FST Test Stand

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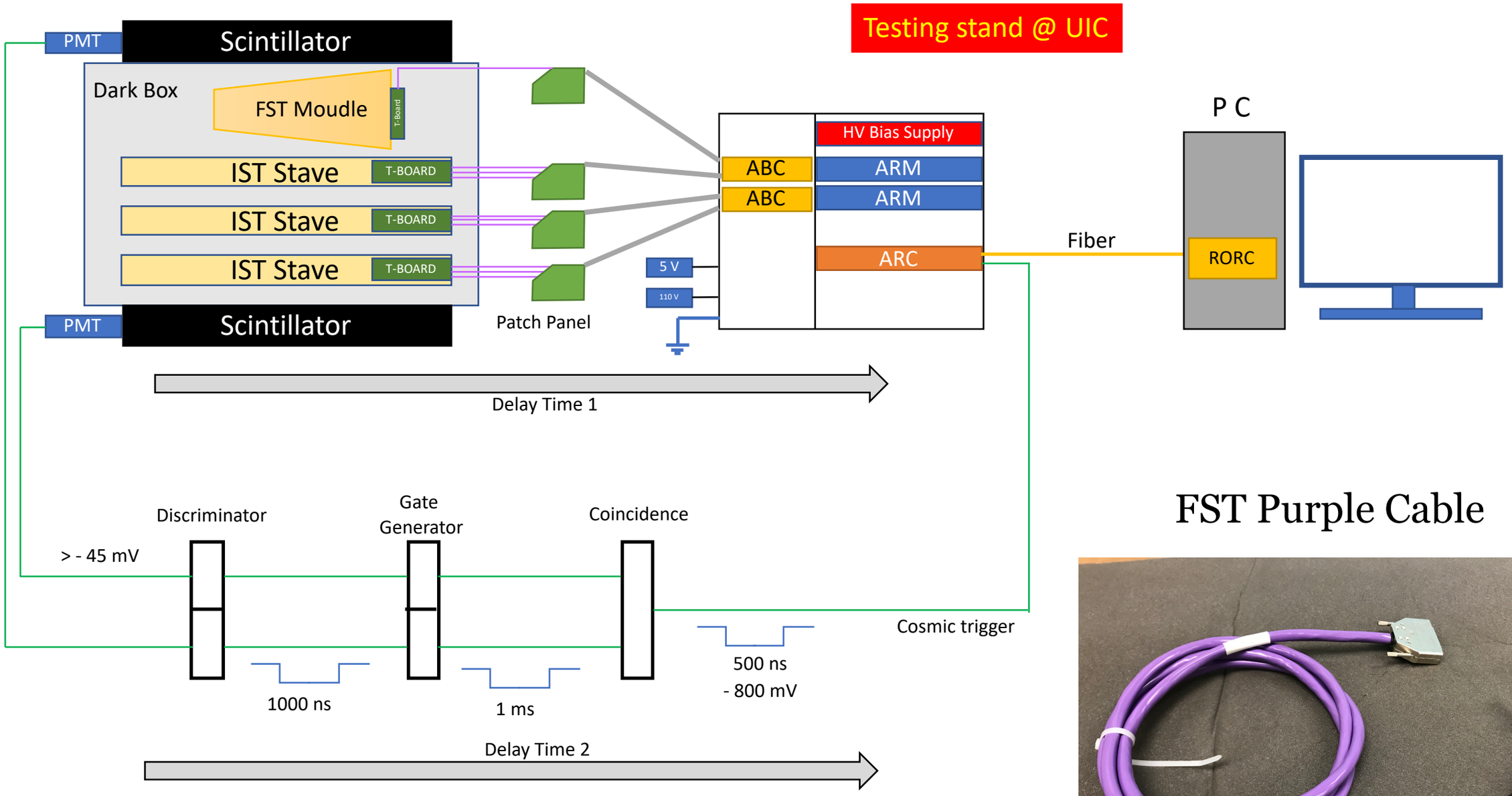
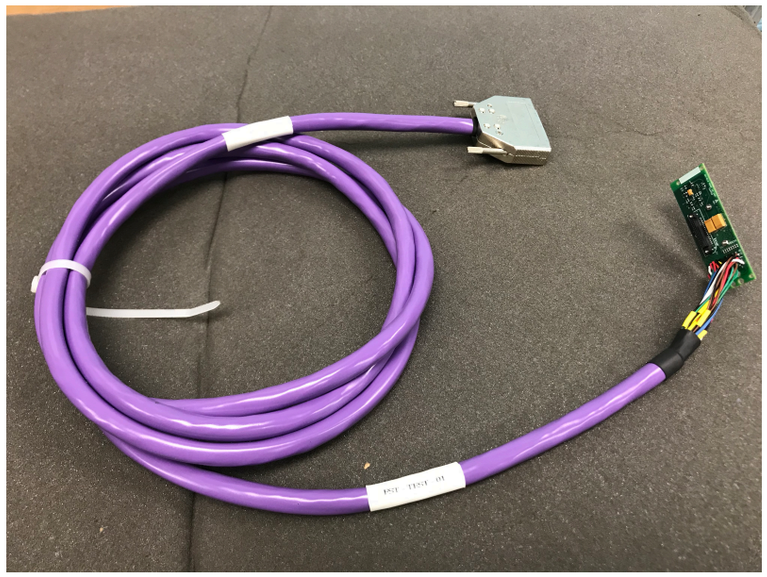
Overview

- Cosmic Test Stand @ UIC
  - Verify the initial response of APV chips before sensors are mounted => pedestal and noise.
  - Evaluate the performance of the sensors after sensor are mounted => signal/noise ratio.
  - Position-dependent hit resolution and efficiency.
  - Investigate the uniformity of response of the sensors in regard to the varying effective width (from 100 micron to about a mm).
- Laser Test Stand @ UIC
  - Precision position-dependent hit resolution and efficiency
  - Investigate the uniformity of response of the sensors in regard to the varying effective width (from 100 micron to about a mm).
- Test Stand @ BNL
  - QA test after modules shipped to BNL.
  - A final checkout of the FST modules (3*12 wedges) before installation into STAR.

Cosmic Test Stand @ UIC

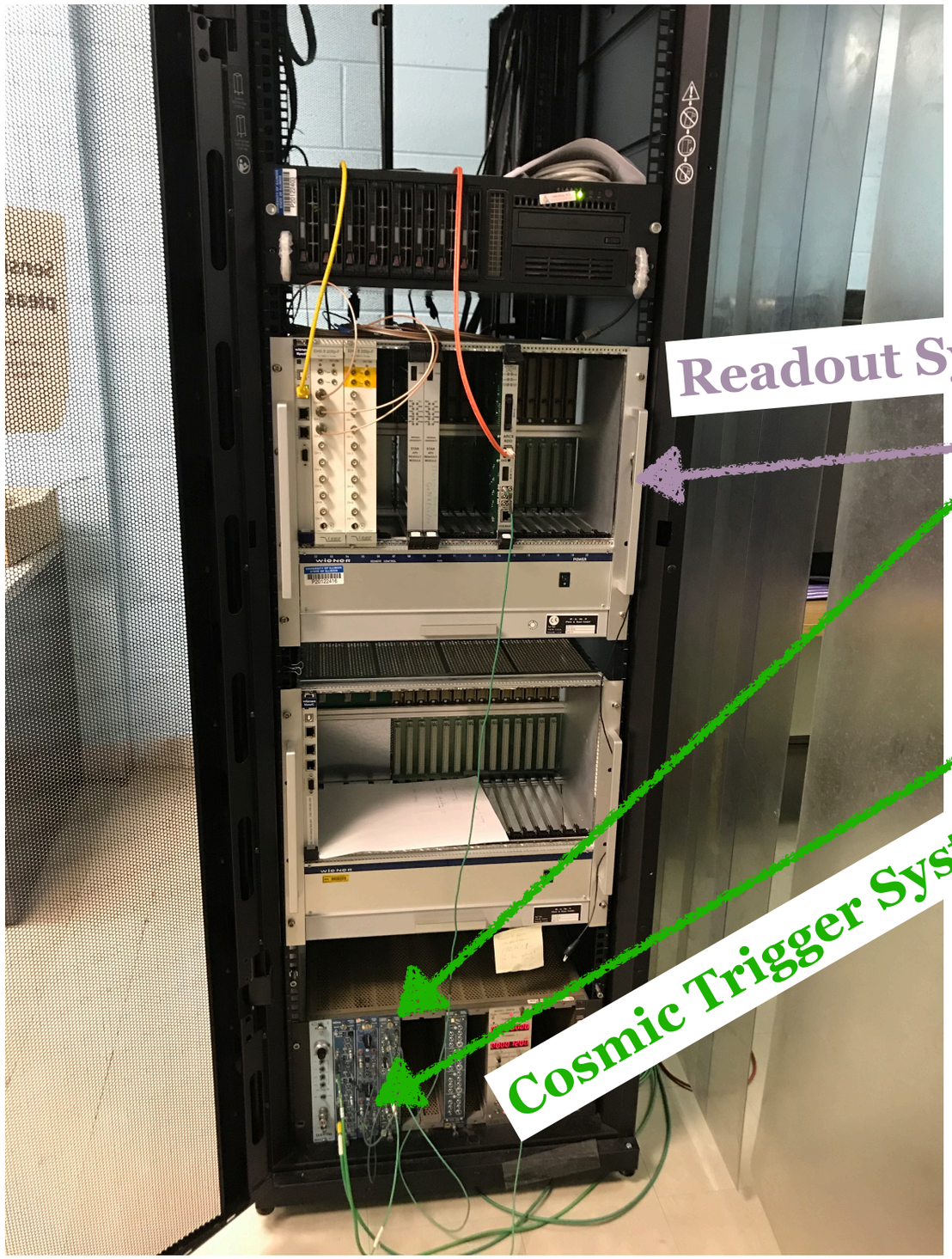


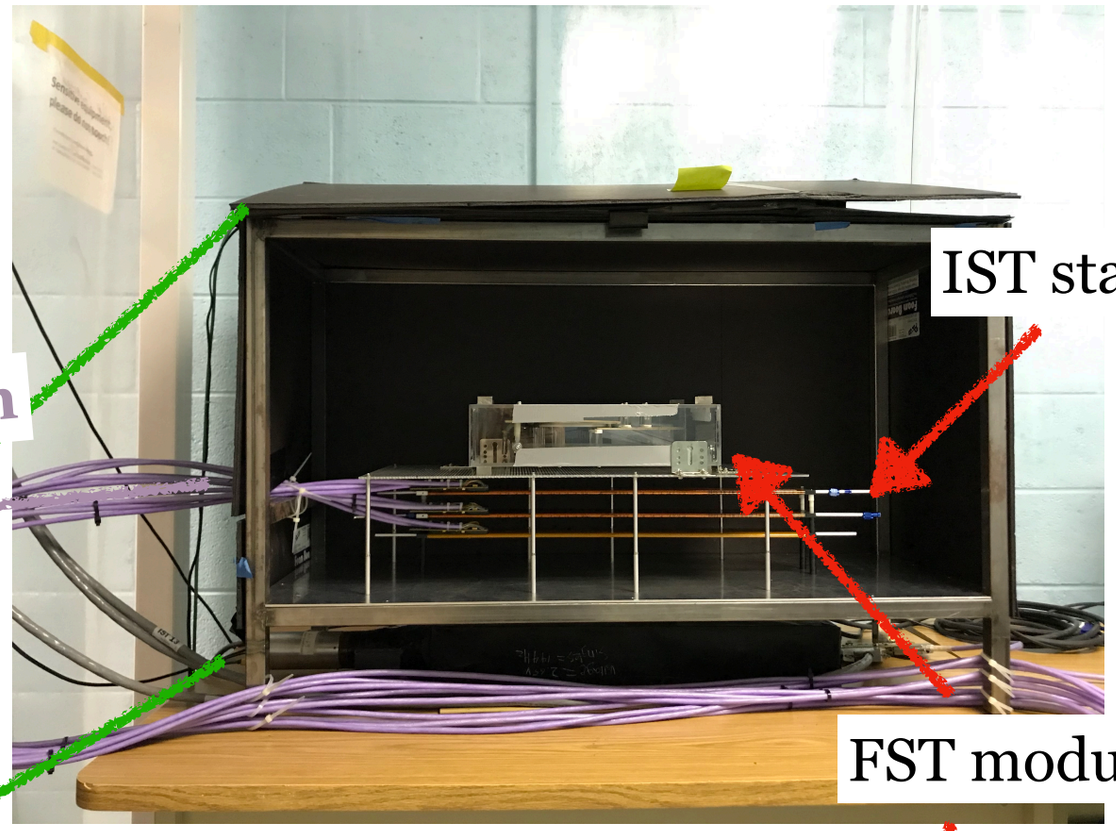
FST Purple Cable

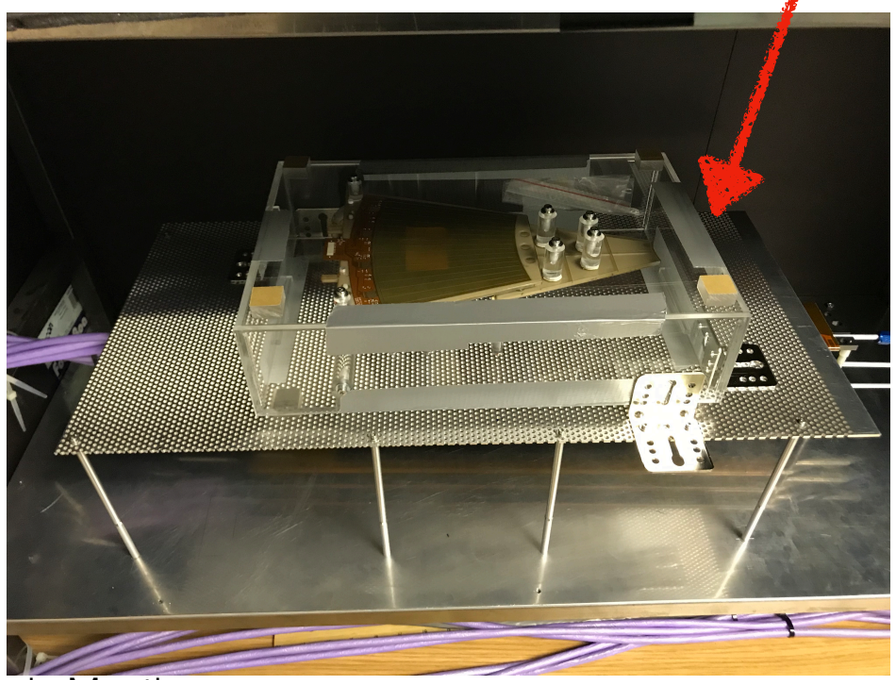


From Mike Capotosto

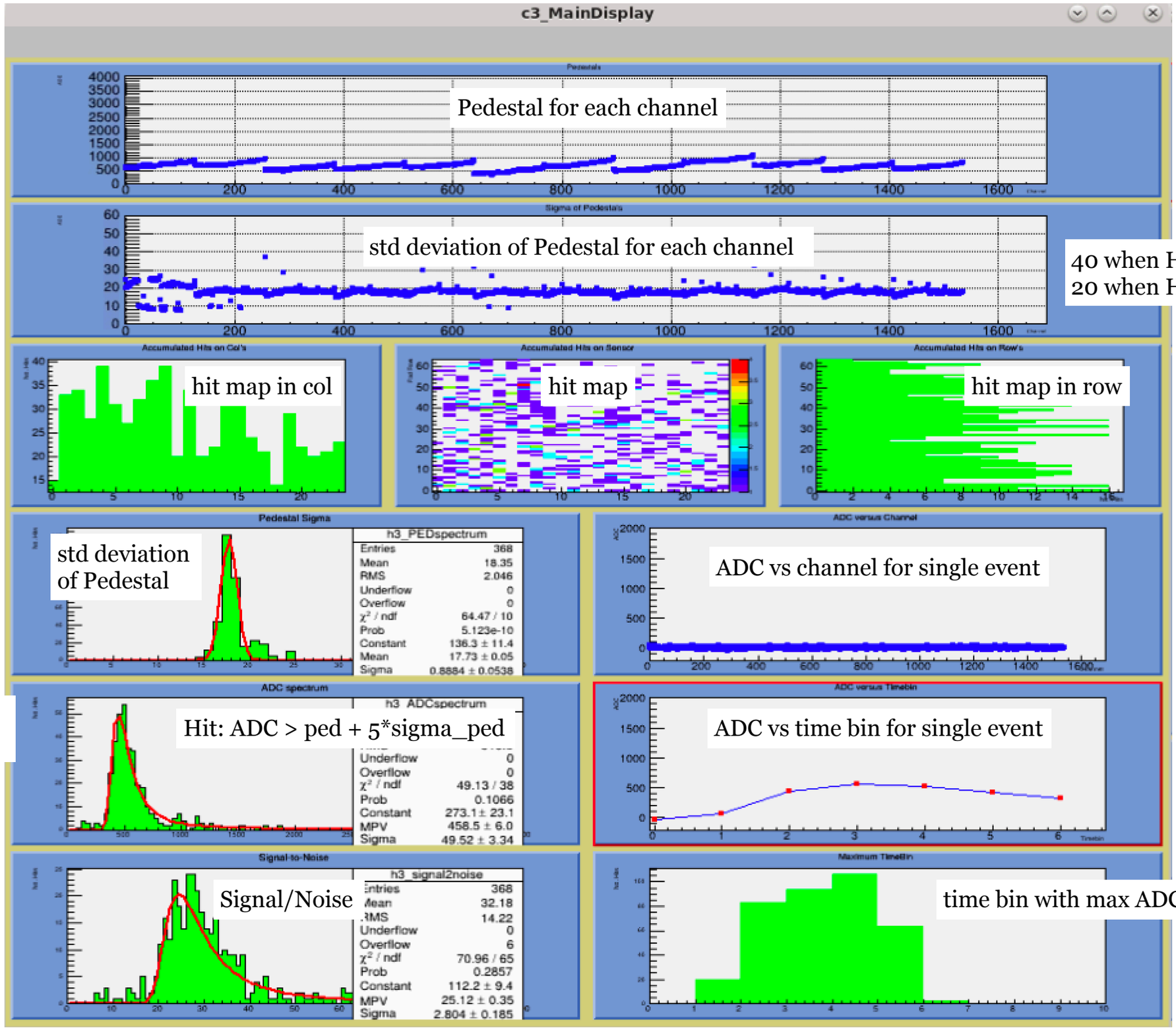
Cosmic Test Stand Tracking Setup @ UIC



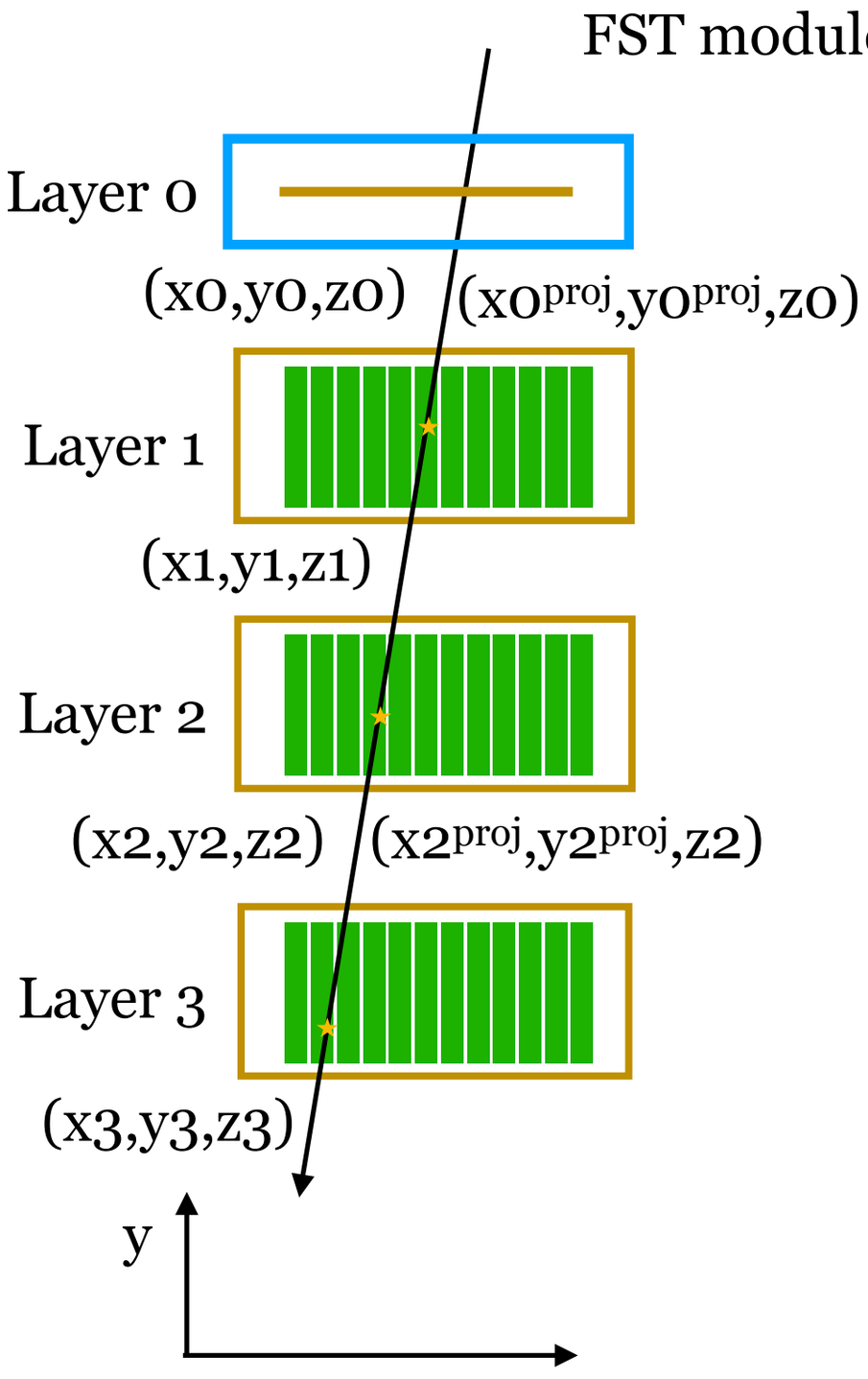




Display for IST Stave

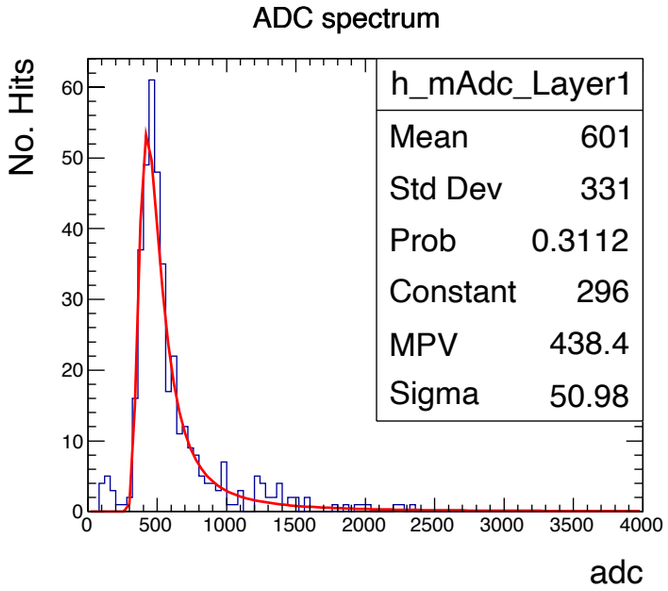


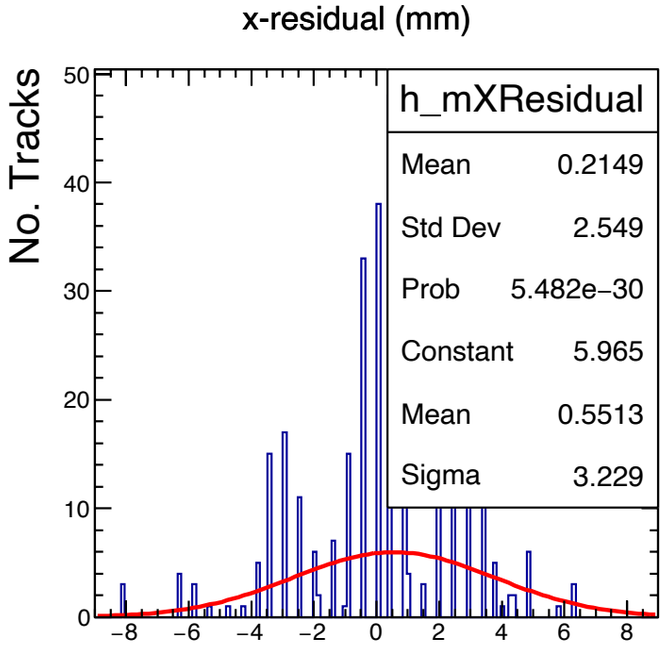
Tracking Method with FST

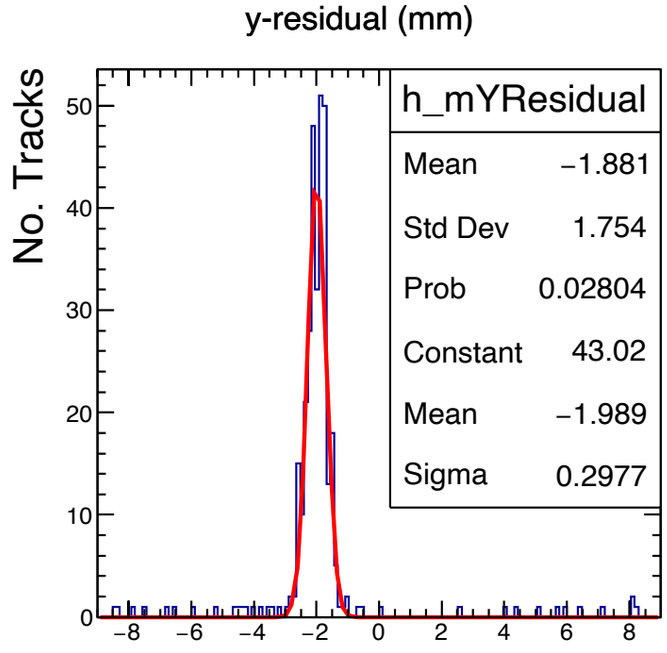


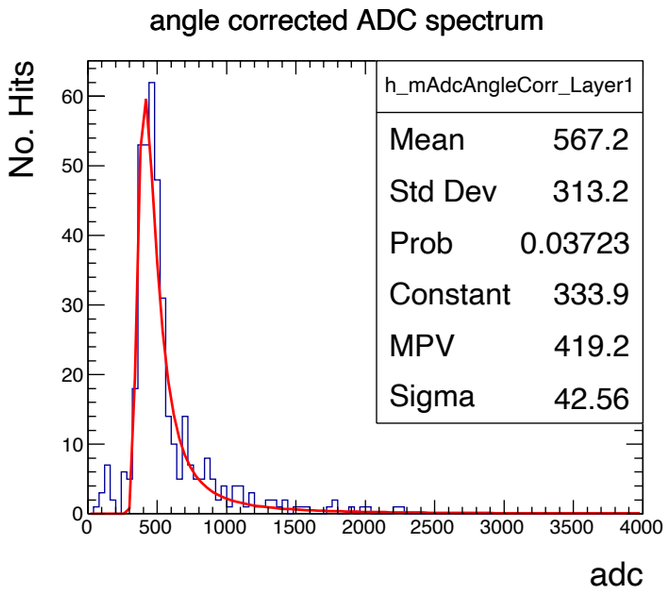
- Find all clusters in Layer 1 & 2 & 3
- Reconstruct track with the cluster in Layer 1 & 3
- Project to Layer 2 and compare with the cluster found in Layer 2
- If matched, considered as a valid track
- Project this track to Layer 0 and compare with the cluster found in Layer 0
- Difference between projected track position and cluster position (y_0-y_0^{proj}) => estimate tracking resolution
- NumOfHitAtFST/NumOfValidTrack => tracking efficiency
- Rotate FST module by 90° and repeat the previous procedures => IST stave has a better resolution in y-direction

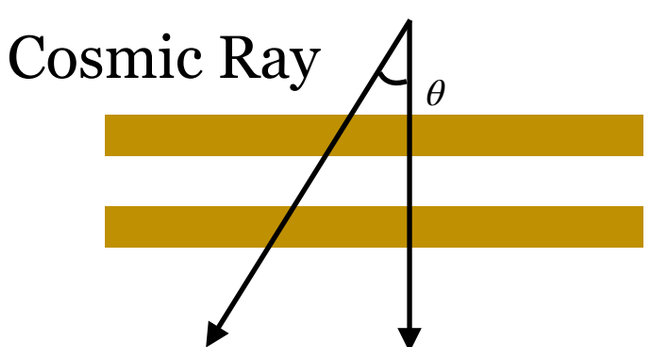
Tracking Display of IST







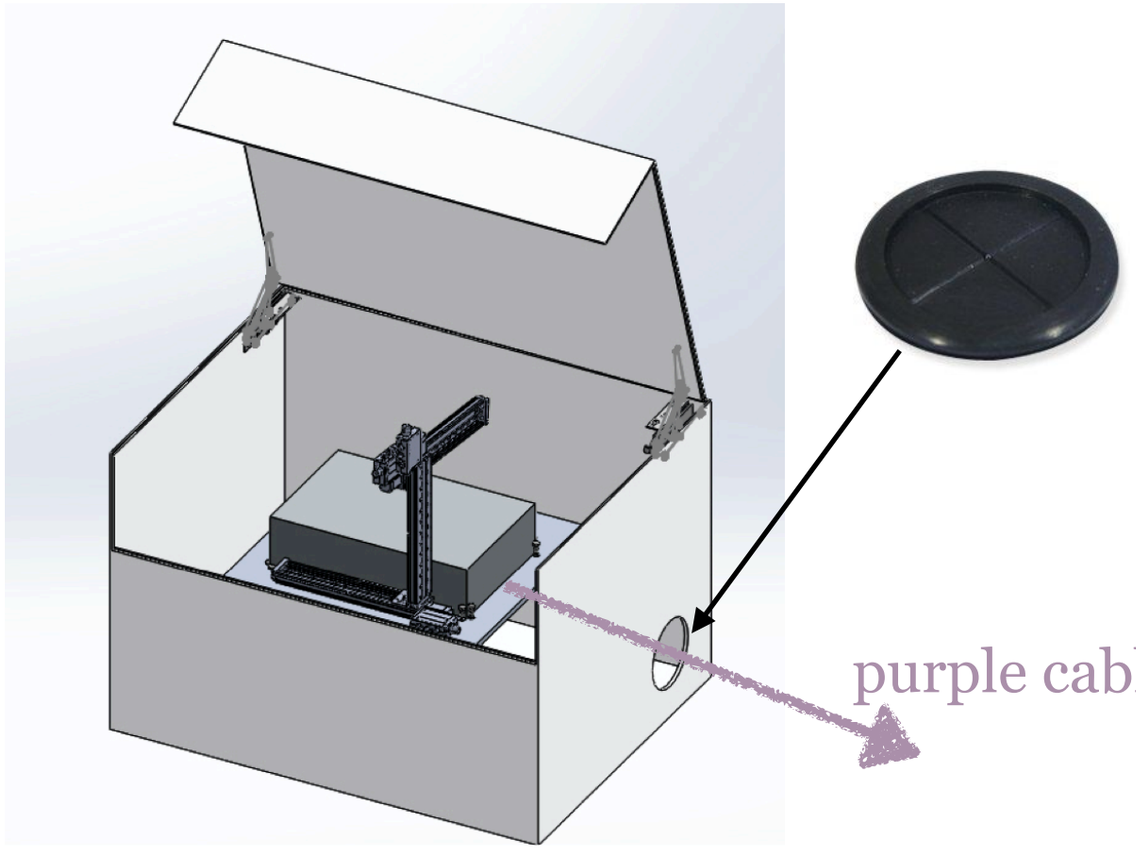


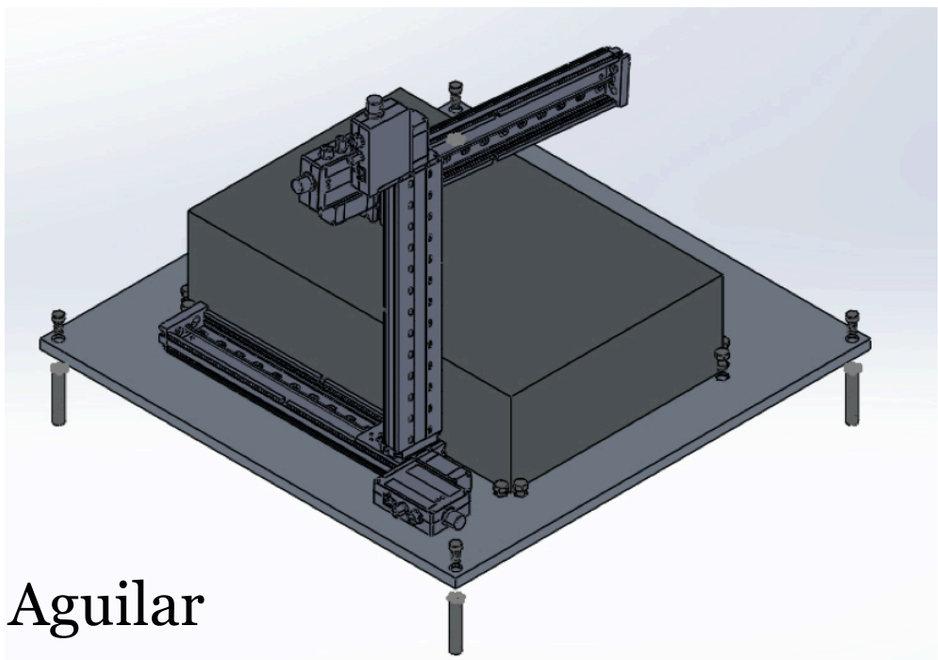


- Tracking software has been updated with UIC test stand setup.
- A misalignment is observed in y-Residual.

Laser Test Stand @ UIC

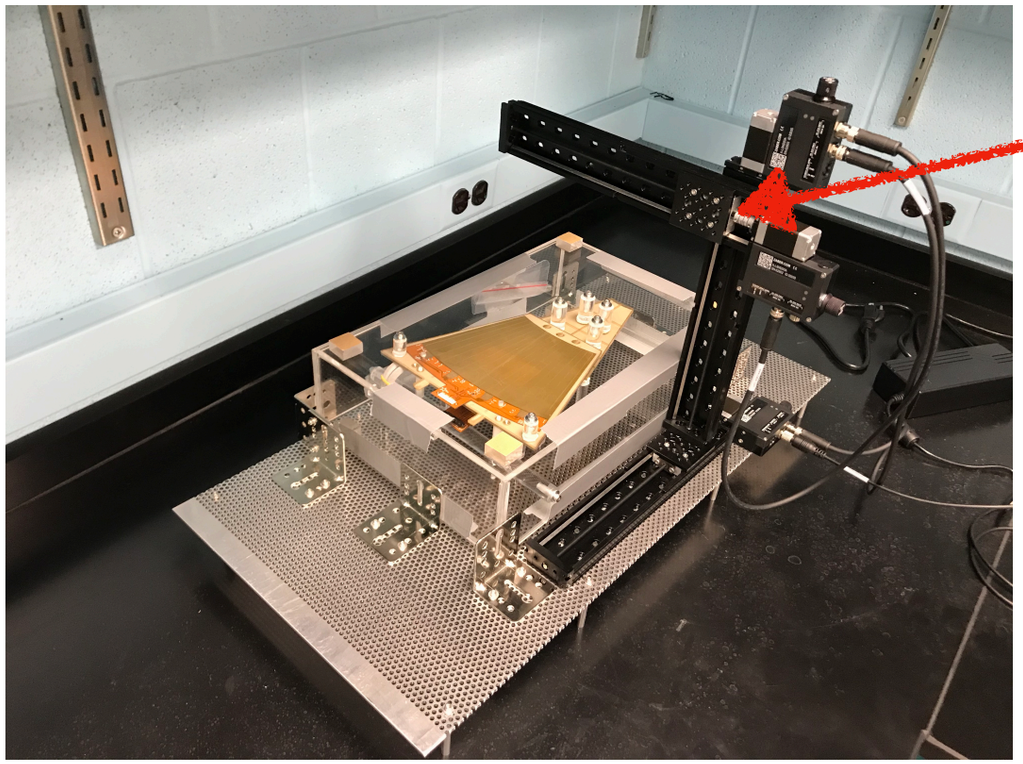
- Precision position-dependent hit resolution and efficiency.
- Investigate the uniformity of response of the sensors in regard to the varying effective width with better precision.
- The dark-box will be finished next week.
- The insertion of cables will be done through the hole on the side with a cover.



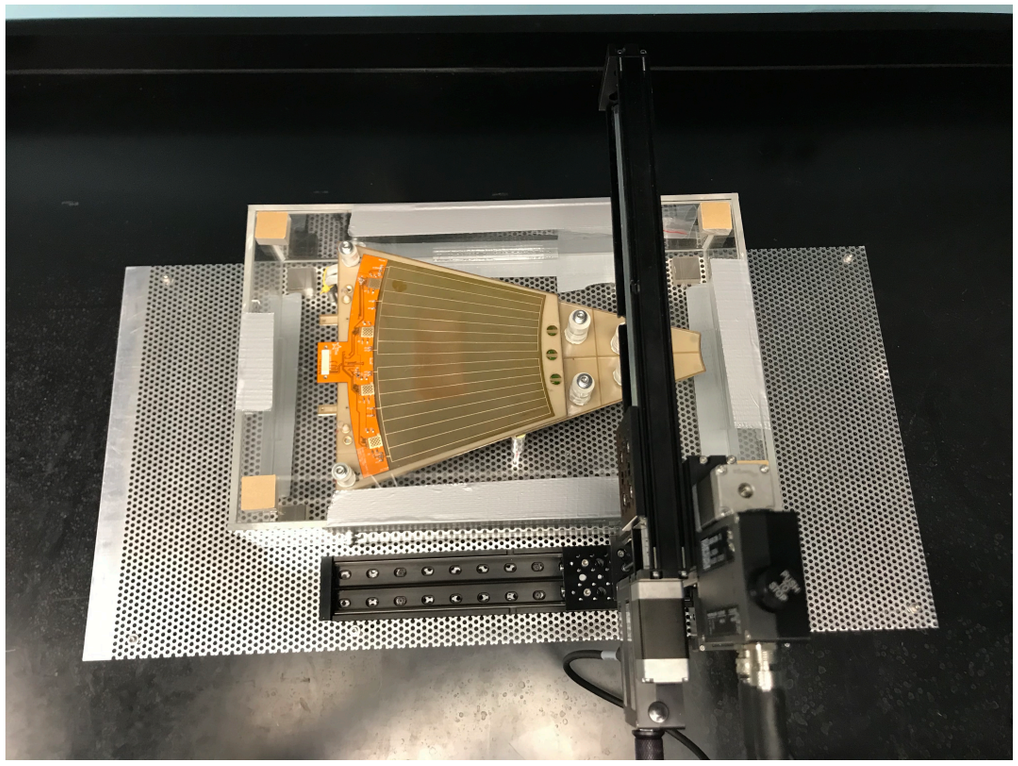


by Andres Aguilar

Laser Test Stand @ UIC



laser source will be attached here



- Laser source: 25 μm diameter laser spot & wavelength 1060 nm
- x-y-z stepping motor: 20 cm*20 cm*20 cm & micro-step size 0.047625 μm & repeatability < 3 μm
- The motors will be controlled by the same computer used for DAQ.
- The sensors will be tested over its entirety but also checking the variance over local areas.

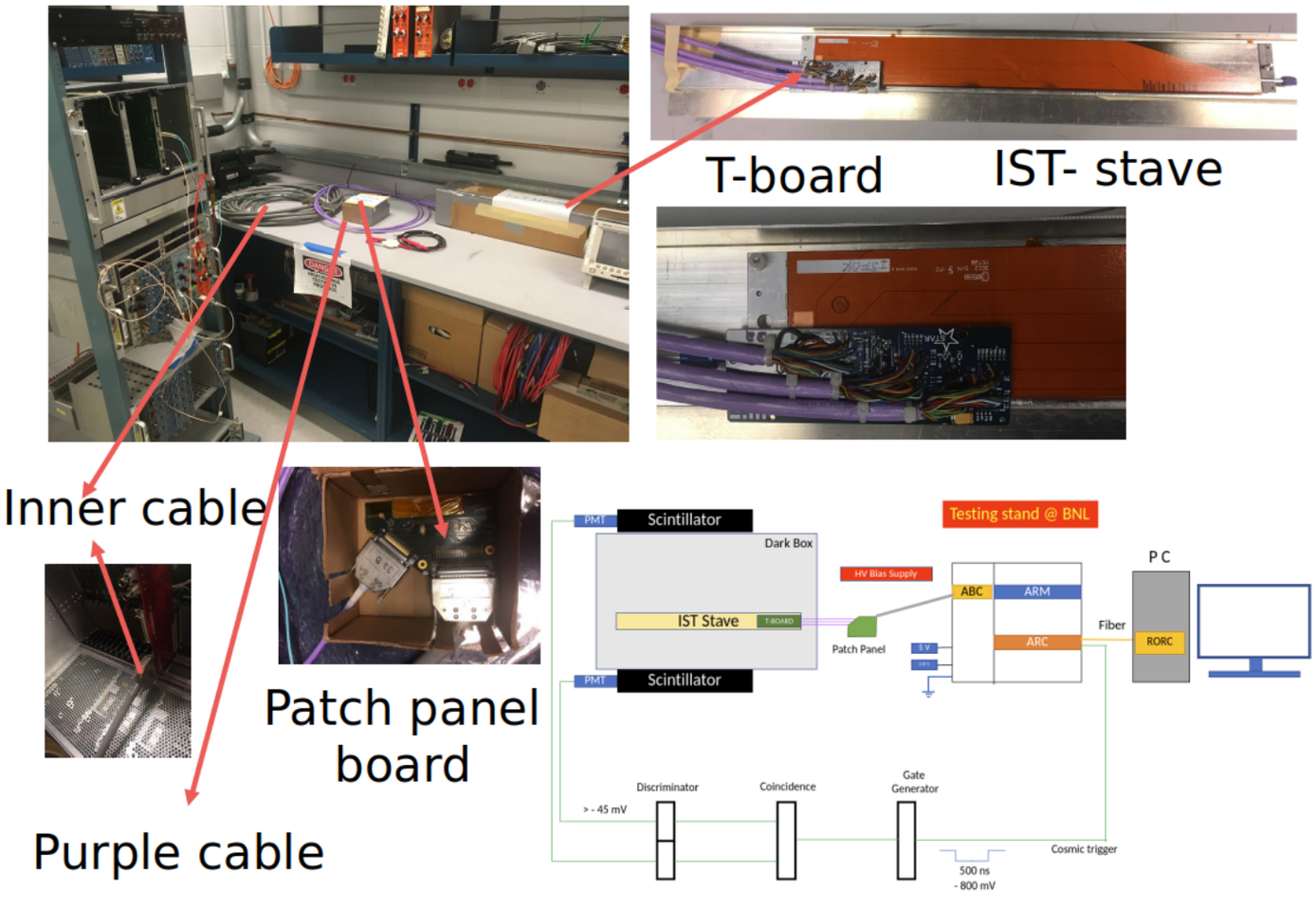
FST Test Stand @ BNL

*Prithwish Tribedy, Flemming Videbaek, and Yu Hu will work on this.

The FST testing stand at BNL will be used to do the following test:
1. QA test of FST modules as they are shipped.
2. Before the installation on STAR, a final checkout of full modules (3*12 wedges) as they are mounted on the support structures. Verification of APV chips & sensors after setup.

Current status & future plans @ BNL

- One IST stave has been used to build a testing stand in order to get familiar with the DAQ system and detector QA procedure.
- A cosmic ray trigger has been set up with a set of scintillators and PMT.
- Will check the pedestal for IST and compare the result with the UIC group.
- Consider to upgrade the trigger system with a pair of larger scintillators.
- Will study and test the FST prototype as soon as it is shipped, then compare it with the UIC group.

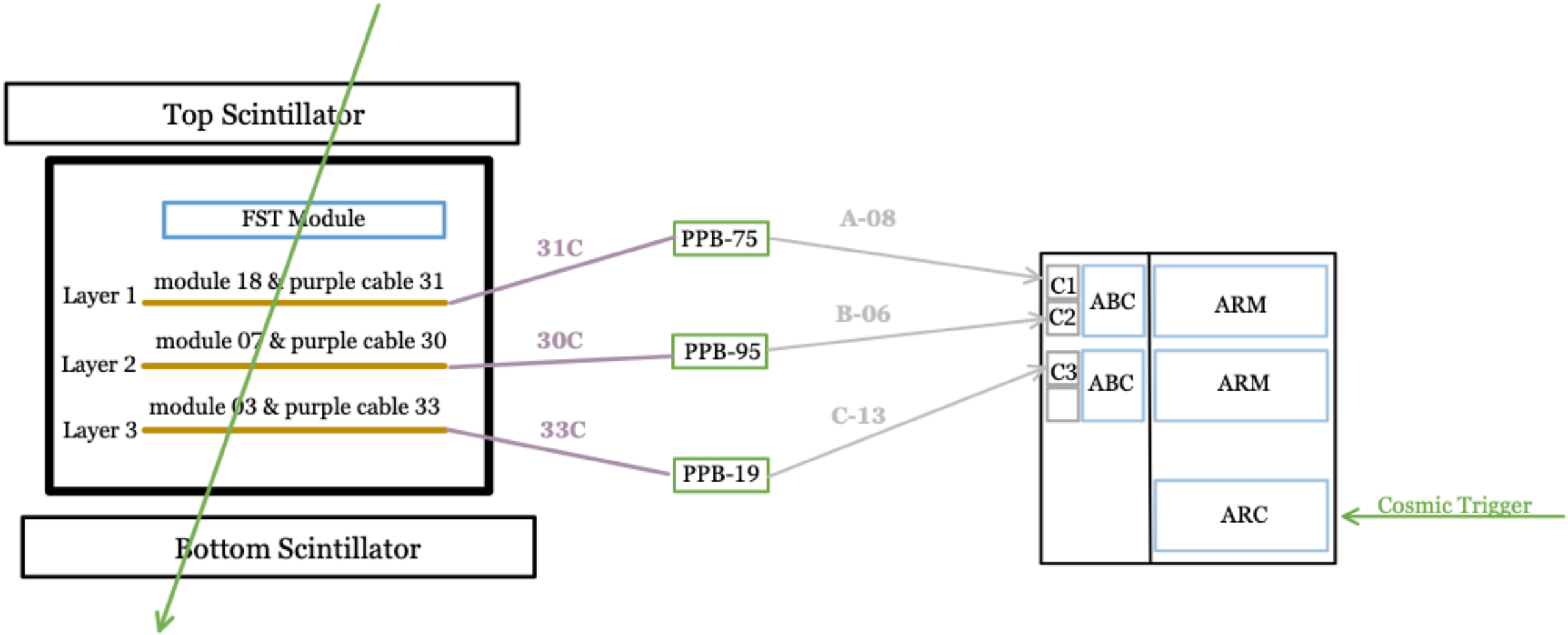


Summary and Outlook

- Cosmic Test Stand @ UIC
  - In principle ready to go with possible further improvement.
  - FST tracking software will be ready before sensors mounted.
- Laser Test Stand @ UIC
  - The dark-box will be finished next week.
  - Will use the same software as cosmic test stand.
- Cosmic Test Stand @ BNL
  - Will check pedestal and noise and compare to UIC.
  - Will try to read out cosmic signal soon.

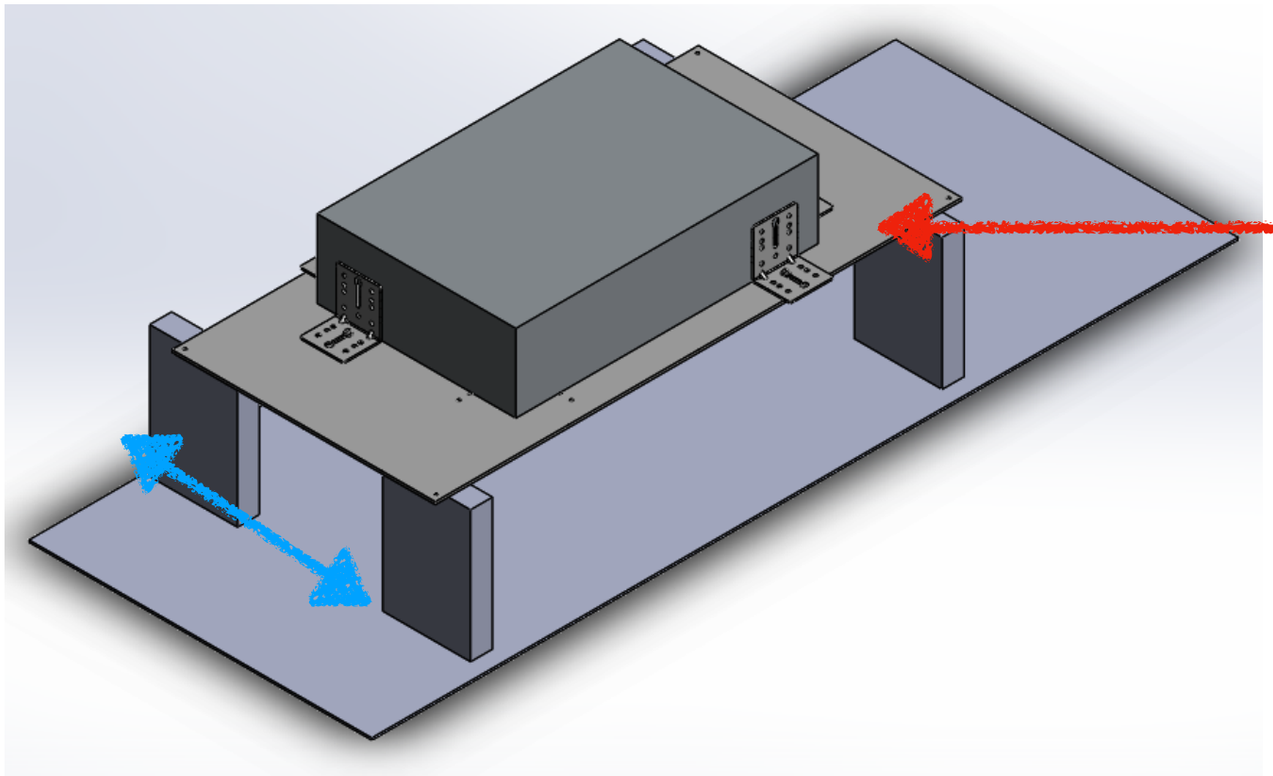
Backups

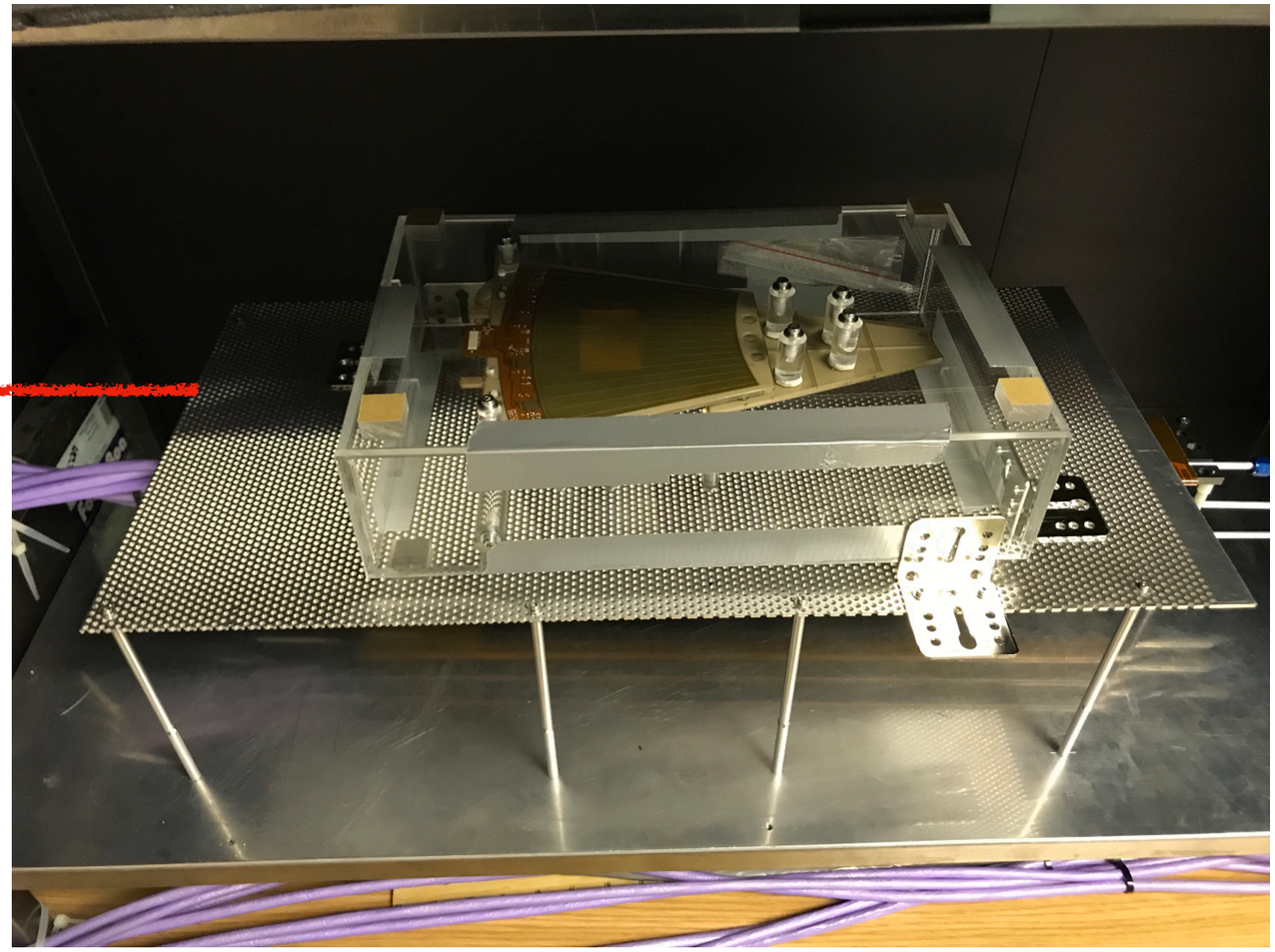
Cosmic Test Stand Tracking Setup @ UIC



- A group of tracking sensor has been identified (group C of each IST stave).
- Cables are connected to match the tracking code.
- 3 IST staves are using for track selection.

FST Cosmic Test Stand v2.0





- Current test stand is capable for FST cosmic test.
- Updated test stand will be more convenient for position dependent tracking resolution & efficiency study.