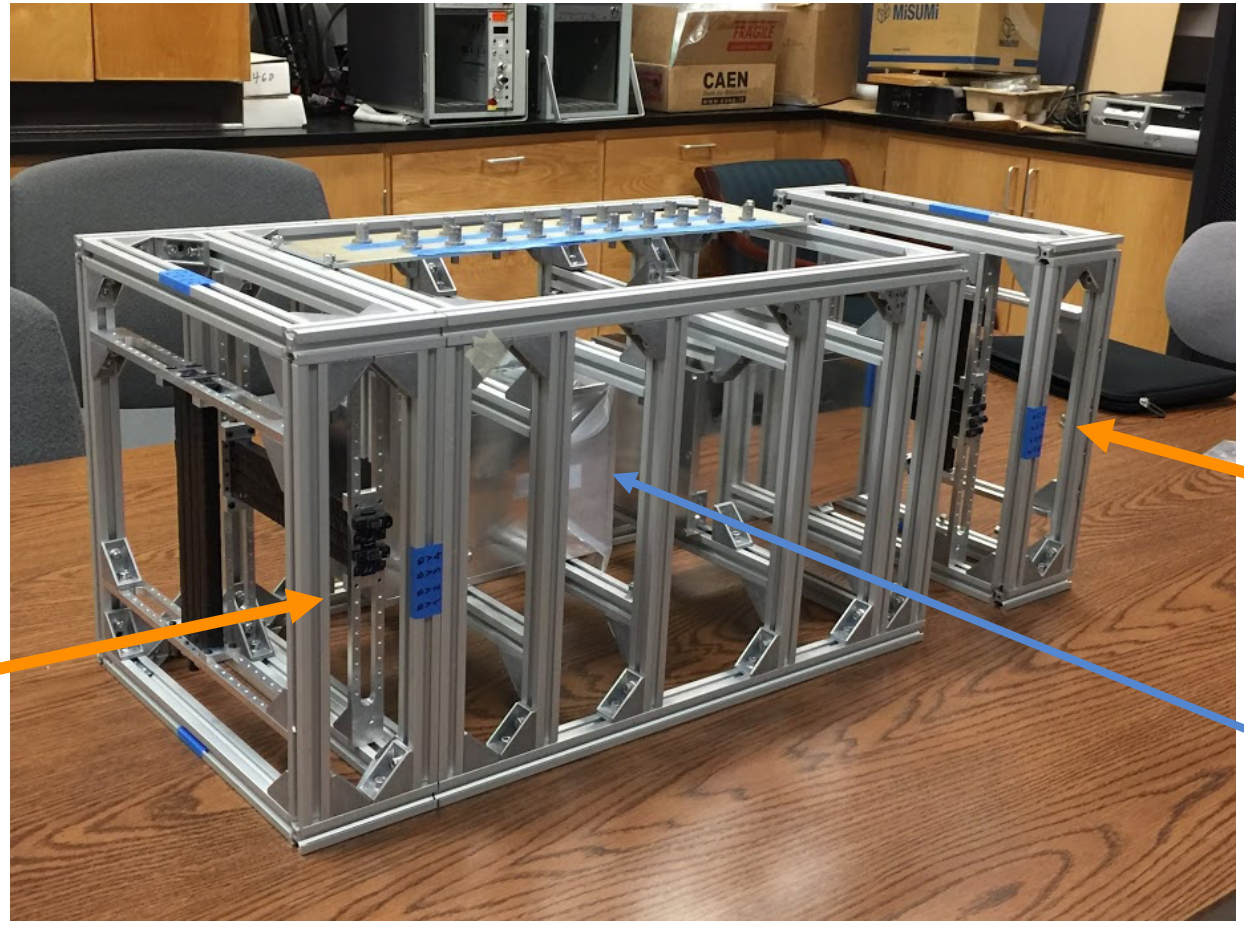
A few things I want to talk about today

- mRICH hodoscopes for the 2nd beam test at Fermilab
- mRICH readout development for the 2nd beam test at Fermilab
- mRICH beam test schedule
- Xu Sun will briefly talk about mRICH simulation

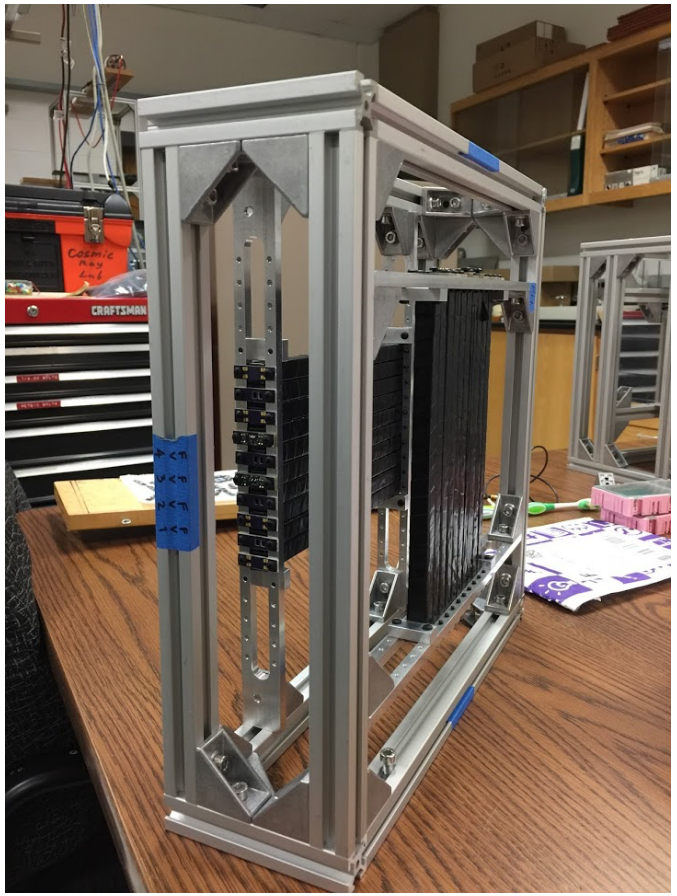
mRICH Hodoscopes

The front and the rear hodoscopes are identical. Each has two finger-scintillator (20cm x 1cm x 1cm) planes (X-direction and Y direction).

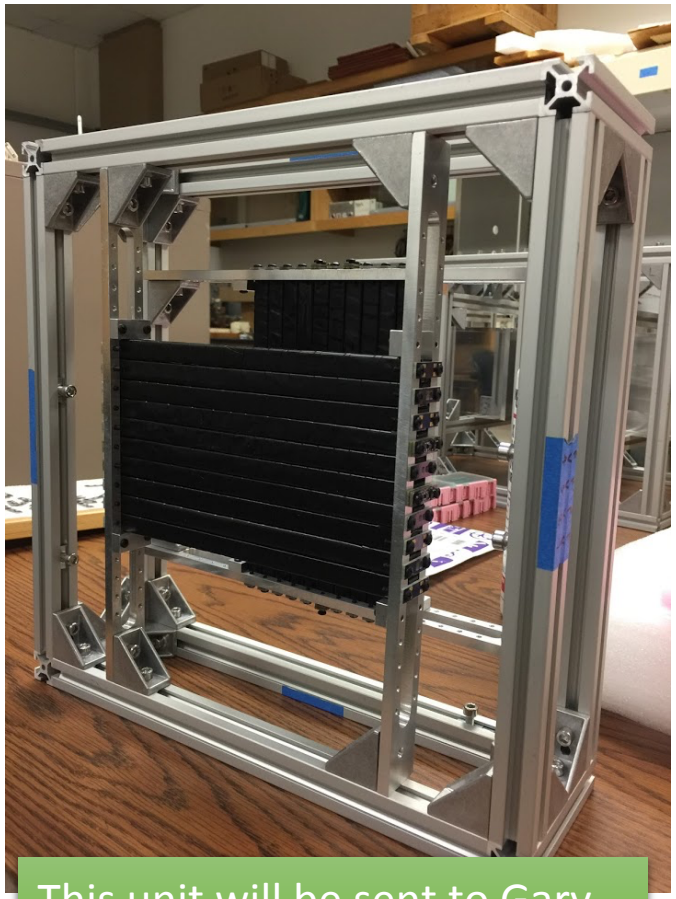




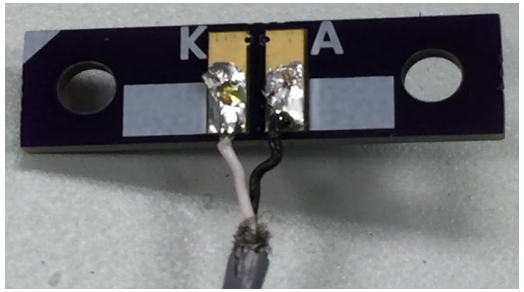
Hodoscopes prepared for the 2nd test



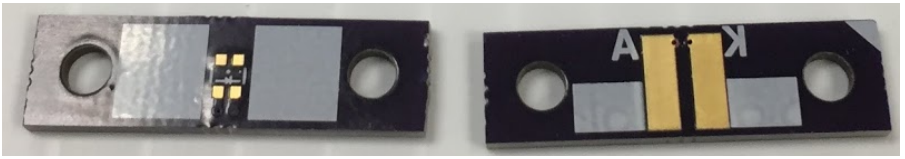
SiPM wires to connector PCB (a few inches)



This unit will be sent to Gary (will all SiPM PCBs installed)



SiPM PCB with wires soldered on



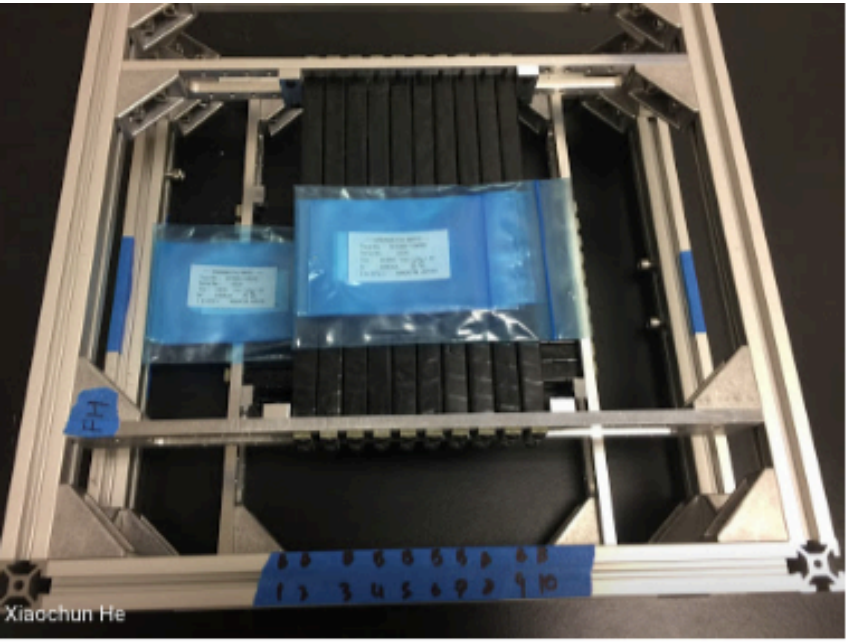
New SiPM PCB: SiPM side interface side

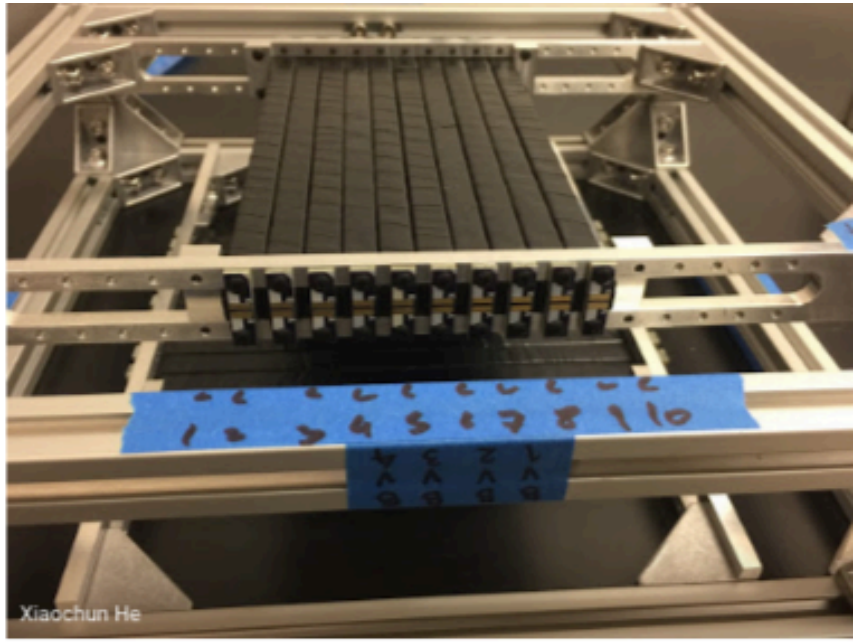
Note: In the first beam test, we did not use hodoscope info for the data analysis because we only focused on 120 GeV primary proton beam. The beam size is small. Also, we had to red them out separately from the mRICH readout done by Marco's group.

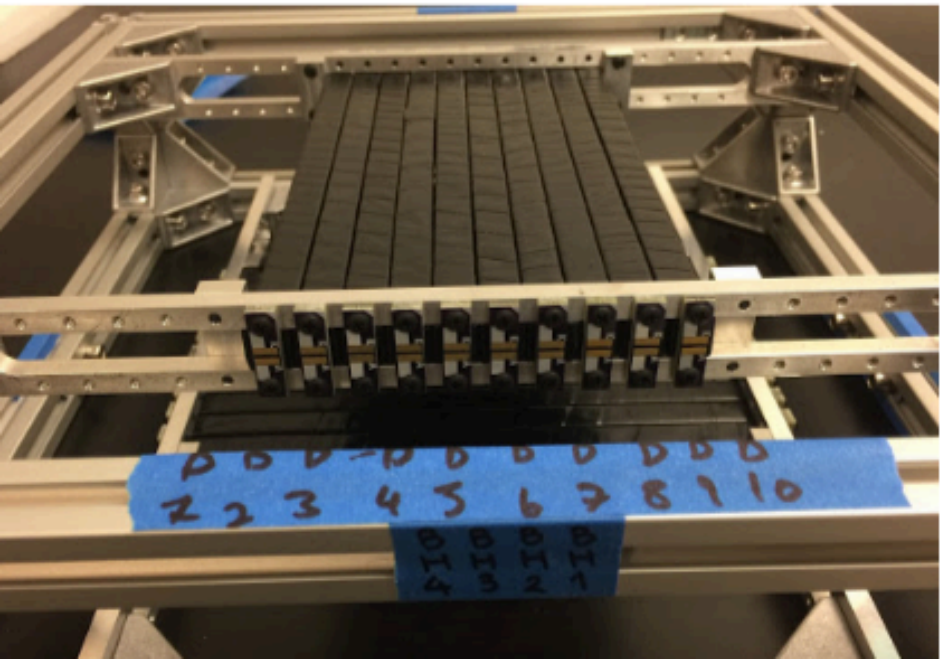
Shipping hodoscopes to Hawaii

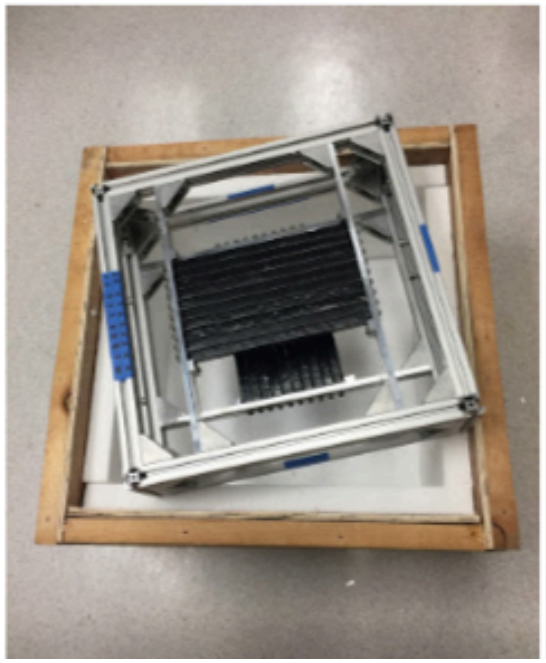
We packaged the two hodoscopes and shipped to Gary on last Friday. Gary reported that they received them and were working on the readout right away. Pictures are shown in the next a few slides.

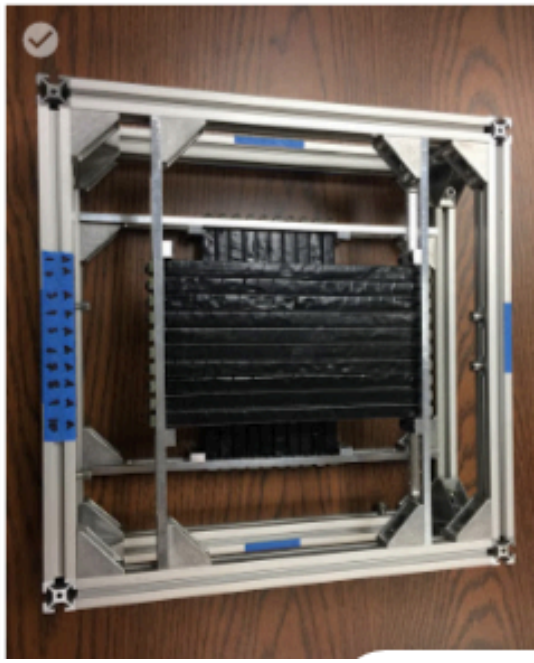
Packing and Shipping (I)



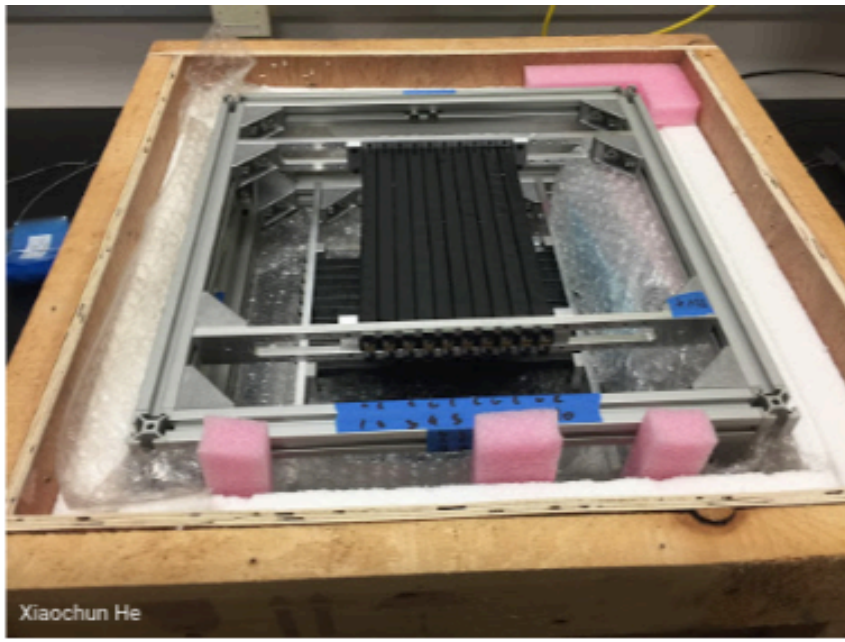


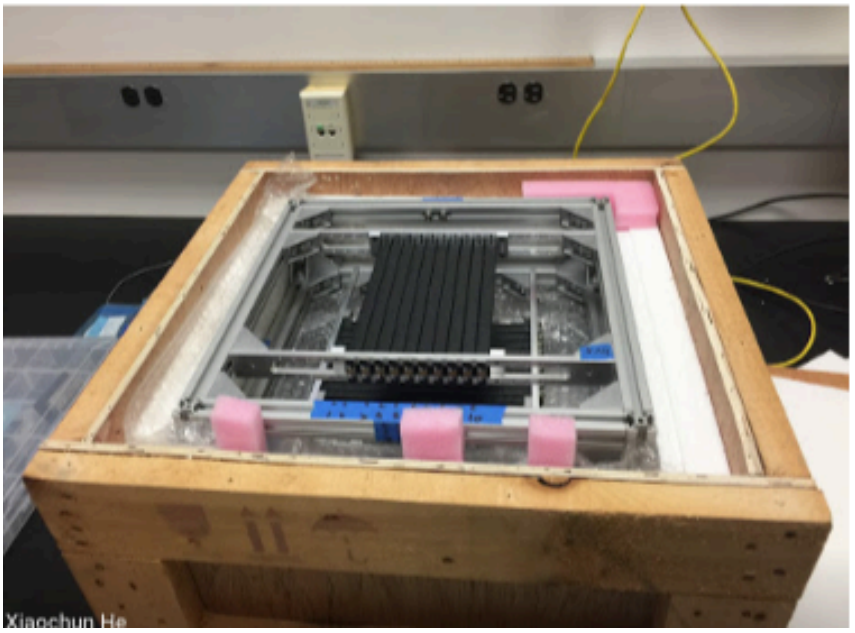


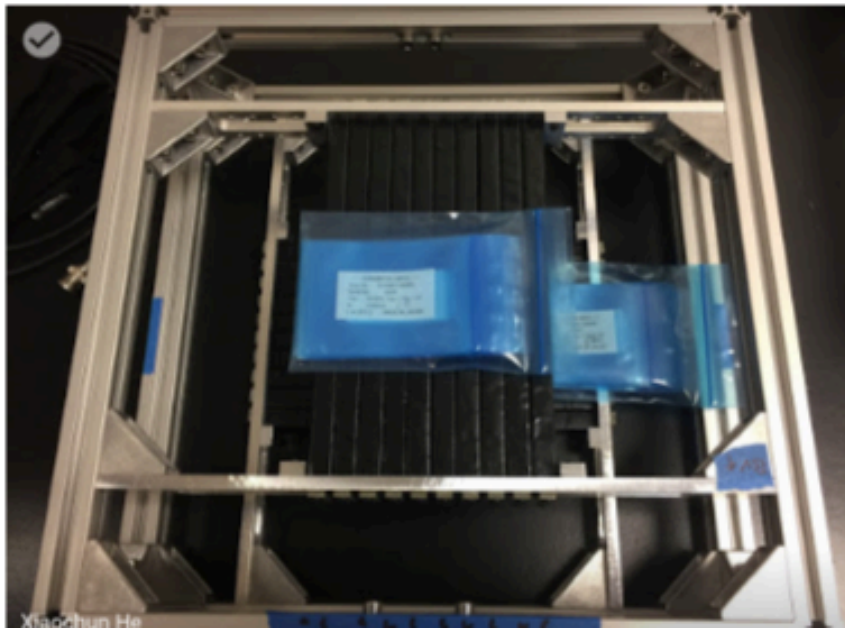




Packing and shipping (II)

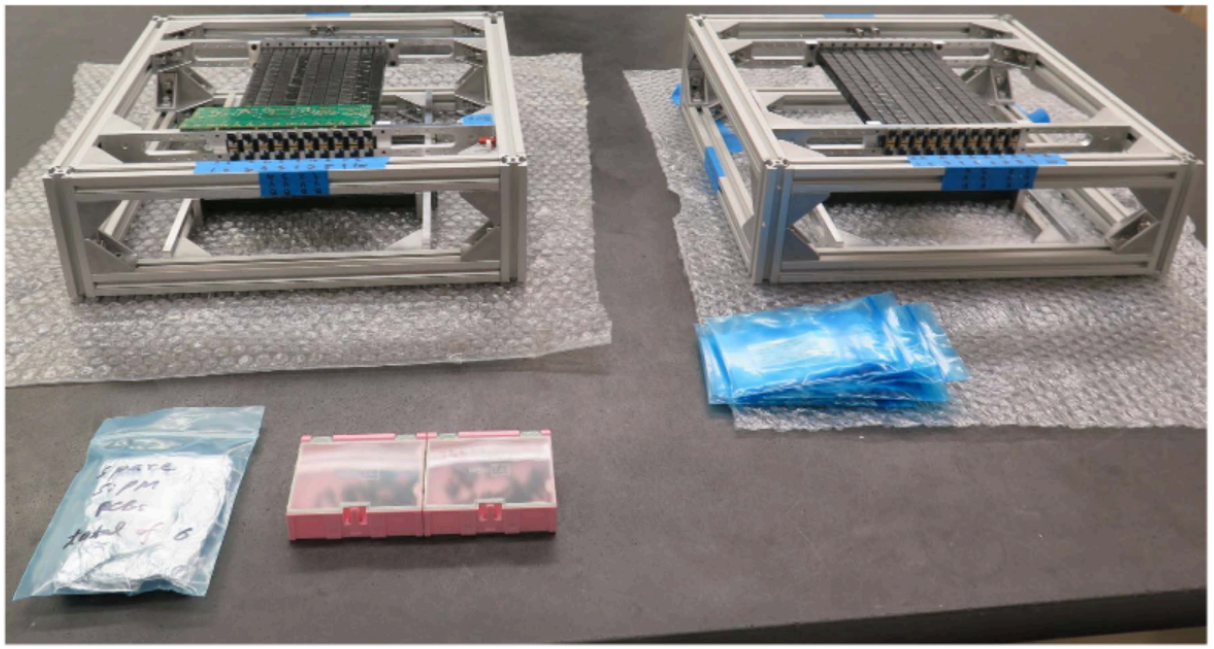






A few slides from Gary Varner

mRICH hodoscope readout
16-APR-2018 -- Updates



Tommy Lam, Emily Lum, Khanh Le, Gary Varner

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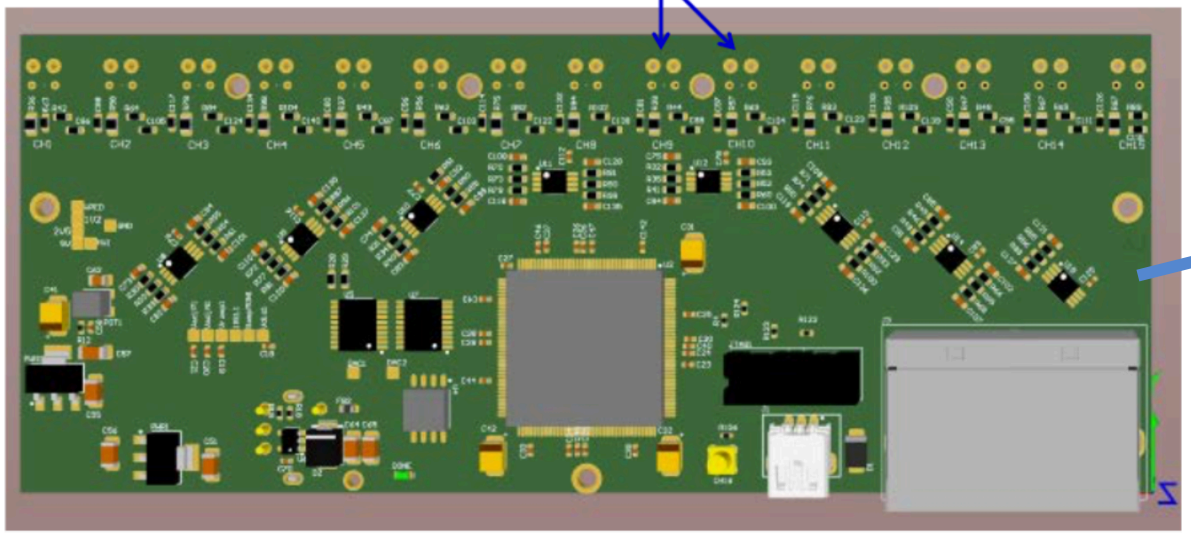
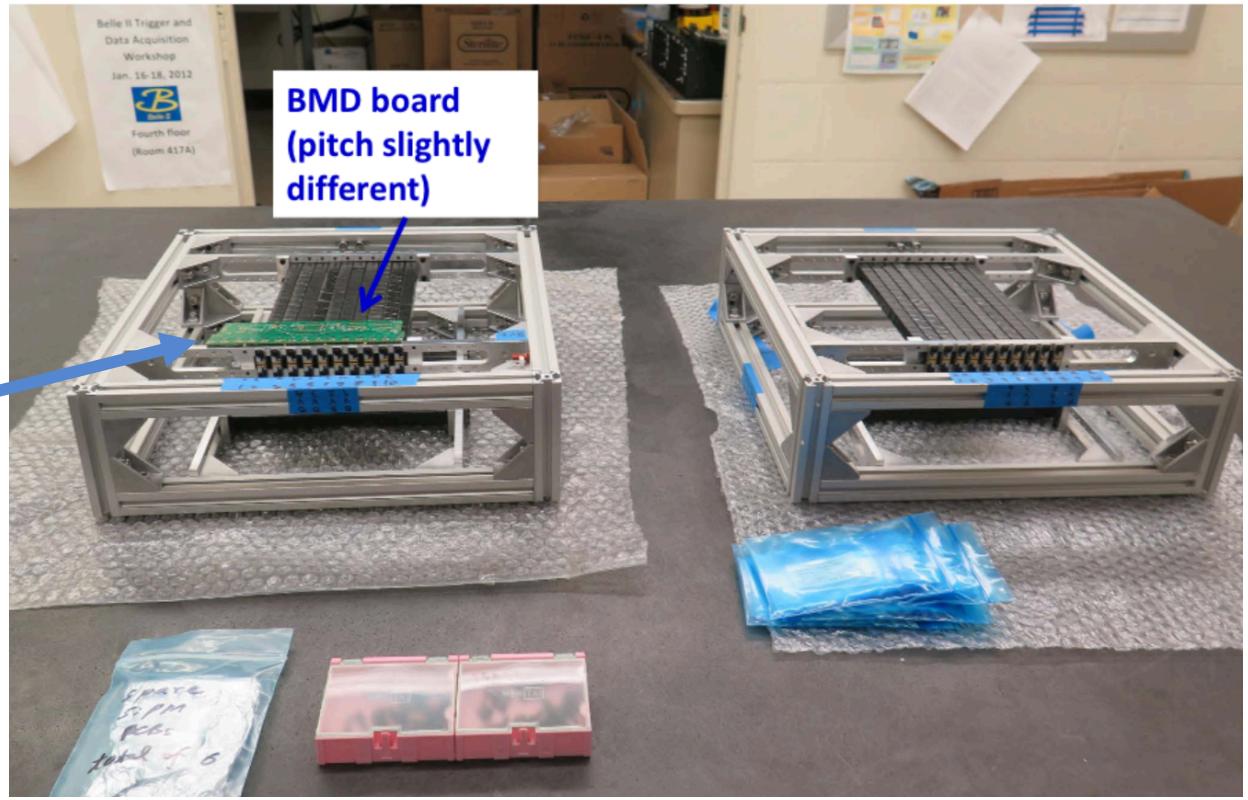
Moving forward with Rev 2 Scint Tracker

- **Hard solder twisted pair to MPPC board**
- **2-pin, keyed headers on PCB**



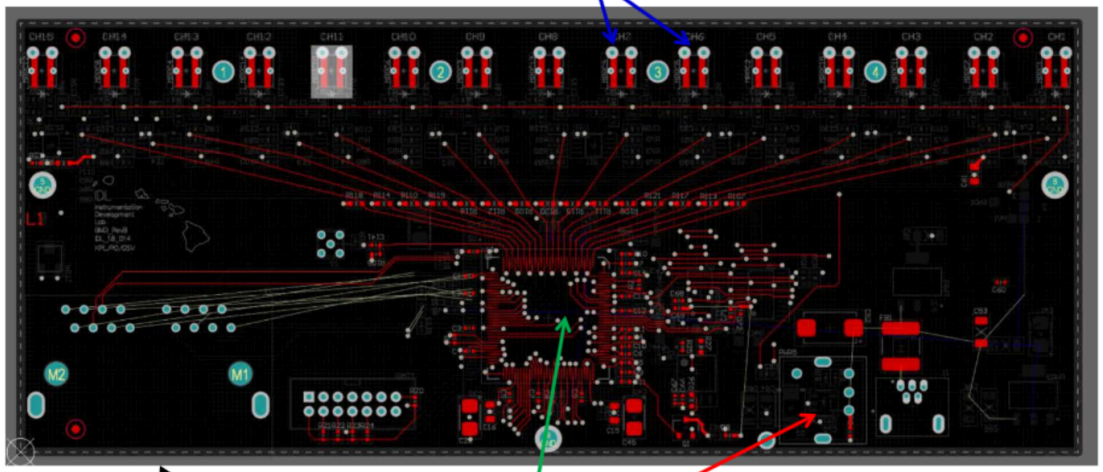
- **USB for power**
- **Simplified trigger uses single RJ-45**
- **Full readout (HMB) uses two RJ-45**

Hodoscope arrived in good shape



Wiring Top

- Hard solder twisted pair to MPPC board
- 2-pin, keyed headers on PCB



- TARGETX ASIC
- USB for power
- Simplified trigger uses single RJ-45
- Full readout (HMB) uses two RJ-45

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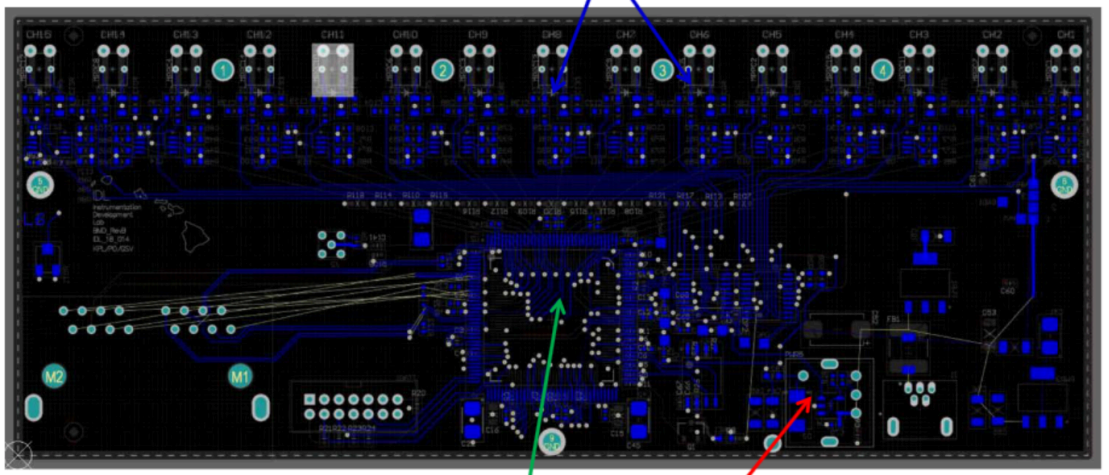
Wiring Bottom

- Bias and AC-coupling circuit
- Single stage amplification



- Spartan-6 FPGA
- Ultra-volt HV on board
- Still need to finish routing LVDS lines to RJ-45s

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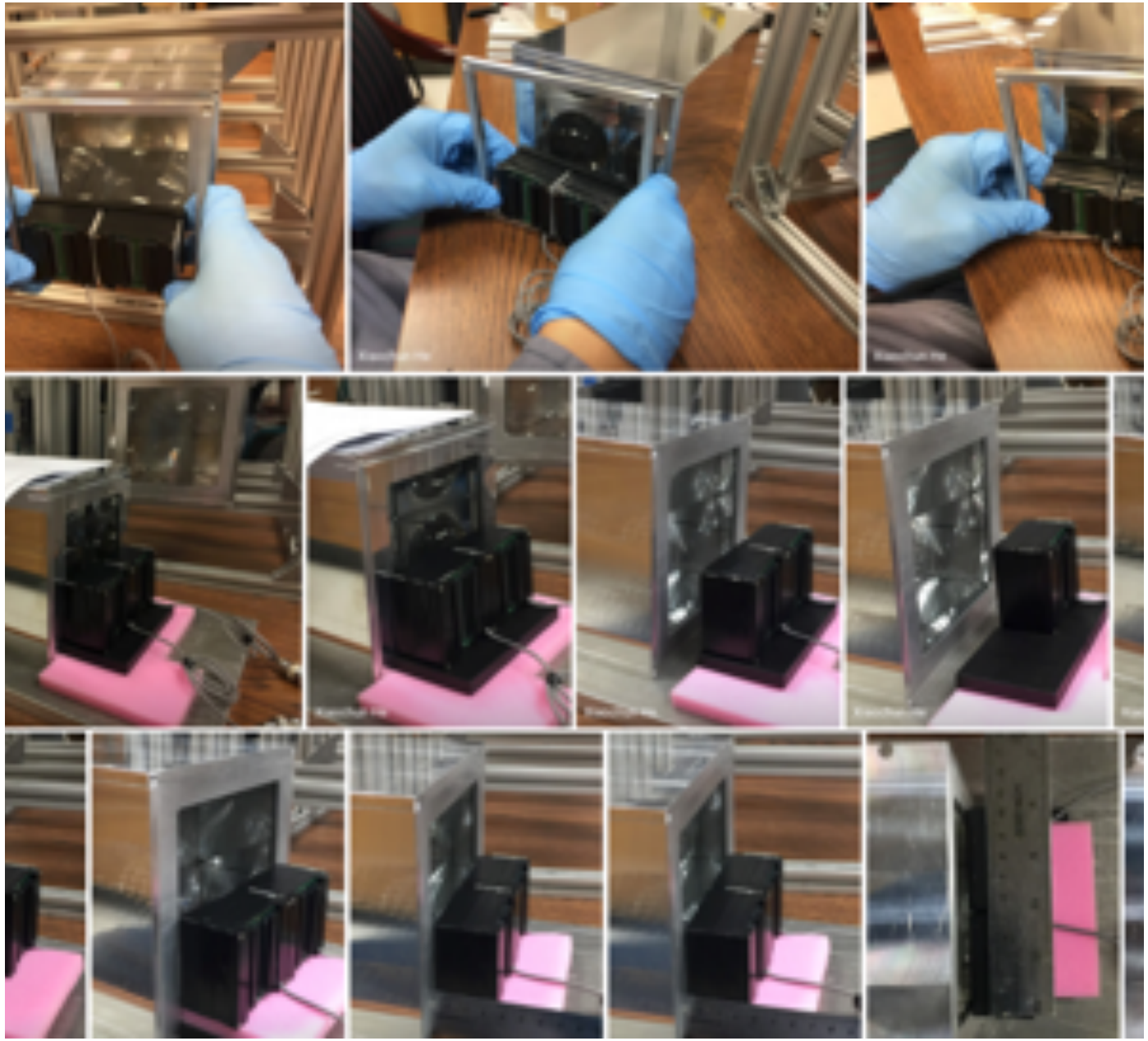
Schedule Update

- **Post Gerber files for review (tomorrow or Wednesday)**
- **Big push also on the MA-PMT readout**
  - **Carrier Card: Emily**
  - **TARGETX Daughtercard: Tommy**
  - **Transition board(s – 2 layout variants): Gary**
- **Manpower plan**
  - **GSU grad student William Roh will visit early May**
  - **Complete assembly/wiring and verification**
  - **Bring working hodoscope back with him**
- **Hopefully will be in debug for MA-PMT readout**
- **Hodoscope to ship in advance → Shipped**

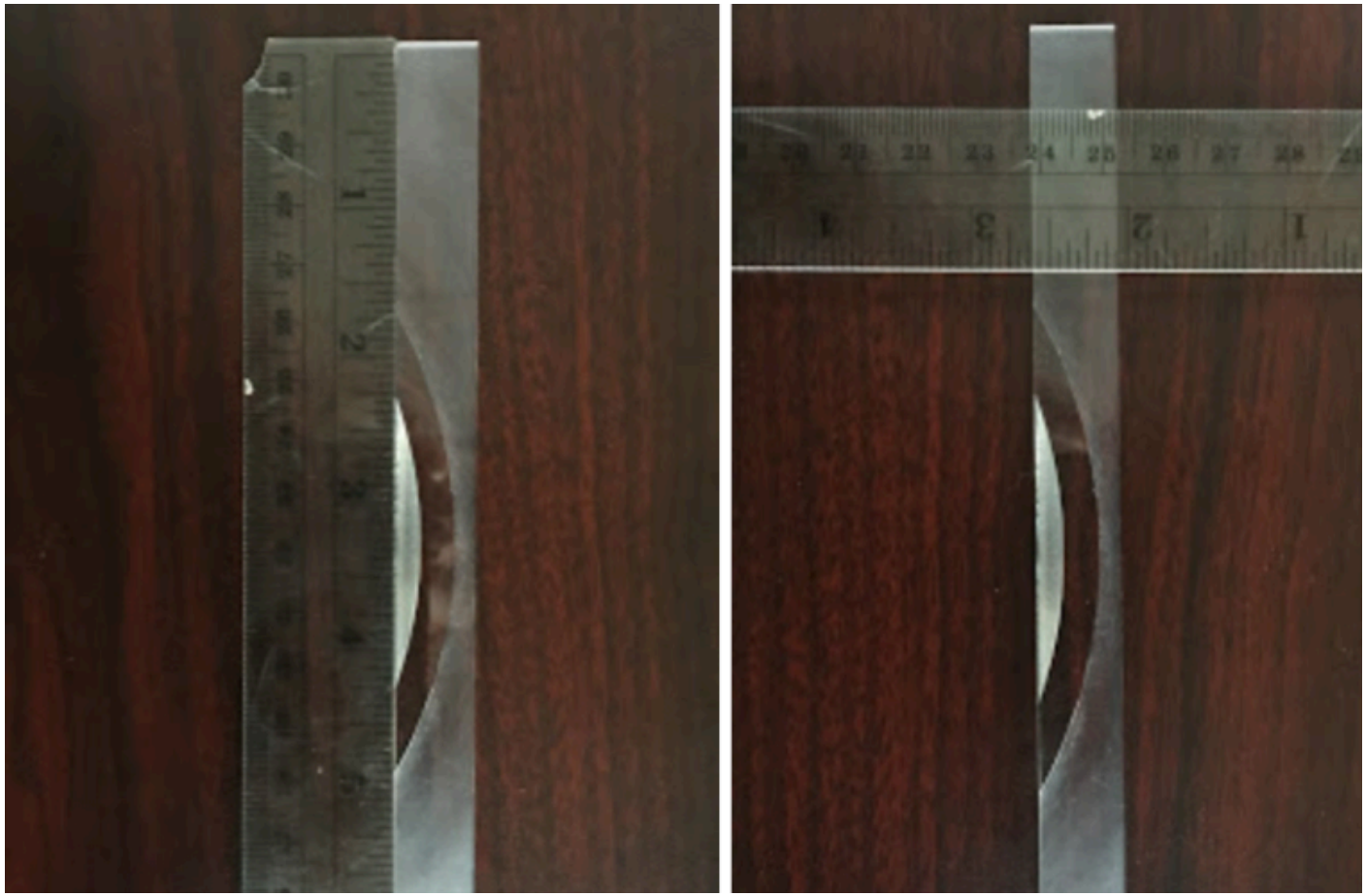
Other progresses on mRICH readout

- Marco is also making progress on his readout development following the mRICH mechanical design.
- We have orders special connectors (with spares) both for the Hawaii and the INFN group to interface with H13700 modules. These connectors should arrive at GSU shortly and will be passed on both groups.



Radiation hardness test of the Fresnel lens plastics

- Thank Greg for leading/working on this effort.
- We have one piece cut from the Fresnel lens we bought from Edmund Optics for the 2nd beam test.
- This will help us on addressing the comment from the R&D committee.



Beam test schedule

- We are still working with Fermilab on the exact schedule. It is roughly between June 25 and July 2. Apparently, there are a few group running tests during this period.
- William Roh plans to go to Hawaii and helps on the readout development in early May (for about two weeks).