

Status of the ongoing pfRICH SPS/PS beam test at CERN

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pfRICH DSC Meeting, June 4, 2026

Our five weeks at CERN [*slides from May 14th*]

Week	Description
May 20-27	Partial assembly & pre-commissioning
May 27 - June 3	Final assembly & SPS run (aka commissioning)
June 3 - 10	SPS -> PS transition; re-assessment of the PS run goals
June 10 - 24(27)	Re-assembly, PS run (main part of the beam test), dis-assembly

- Objectives of these four distinct periods are obviously different
- Goals are clear in principle; details will depend on the previous period(s)
- May make sense to mostly focus on the upcoming periods?

Goal candidate topics for the beam test overall

- HRPPD performance in a particle beam
 - Single photons, flashes in a window, timing
- Direct N_{pe} measurement (aerogel, filter, HRPPD QE)
- Cherenkov angle resolution; comparison with Monte-Carlo

- π/K separation from low momenta to 7+ GeV/c
- e/π separation at low momenta

- FCFD-related studies
- Mirrors (conical, pyramid, co-bonding vs plain lexan?)
- Laser monitoring system
 - Live demonstration; delay calibration, at a bare minimum (ideally, using a PiLas laser)

The week of May 20-27

Yellow background: either not done or not needed

- Alexander, Martin, Preet @ CERN
 - Access procedures, trainings, safety protocols, dosimeters, logistics, etc
 - Communication with local CERN colleagues and dRICH team

- Unpack the boxes to the extent needed before Bob & Co come a week later
 - Assess what is missing / damaged / forgotten / needs to be brought in suitcases next week

- Set up computing infrastructure
 - Local network(s), DAQ PC, online monitoring computing, Control Room -> installation area
- DAQ hardware
 - Restore configuration used in 2-198, with a NIM logic adjusted to SPS run
 - VME crate reset procedure

The week of May 20-27

- Online monitoring tools
 - VNC, tracker & imaging panels, GECO, HRPPD #5 plots, beam line instrumentation
- Digitizer s/n 81 -> repair; get a spare one from CAEN (and a 2nd VME bridge)
- Get a third rack-mounted HV power supply from CERN El.Pool?
- Finalize V1742 configuration, calibrations, mapping, etc
- Have offline / near online reconstruction codes in a usable state
- Assemble all five HRPPDs
- Assemble aerogel box
- Pre-assemble the 8020 chassis, identify possible conflicts

The week of May 20-27

- Clarify CO₂ & nitrogen connections
 - Can we test GEM chambers in some way, or do it a week later?
- Scintillating counters?
- See the DESY table installed (hopefully)
 - Learn how to operate it; decide on the actual chassis, DAQ PC, LV module location
- Check the 19" rack location, verify cable run
- Learn beam line Cherenkov counter infrastructure, cabling, latency

- Finalize RCDAQ script
 - Record Velmex stage positions, beam line conditions (?), perhaps DESY table offsets, etc

- Data transfer to SCDF

The week of May 20-27

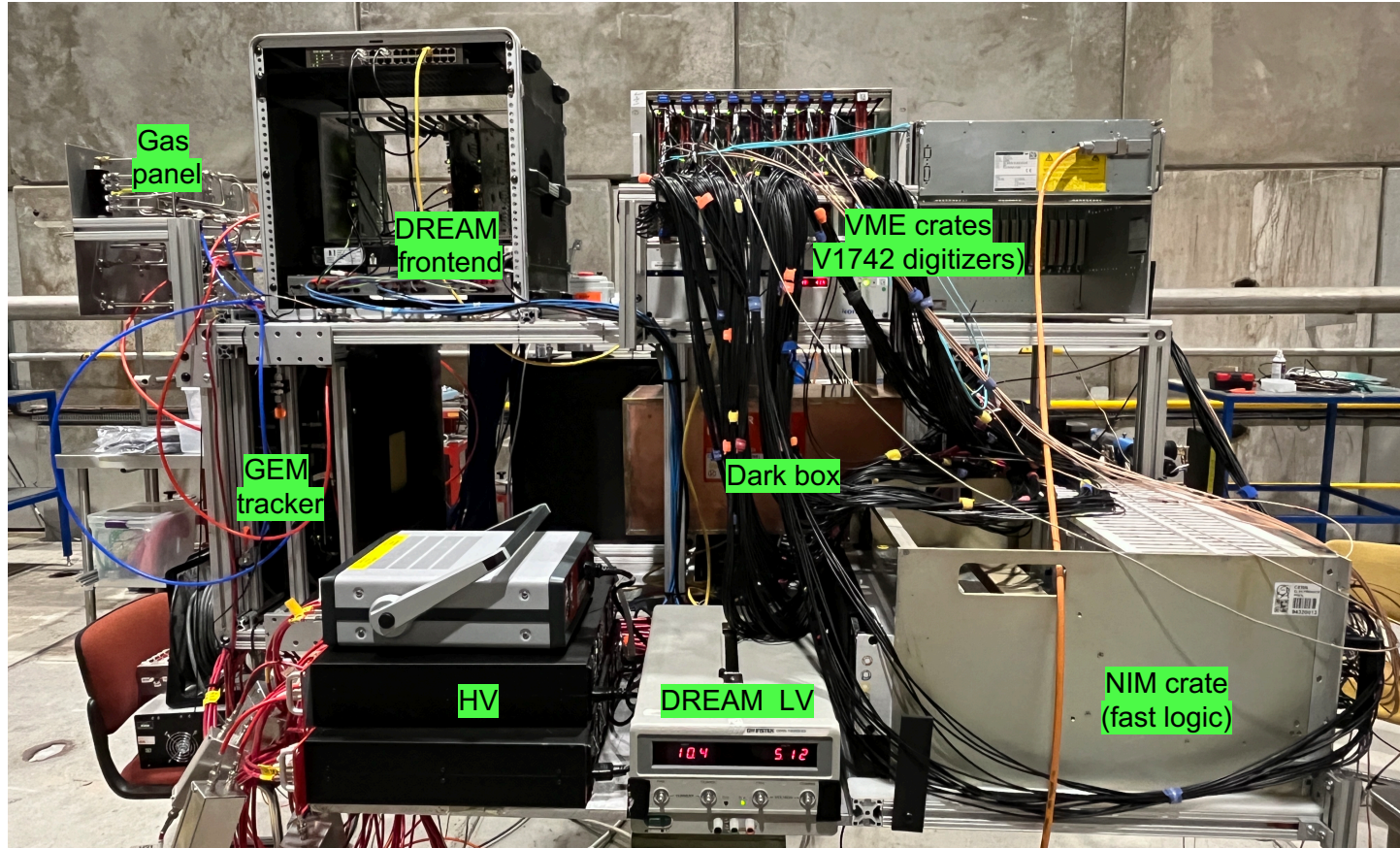
- Book safety readiness review, patrol training, ..?
 - Assume that Brian and Bob take care about this from remote

- Electrical connections (110V vs 230V)

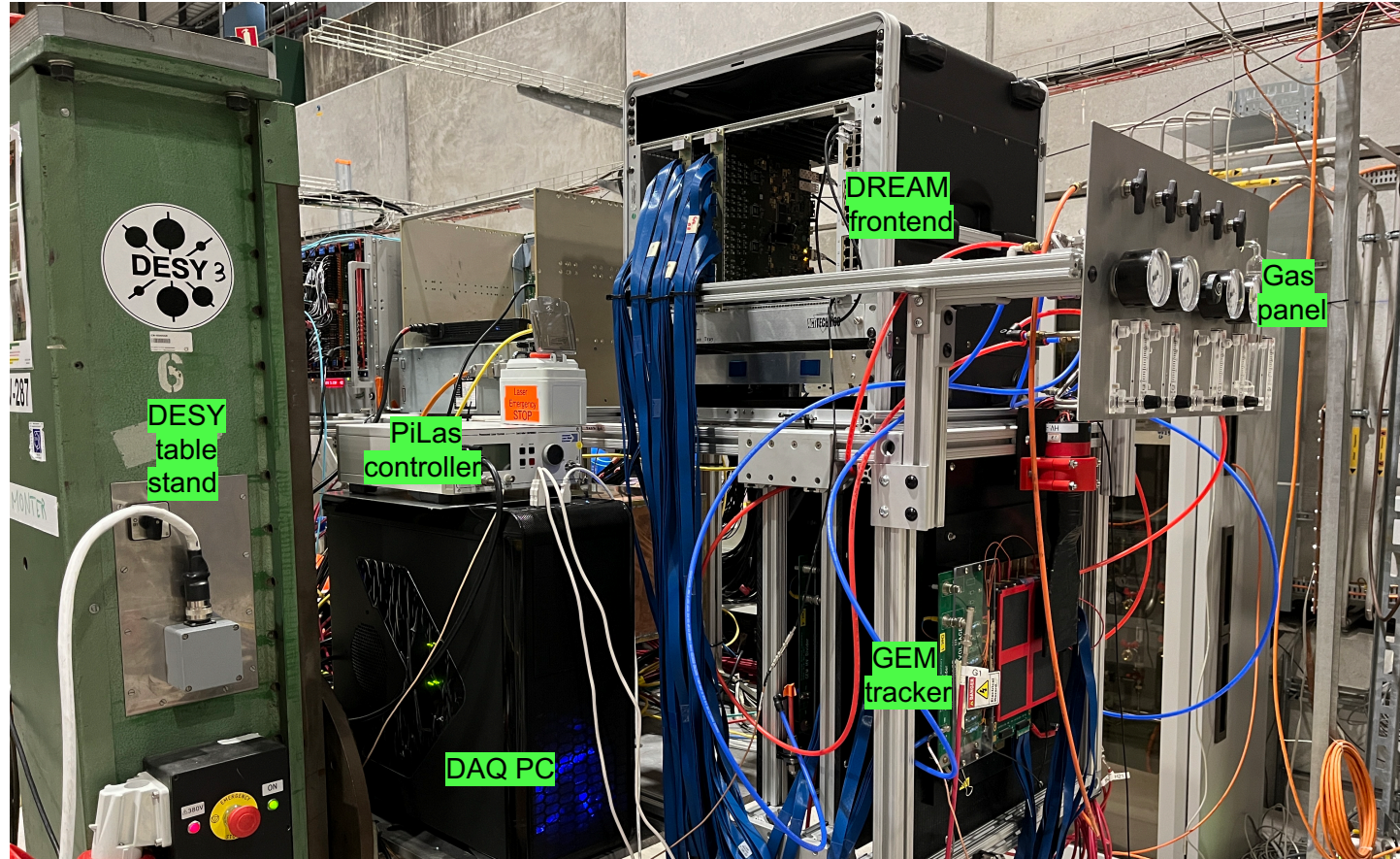
The week of May 27 – June 3 (SPS run)

- Alexander, Bob, Jihee, Martin, Preet @ CERN
- May 27-28: moving equipment to the installation area; assembly of the setup
- May 29 @ ~11am – obtained safety clearance (including PiLas laser)
- Commissioning work for about three days
- June 1 @ ~1pm - LINAC went down; end of the SPS run

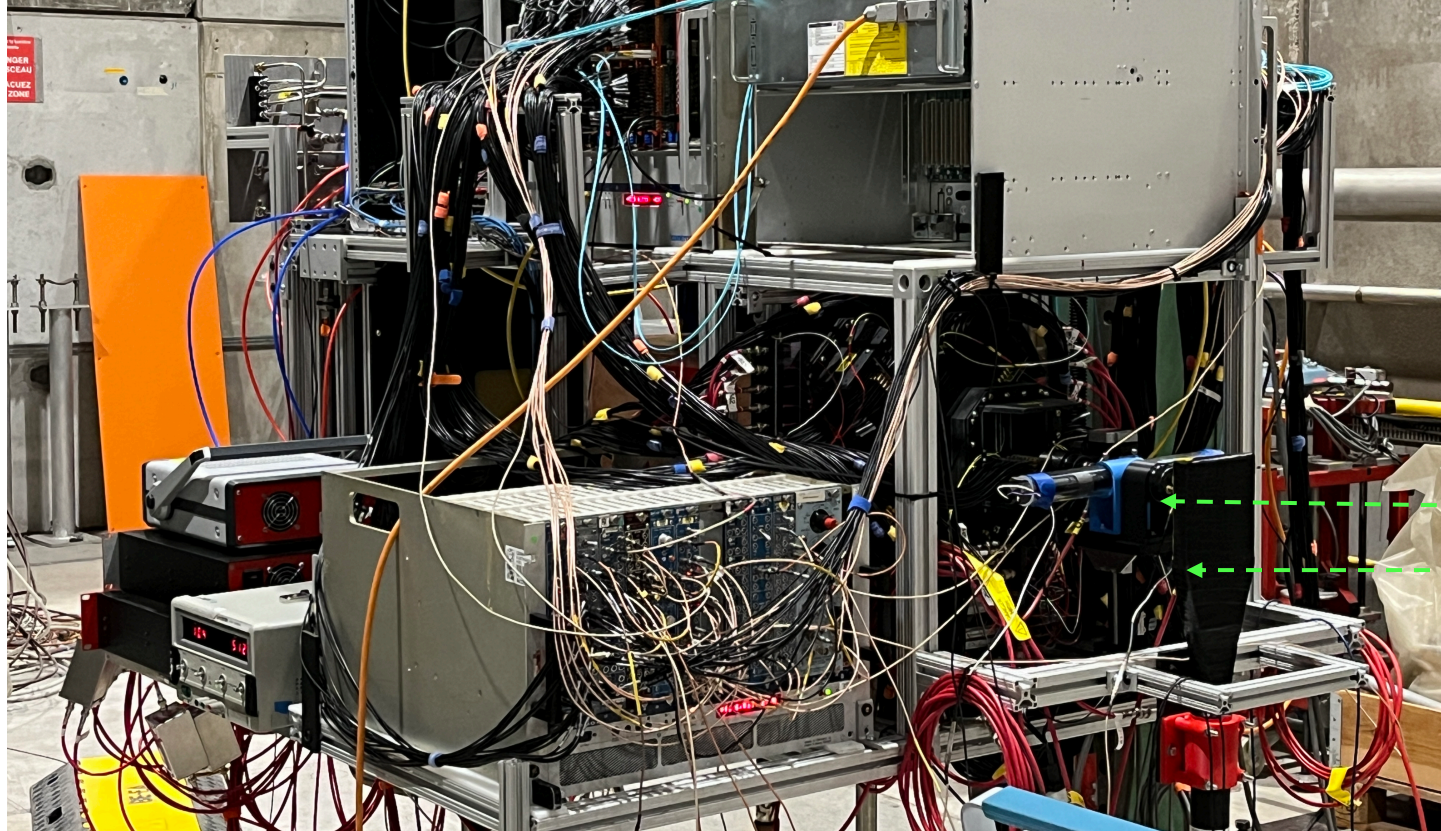
The week of May 27 – June 3 (SPS run)



The week of May 27 – June 3 (SPS run)



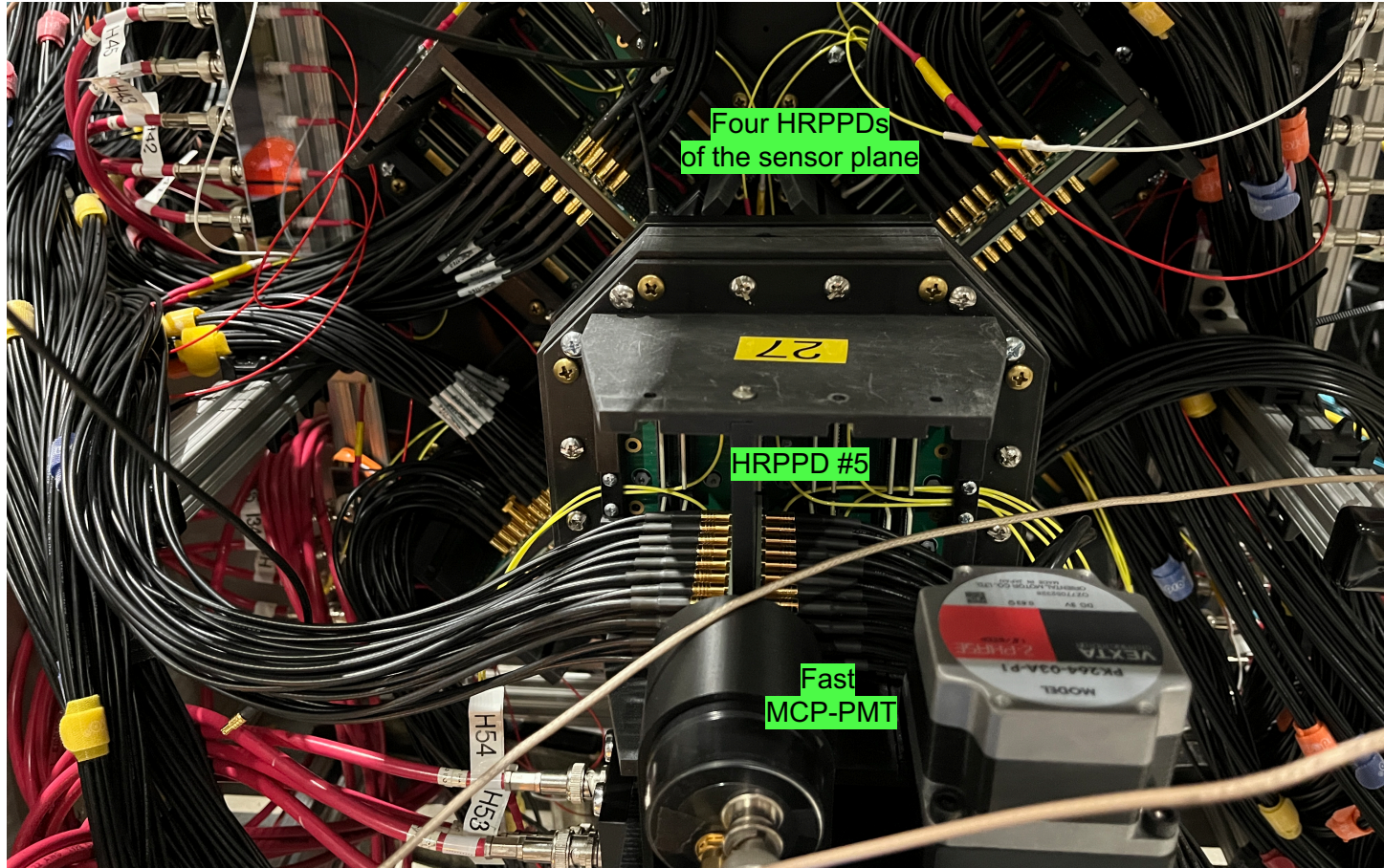
The week of May 27 – June 3 (SPS run)



Fast
MCP-PMTs

Trigger
scintillators

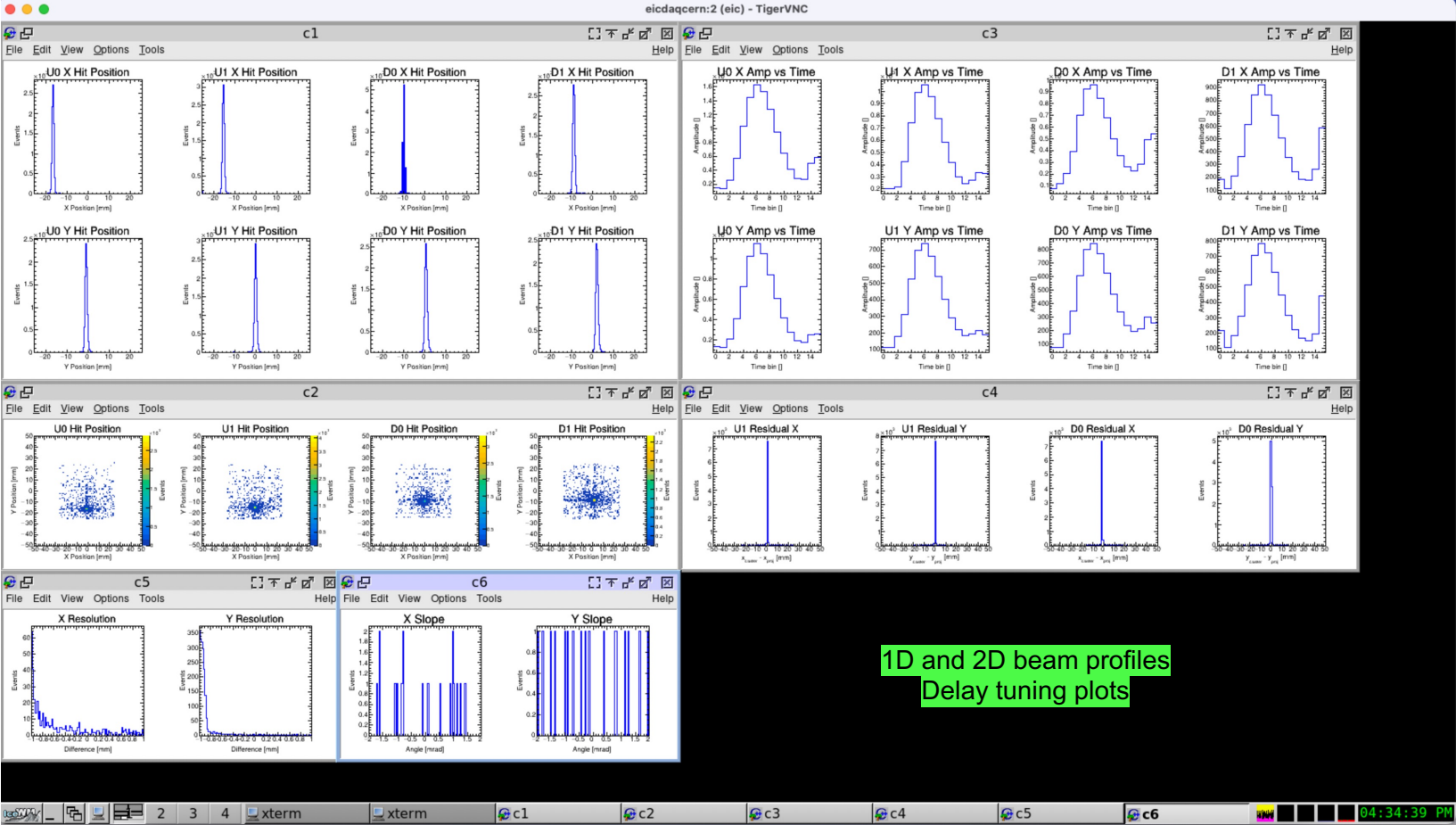
The week of May 27 – June 3 (SPS run)



The week of May 27 – June 3 (SPS run)

- Put everything together; made sure there are no major equipment conflicts
- Commissioned several components:
 - GEM tracker, large trigger scintillators, HRPPDs, fast MCP-PMTs (?)
 - NIM logic, V1742 and DREAM readout
 - GEM gas system, HV, LV, laser monitoring system, etc
- Tuned V1742 and DREAM latencies
 - Were able to run with 520 DRS4 samples
- Commissioned the tracker part of the online monitoring system

The week of May 27 – June 3 (SPS run)



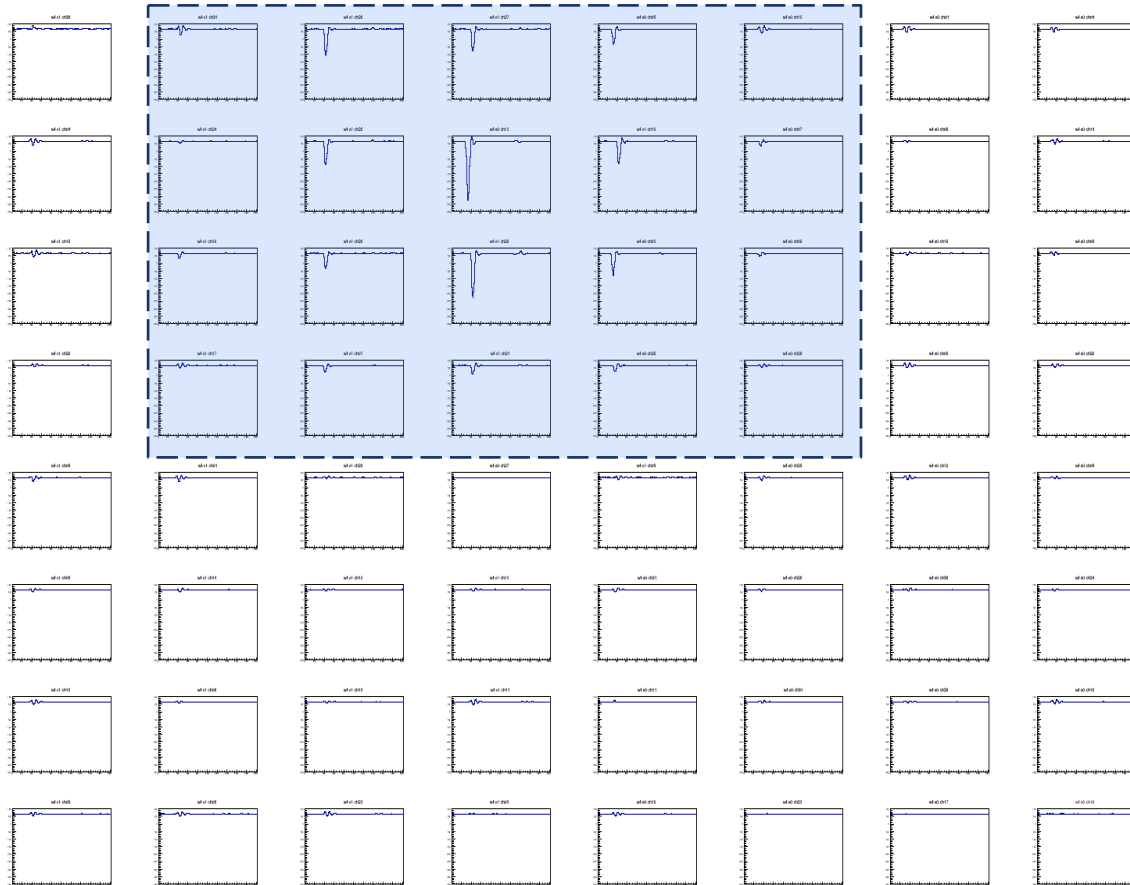
The week of May 27 – June 3 (SPS run)

- Played around with alignment, DESY table & Velmex X(Y)-stage movement
- Performed beam profiling
- Collected some data with window light flashes in HRPPD #5
- Also, collected a sufficiently large data sample with the laser monitoring system

- Have no data with a beam line Cherenkov counter
- MCP-PMTs have only been watched using a scope (no data either)
- Have not installed aerogel (therefore, no imaging data as of yet)
- No remote control of the Velmex stages

The week of May 27 – June 3 (SPS run)

500 mV



A single events with waveforms of a multi-photon flash produced by a beam particle in the HRPPD #5 window (8x8 pad area)

40 ns

The week of June 3-10 (SPS -> PS transition)

- Jihee leaving
- Brian, Andrew, Kathleen, Bradyn (and Jinky?) coming
 - Should be able to staff 24/7 shifts which is essential (beam duty cycle @ T10)
- Equipment is packed and waiting for a transport to the PS T10 area
- Checked the installation area and the Control room
- The actual installation will start on June 10th
- Safety inspection booked for Thursday June 11th @ 3pm
- **Waiting for a successful physics run!**