



Progress on recommendations from previous meeting

M. Rominsky

Annual Test Beam Committee Meeting

12 November 2018

Responses to Recommendations

- **Continue to prepare and plan for a spike in requests at the FTBF during the next long CERN shutdown. The period during 2019/2020 will be crucial for the LHC HL-LHC upgrades, and a time where the CERN facility will be unavailable.**
- **Continue to track the number of papers, conference talk, conference proceedings and internal notes generated based on data taken at the FTBF, to accurately account for the impact of the FTBF**
- **Work with ATLAS and CMS to ensure that the requests for beam from those experiments are prioritized by the experiments.**
 - Thank you for the comments, we'll continue to talk to groups and coordinate to prioritize activities

Response to Recommendations

- **Develop a clear accounting for the actual fraction of protons that are sent to the facility compared to the total available to the physics program. Ensure that this fraction is used to describe the impact of the FTBF on the physics program (the “proton tax”) rather than the maximum 10%**
 - We are working the accelerator division to calculate this. At the moment, we don't have a concise accounting. Last year we worked with AD and our users to make sure we were out of the timeline whenever we weren't running. This year, we're supporting the NOvA test beam, and next year T1039 will run.

Response to Recommendations

- **Work with the experiments to develop a contingency plan if the amount of beam time is reduced**
 - We currently have weeks open this year and we're limiting people to 12 hours per day unless they can prove they have the need or shifters to staff it. We would slot groups in that need time in these spaces.

Response to Recommendations

- **Write the standard paragraph to be included in papers and conference proceedings and hand it to the experiments when they arrive on site.**
 - This year, the Fermilab Technical Publications group has developed a paragraph and an easy to understand website on how to give credit to any Fermilab facility (including Test Beam) and provides instructions on getting a Fermilab technical publications number. We've passed this information along to users and will continue to remind them throughout the year.
 - <http://techpubs.fnal.gov/>

- Questions? Comments?



Annual FTBF Report for 2018

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FY18 Annual Report

- General statistics
- Specific users
- Facility projects

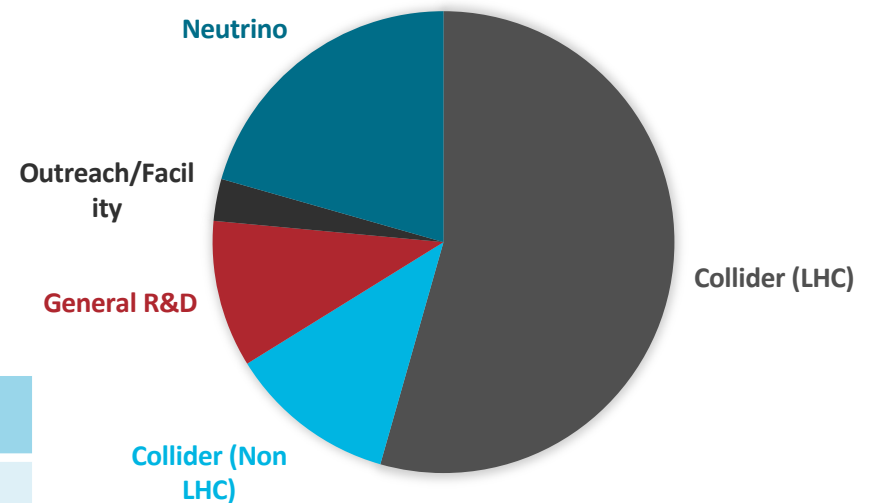
Running Conditions

- This year, the AD did well with minimal downtime to users
 - 2 day downtime for Septa issue
 - 5 day downtime for a magnet change out
- There were a few < 1 day downtimes for general maintenance, and these would often coincide with our changeover days.
- We supported 20 experiments plus the EDIT school.
- Smoother installations
 - Maintained a spreadsheet of users coming – helped with training prep.
 - Had space setup for staging. Users took extensive advantage of that.

Summary of Users - Research groups

- This year, a majority of users were from LHC and other collider groups

FY18 USER GROUP BY RESEARCH FOCUS

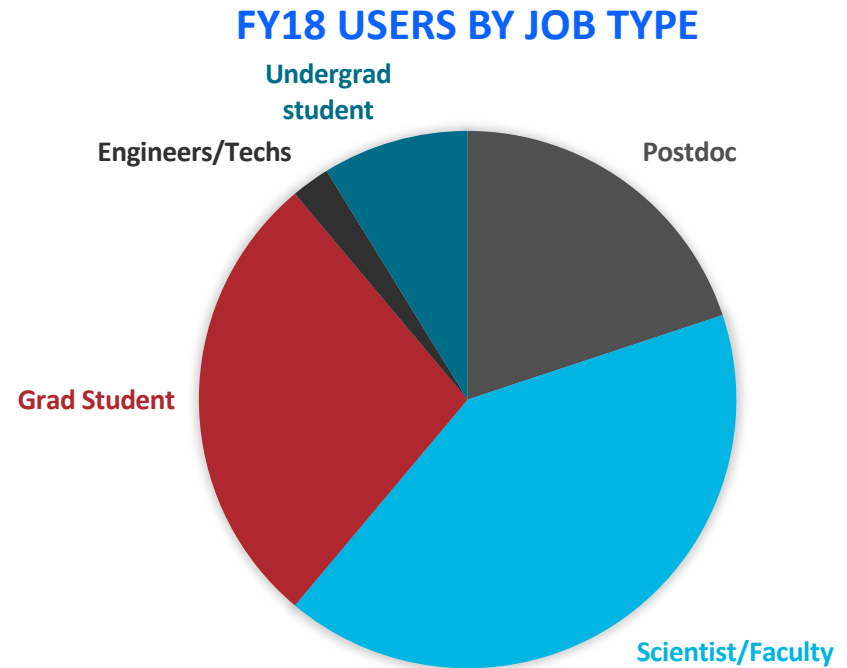


Experiment	Beam weeks
Collider (LHC)	37
Collider (Non LHC)	8
General R&D	7
Outreach/Facility	2
Neutrino	14
Total	68

Summary of Users – People

- A variety of professional classes came to the test beam
 - These numbers do not include EDIT

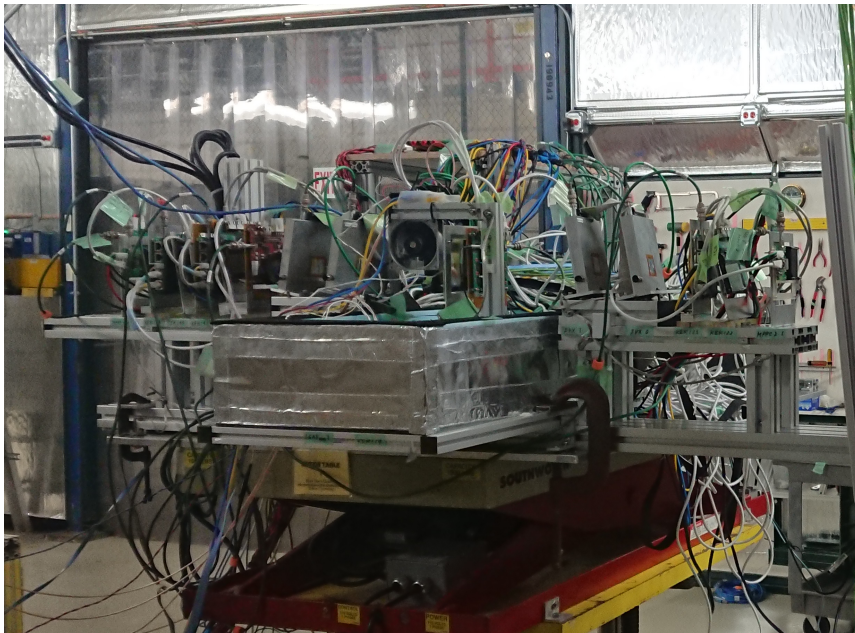
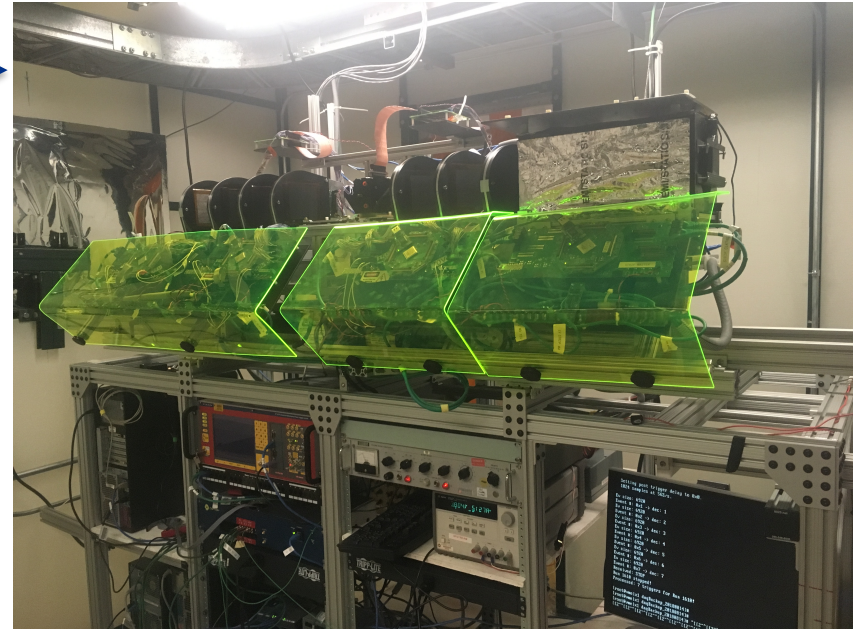
Professional group	Number
Undergraduate students	19
Graduate students	60
Postdoc	43
Scientist/Faculty	89
Engineer/Technician	5
EDIT Students	48
Total	264



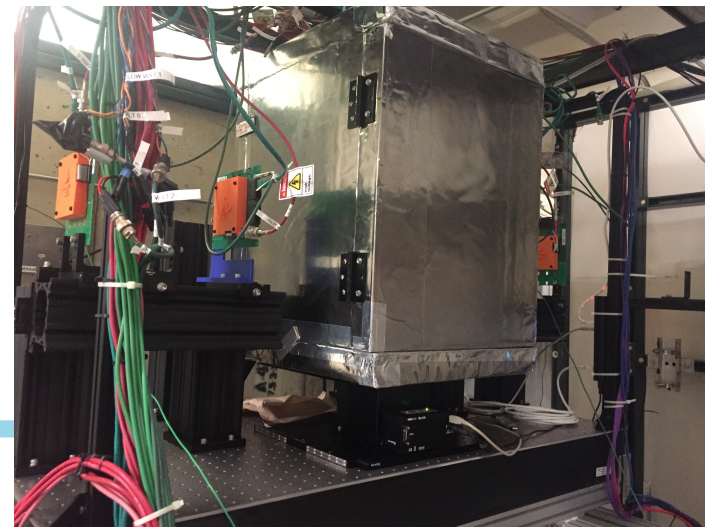
LHC: CMS and ATLAS

- Both experiments did a variety of sensor and ROC tests using telescopes

CMS →

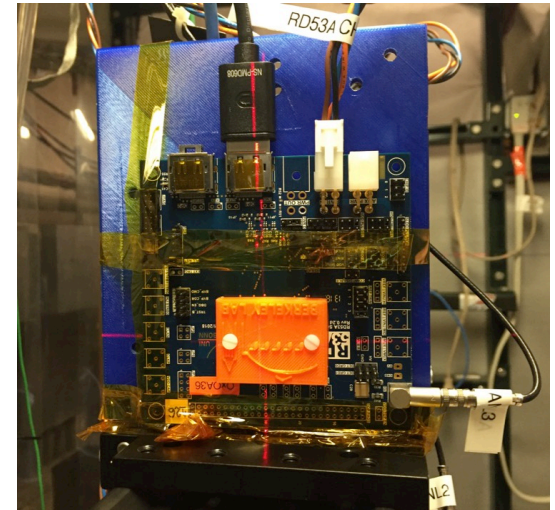


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ATLAS Telescopes →

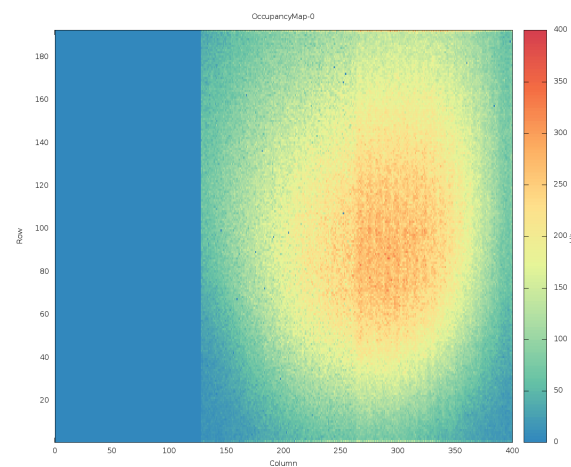
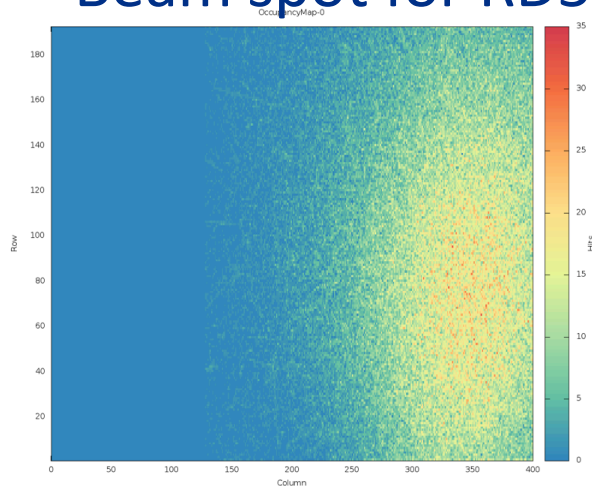


Sensor Testing

- A large variety of sensors, both irradiated and not, were tested in these telescopes
 - 3D sensors (T992)
- Readout chips
 - RD53a (both CMS and ATLAS)
- LGAD detectors also tested

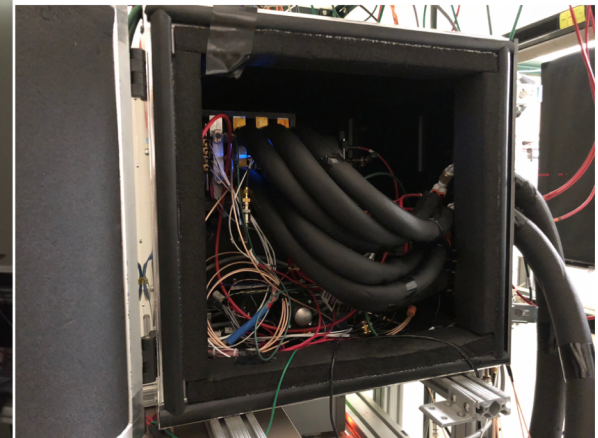


Beam spot for RD53a chips: ATLAS (Left), CMS (Right)



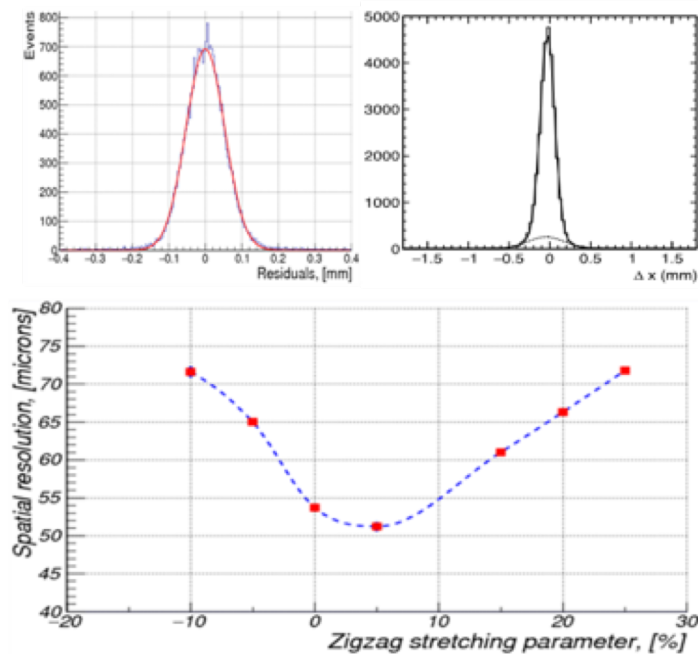
CMS Timing

- High priority for the US CMS group
- Looking for radiation hard solutions with timing resolutions between 30-40 ps.
- Endcap and barrel detectors technologies tested
 - Endcap: LGAD
 - Barrel: SiPM-LYSO



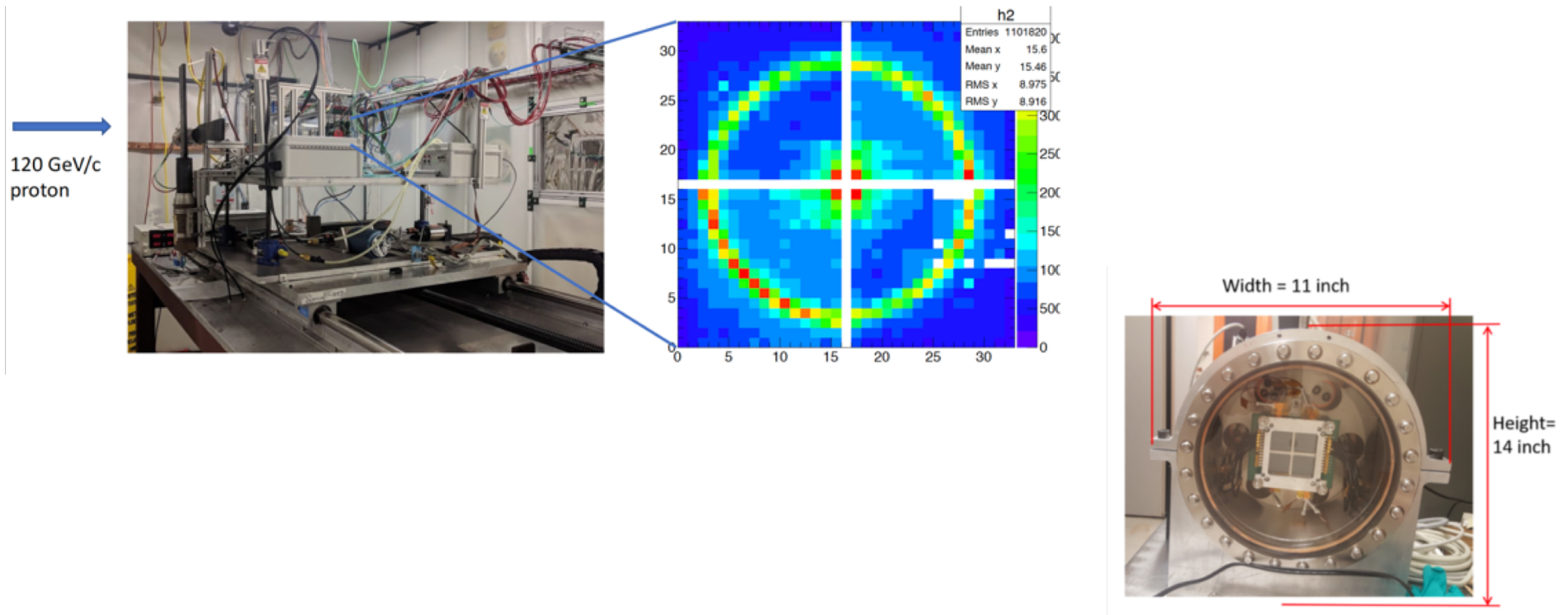
EIC R&D Groups

- ZigZag readout for GEMs and Micromegas detectors
 - Testing different type of zigzags
 - Resolutions between 50 and 90 microns



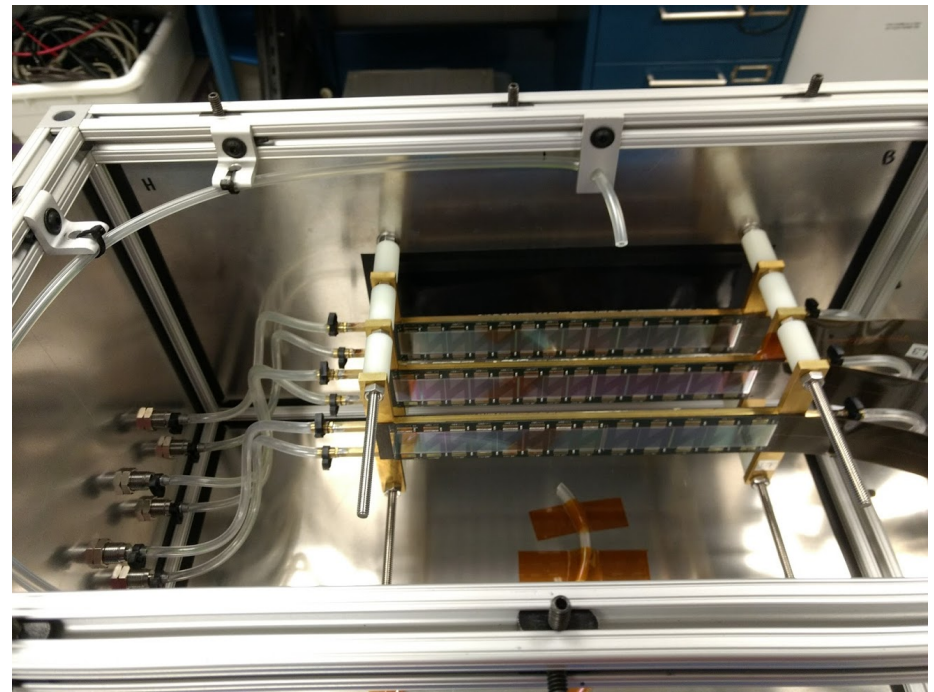
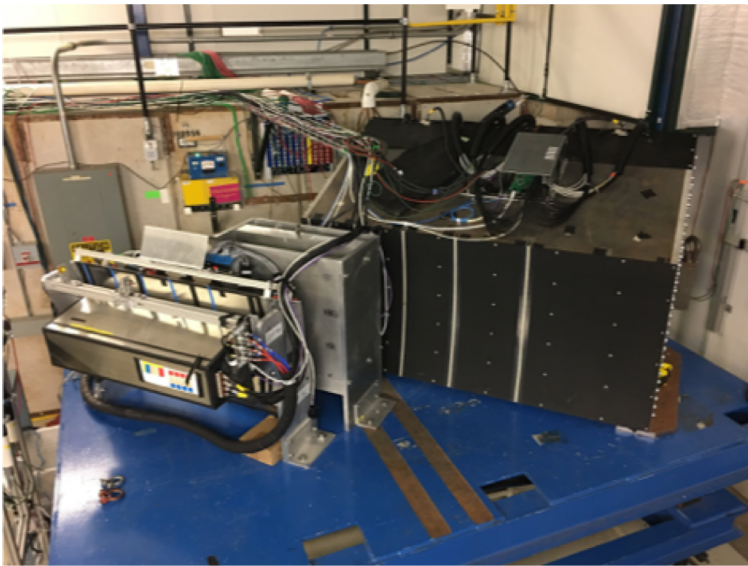
EIC R&D groups

- EIC PID groups (Argonne, Hawaii, Georgia)
 - Using LAPPD Style MCP-PMTs
 - Looking at imaging detectors (RICHs, DIRCs)



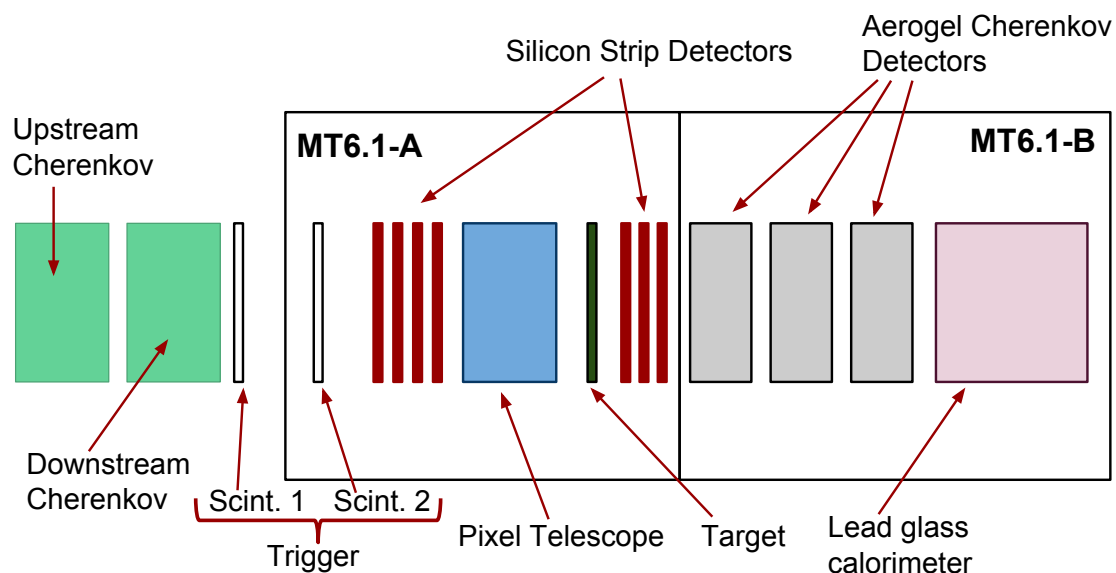
sPHENIX Groups

- Calorimeter, Silicon Strip, MAPS vertex Detector tests
 - Part of the goal was integrated tests of these detectors and DAQ system



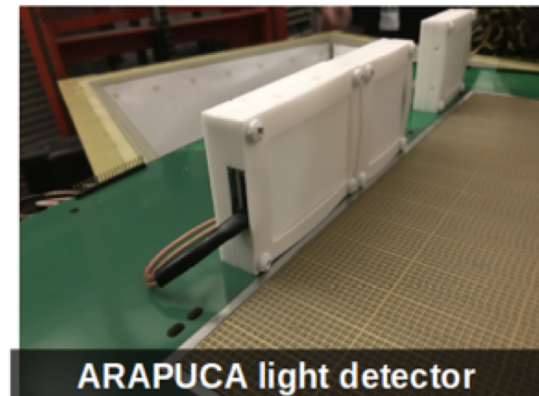
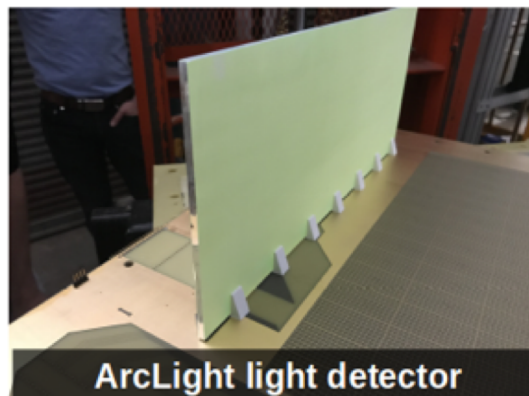
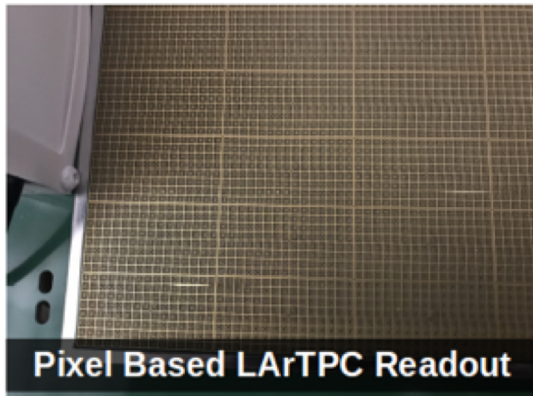
EMPHATIC

- Testing emulsion detectors to be used for hadron identification.
 - Goal is to measure pion, proton, and kaon production cross sections
 - Big neutrino experiment background, goal is to help reduce that
 - Funded via US-Japan funding stream
 - Multi-year testing

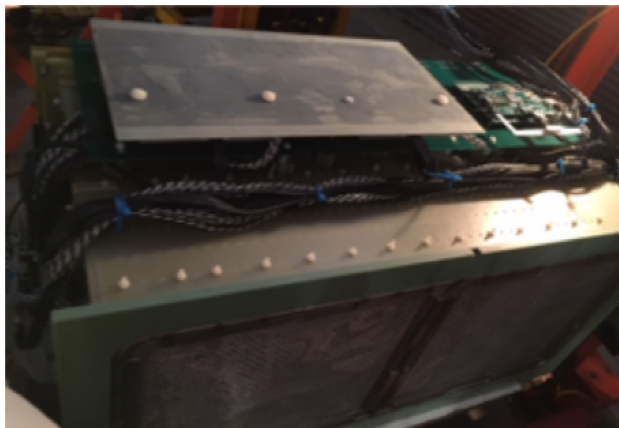


PixLAR and SBND Cold electronics

- PixLAR testing pixel planes instead of wires for LArIAT



- SBND
 - Testing TPC readout, DAQ, online monitoring, etc



Facility projects

- Students worked over the summer on the DAQ
 - Wrote a Cherenkov module
 - Separate group worked on documentation and tutorials
- Students worked on Cherenkov slow controls.
 - Removed unnecessary cabling
 - Researched and suggested a new controls system
- Hired another Applications Physicist
 - Welcome to Evan!
- NOvA Prep work most of the summer in MCenter
 - Constructing a second Tertiary beamline
 - General help with facility



FY19 Plans and Beam Request

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FY19 Users

- **Nominally 36 weeks running**
- **Scheduling: MTest**
 - 14 weeks with 2 or more users (split at 12 hours)
 - 16 weeks with one user (12 hours)
 - 6 (ish) weeks with no users (includes over the holidays)
- **Scheduling: MCenter**
 - Commissioning, Installation of NOvA Test Beam until January
 - NOvA Physics: January – July
- **Of the currently scheduled groups:**
 - 1 is from LHCb – first time at our test beam
 - About 2/3 are from CMS/ATLAS
 - Mu2e, EIC R&D also returning

FY19 Current Status of Projects

- OTSDAQ has modules written for all our detectors, so we'll continue to debug and bring this up to speed.
 - Tutorials written over the summer by students
- We have hired Evan Niner to help out with coordination and running of the test beam. He joined us 2 weeks ago and has jumped in already with both feet.
 - Set up a Slack channel
- We have a working method for allowing access to machines on our network from offsite
 - Refined over the summer by students.
- Continuing to refine our space for users to stage
 - Also, allows us to focus on safety. We can see/help people as they are working.

FY19 Focus - Documentation

- Setup our own instance of DocDB
 - Transfer all old documentation
 - Write new documentation for current projects
 - Include safety information, yearly statistics.
- Finish the FTBF paper
 - Reaching out for more help: Evan and Jason have agreed to write portions.
- Each week: remind users about our elog, slack channel, weekly status emails, other ways to communicate with us.
 - Helps to make runs go more smoothly
 - Keeps lab management aware of what is happening and the importance of the work.

FY19 Focus: Controls system

- Much of our infrastructure is on separate systems
 - Cherenkov pressures
 - Gas shed (gas levels, safety systems)
 - HV and LV
- Not easy to monitor
 - Alarms need to be updated
- System needs to be easy to work on by facility staff.

FY19 Focus: DAQ and Beamline

- DAQ is there, needs to be exercised
 - Stability studies
 - Add a few other instruments
- Documentation
 - Instructions on running the DAQ
 - Instructions on installing new detectors
- Will test out the DAQ by carrying out various beam studies.
 - In January we have a few weeks downtime.

- Questions?
- Comments?