Status report
preparation for beam test data analysis

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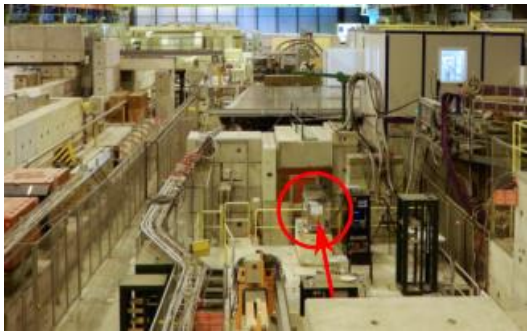
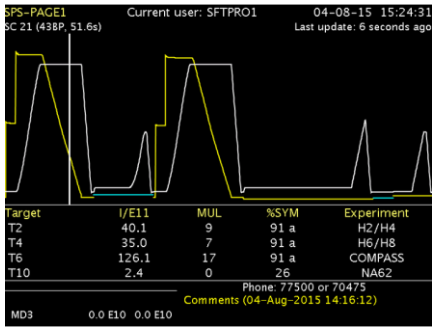
Introduction

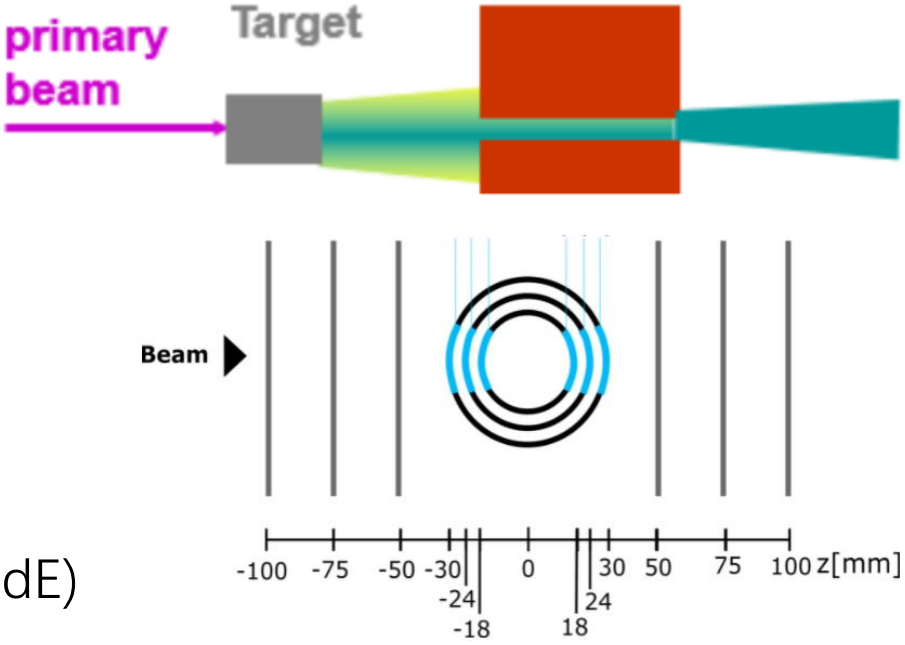
- Beam properties
  - Particle type & momentum
  - Intensity & divergence
  - Injection cycle
- User operation
  - Beam parameters
  - Run & access control
  - Collimator configuration
- Telescope
  - **Reference**
  - **DUT** (Device-Under-Test)

  Info - Position, timing & charge (dE)



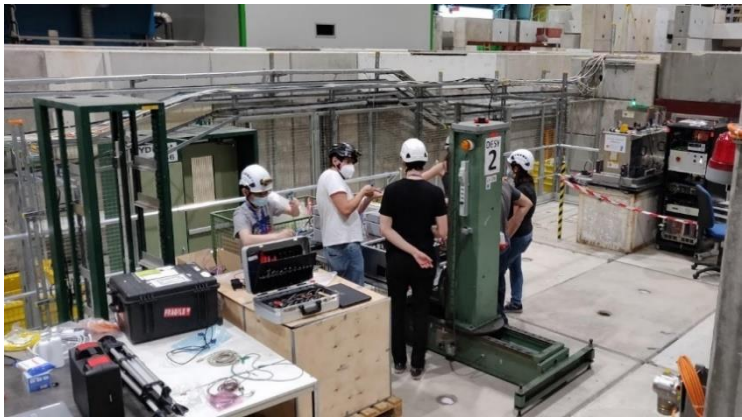


Experimental hall and beam line @ CERN-SPS NA



Introduction

Beam test procedures

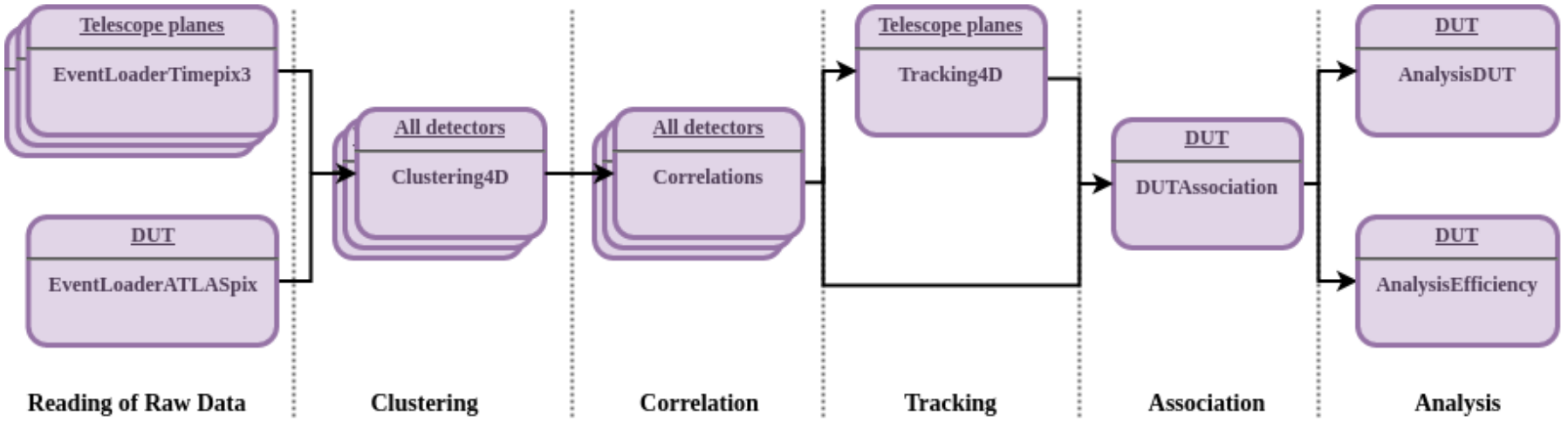


- Preparation (lab)
  - Beam coordination
  - Test plan: chip variants, THR scan, Vbb…
  - Test system (telescope)
- Installation (on-site)
  - Safety policy & Access
  - Setup: Power, network, alignment, trigger, …
  - DAQ debug (dry-run)
  - Remote control (route & switch, webcam, motors)
  - Safety inspection (by beam facility)
- Data taking
  - Monitoring & pre-analysis

Introduction

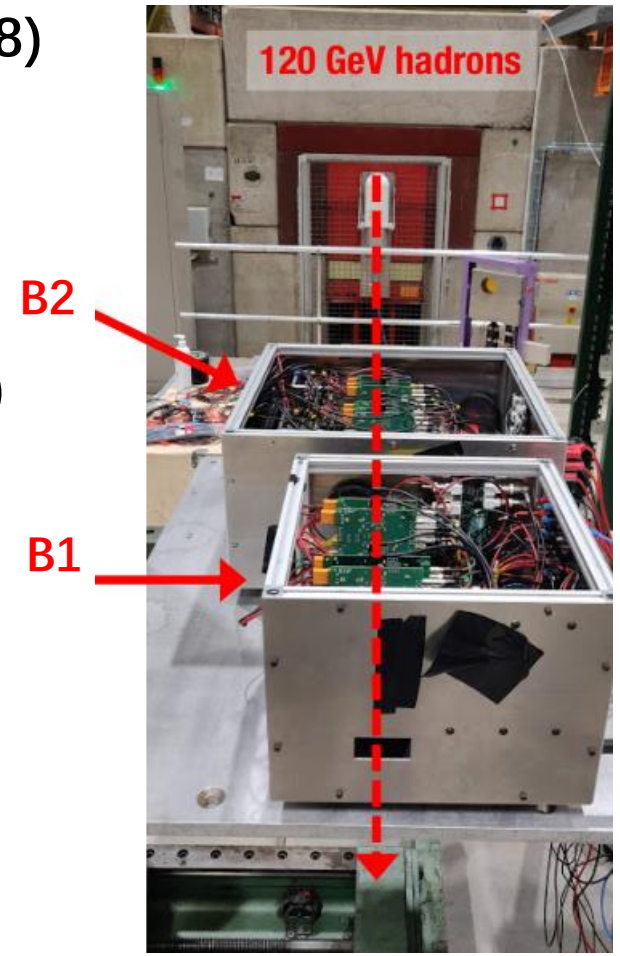
- Data analysis – corryvrekan
  - Mask creation (pixel)
  - Clustering & Correlation
  - (Pre-) Alignment
  - Tracking & association on DUT
  - **Analysis** (Efficiency, spatial resolution, cluster distribution…)

Input
Raw data
Detector info.
Geometry



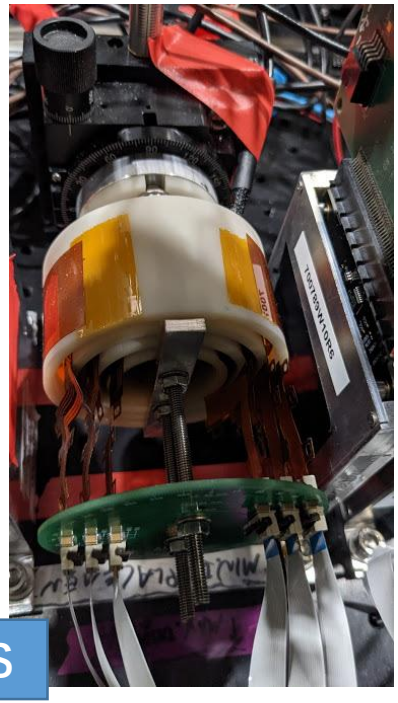
Example - SPS July

- **ITS3 WP3 - Sensor Characterization and Qualification**
  - **Beam test @ SPS 2021 July (07.07-07.28)**
- SPS H6 Beam Line, PPE 156, **120 GeV**
  - Pions π ~ 60-70%,
  - Protons p ~ 25%
  - + electrons and muons
- ALPIDE: 1024 x 512 pixels (spatial res. ~5um)
  - pixel_pitch = 29.24um, 26.88um

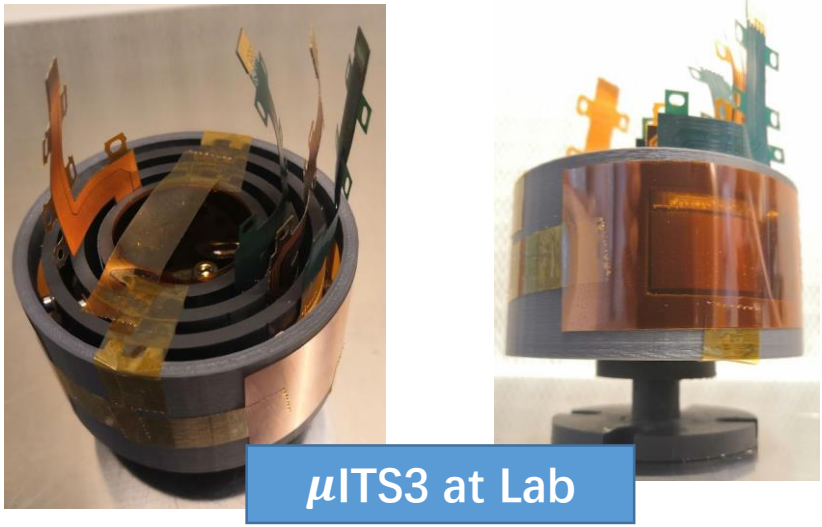


ulTS3 setup

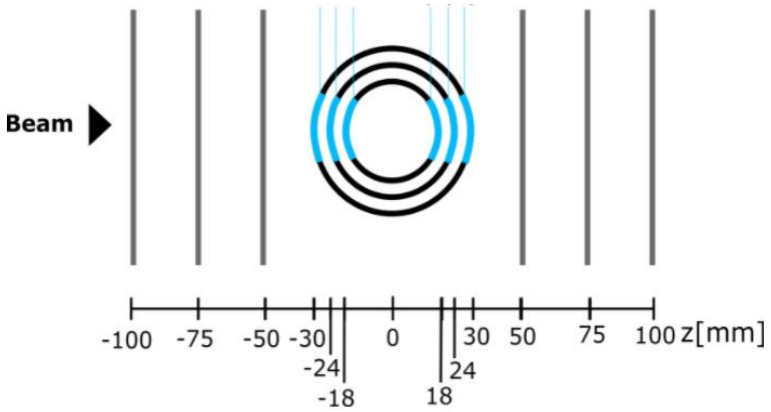
- **ITS3 WP3 - Sensor Characterization and Qualification**
  - **Beam test @ SPS 2021 July**
- **Setup**
  - microITS3 – Cylinder 18/24/30 mm
  - bent ALPIDE



μITS3g1 at SPS



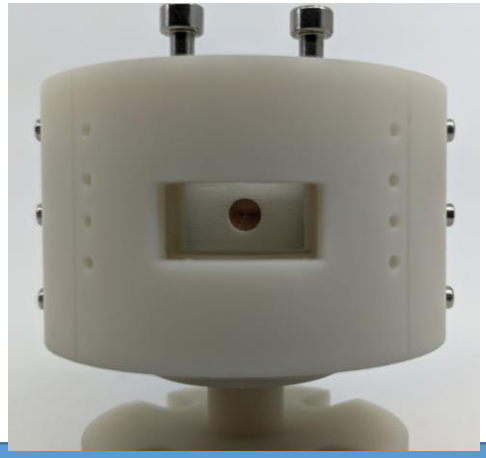
μITS3 at Lab



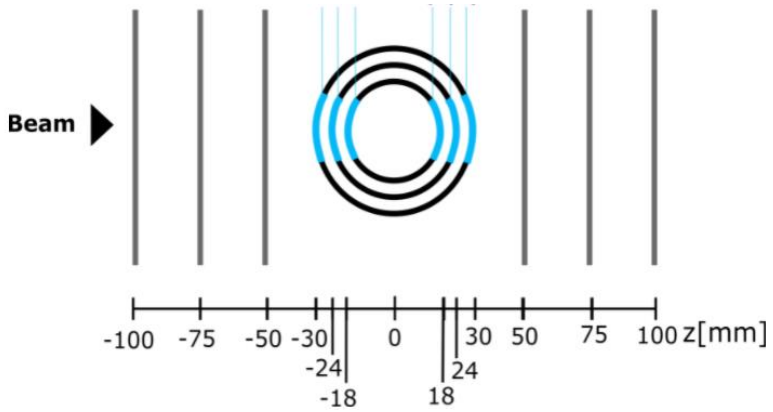
ulTS3 setup

- **ITS3 WP3 - Sensor Characterization and Qualification**
  - **Beam test @ SPS 2021 July**
- **Setup**
  - microITS3 – Cylinder 18/24/30 mm
  - bent ALPIDE
  - **+Target (copper)**

Copper target

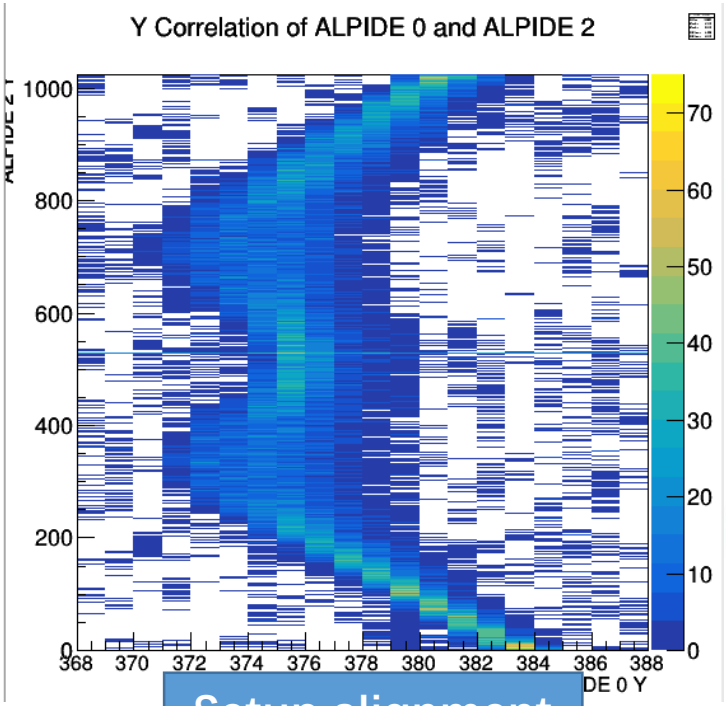


Support for ulTS3g2 at Lab

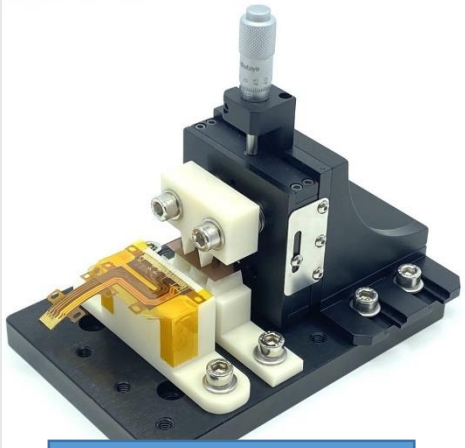


W-chip setup

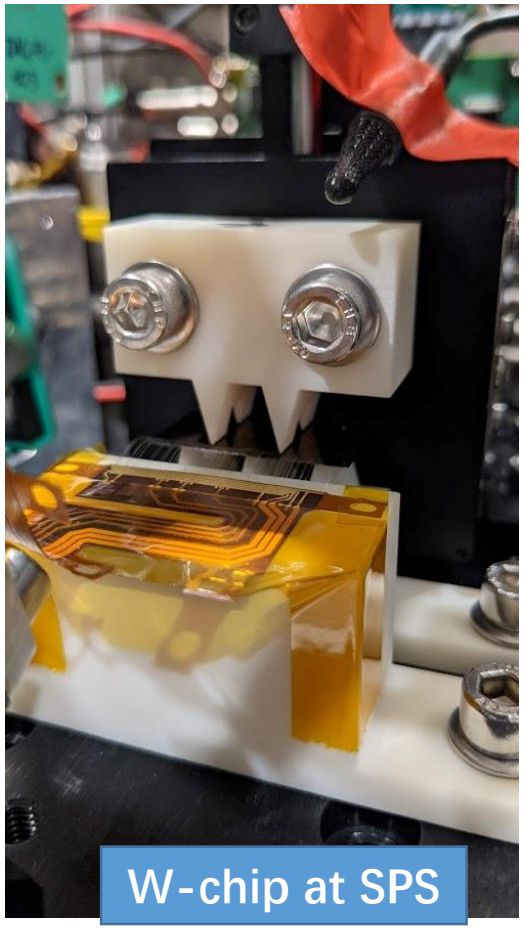
- **ITS3 WP3 - Sensor Characterization and Qualification**
  - **Beam test @ SPS 2021 July**
- **Setup**
  - W-chip (bent with 2 plastic needles)



Setup alignment



W-chip at Lab

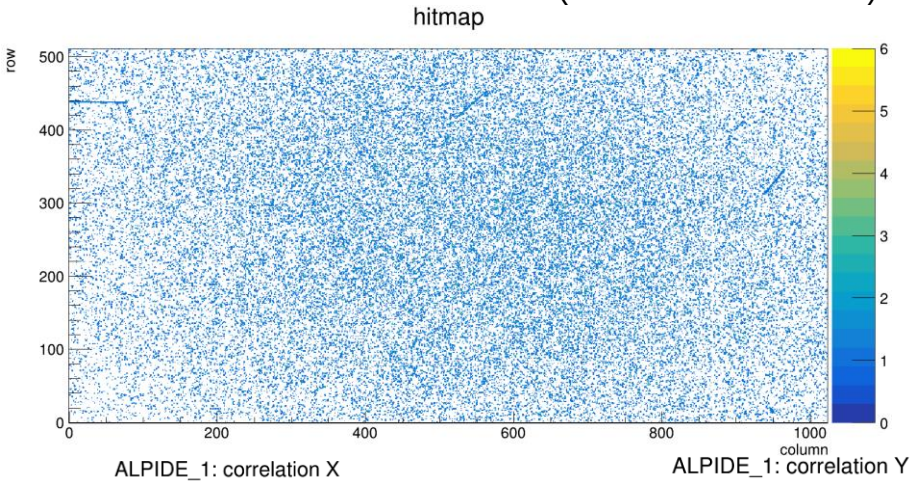


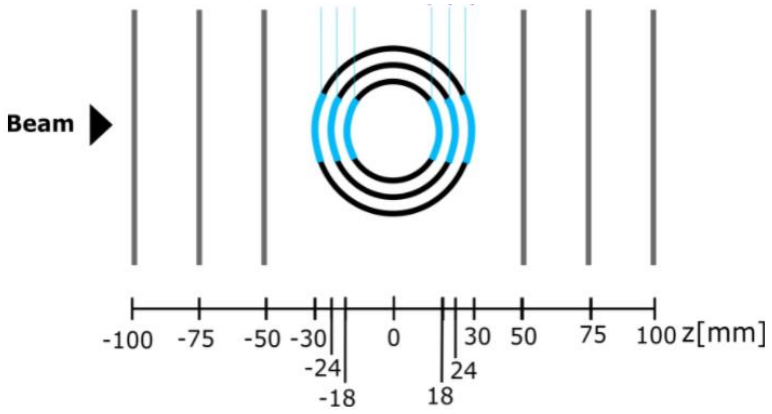
W-chip at SPS

Analysis - uITS3

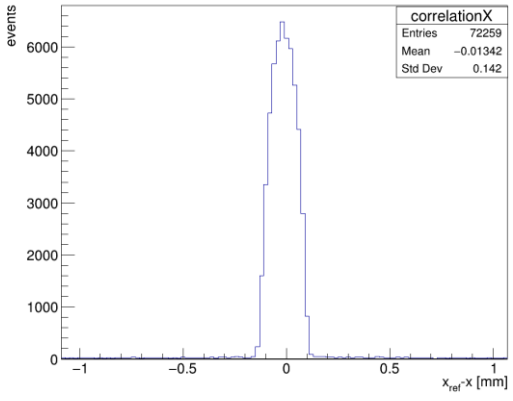
uITS3g1

- Raw data: **79220** events (run283202336)

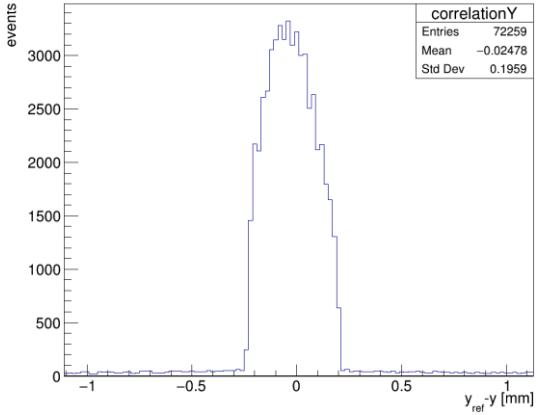




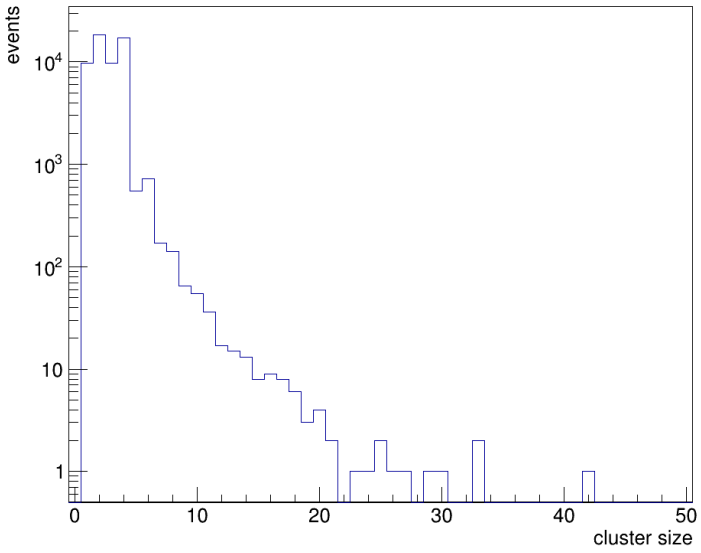
ALPIDE_1: correlation X



ALPIDE_1: correlation Y



ALPIDE_0 Cluster size



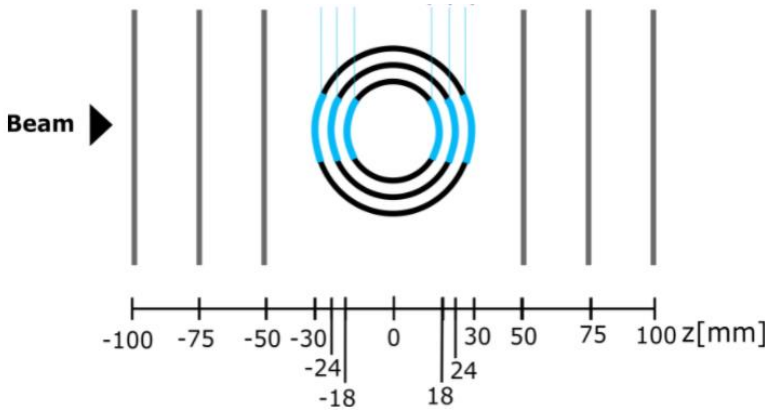
Analysis - uITS3

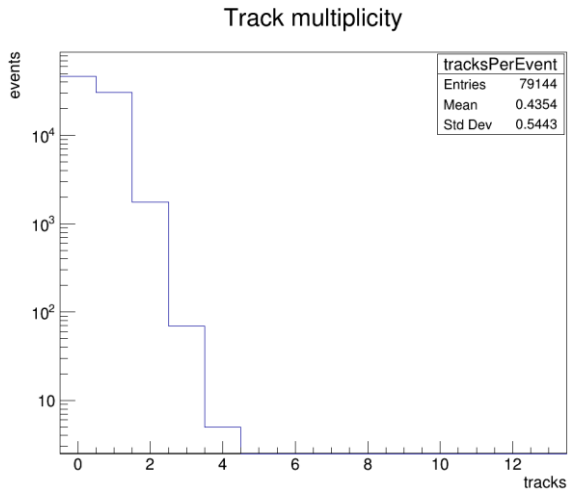
uITS3g1

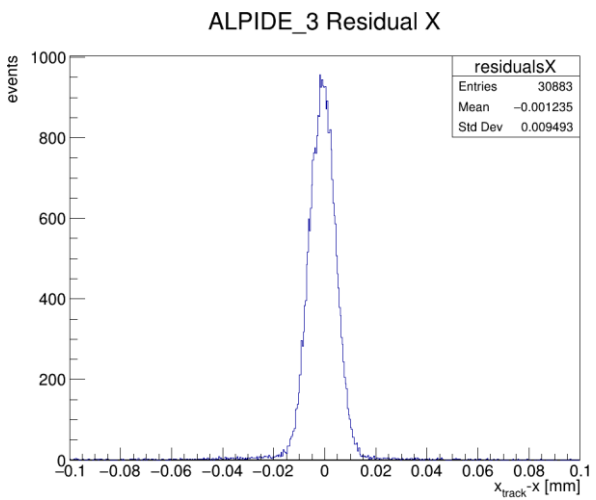
- Raw data: **79220** events (run283202336)

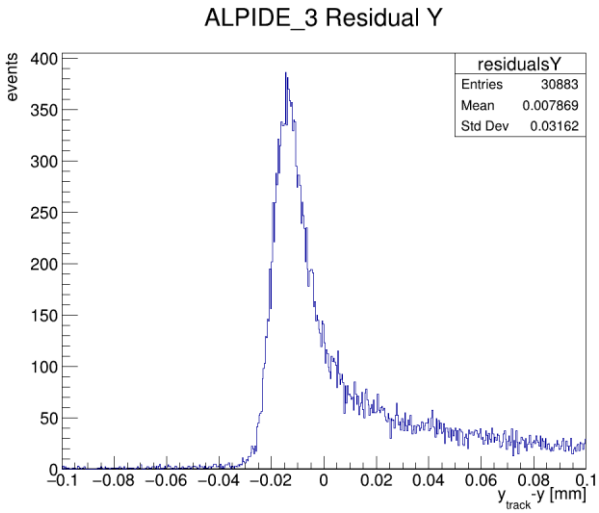
- Tracking (residuals, N tracks)
  - check DUT alignment

-> Next: DUT association, analysis





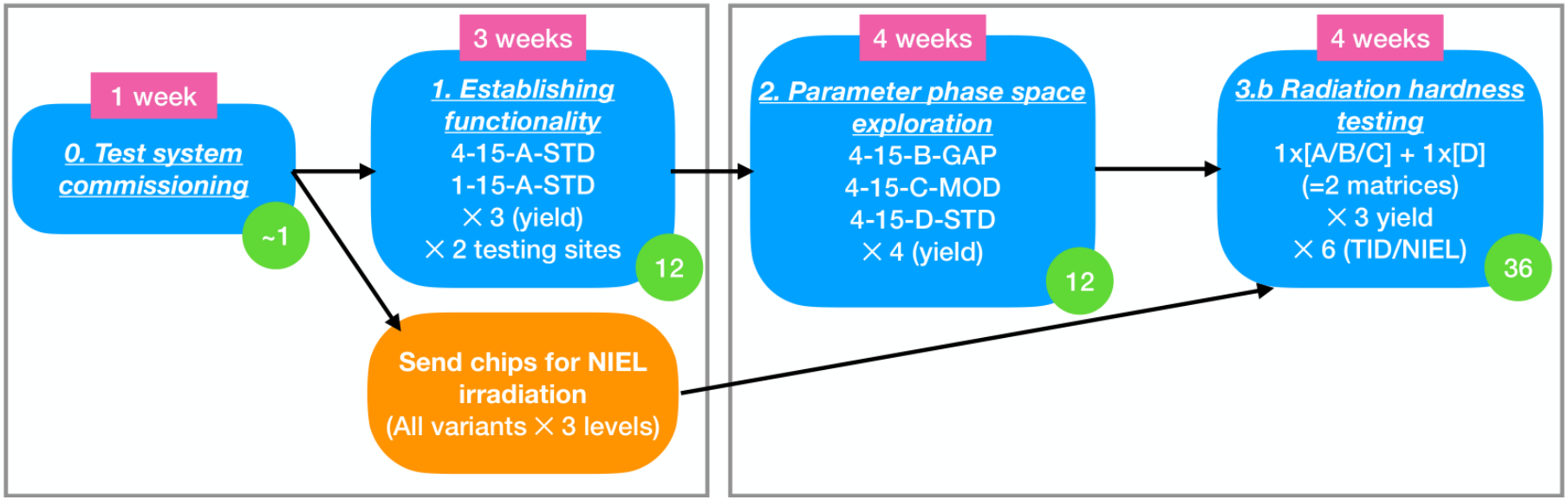




Next...

- **18/10 - 06/11** @ PS, CERN
  - Start preparation 1 week before, **11 – 15/10** (from Miko)
  - all the DUTs should be on-site by **13/10** at the latest (from Miko)
  - Plan of IPHC: **CE65** (functionality, efficiency, clustering, spatial resolution…)

    -> Exact date & duration?



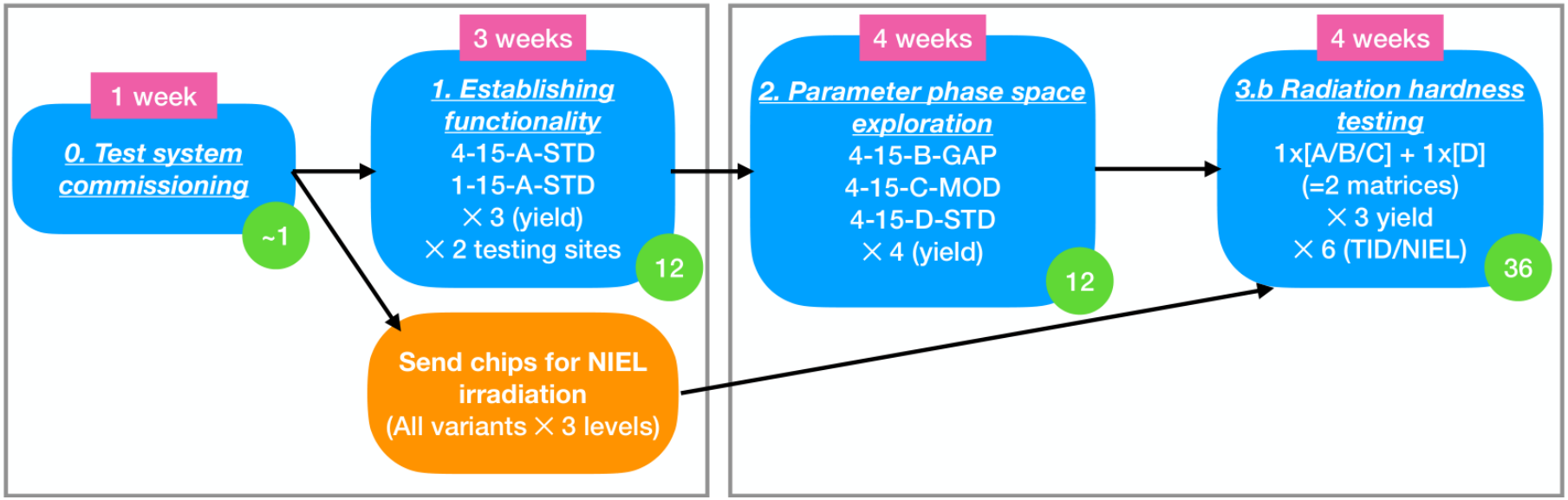
Next...

Outlook

- Continue uITS3 analysis
- Online monitoring: system control, quick check for alignment, chip & beam status

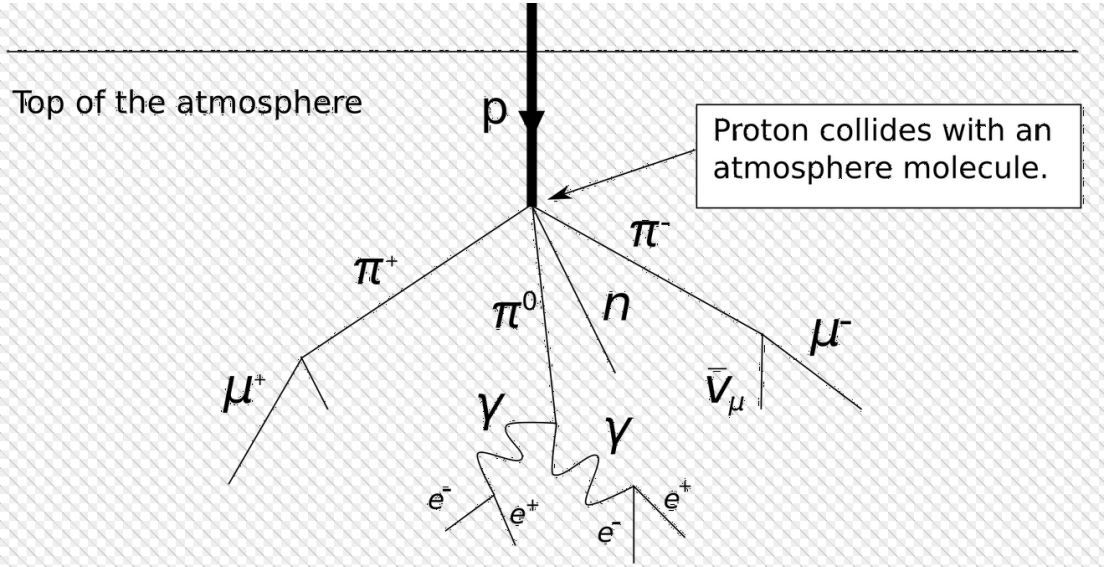
  -> more tools needed (scripts / GUI / ···)

? **More**: Simulation, lab test, interface for EUDAQ & corry···



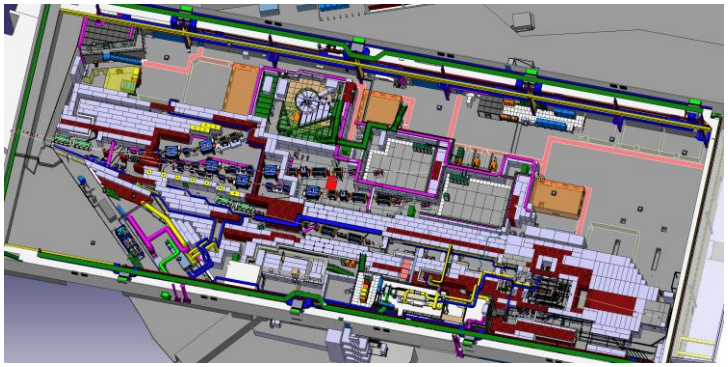
Backup

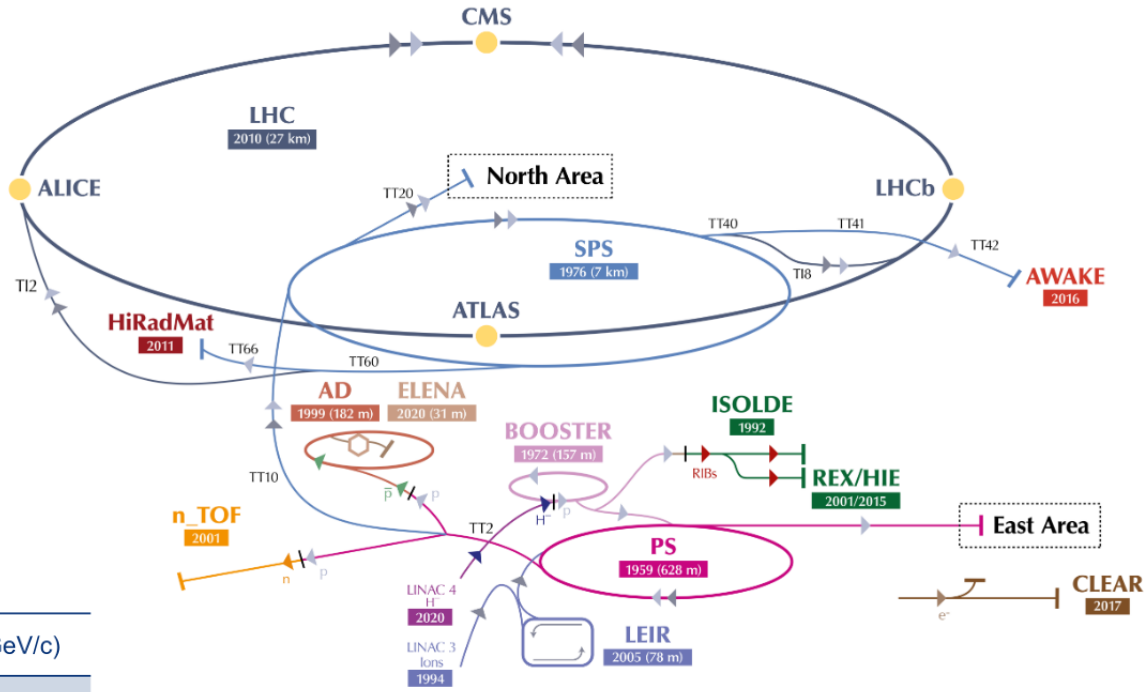
- Beam facility @ PS/SPS



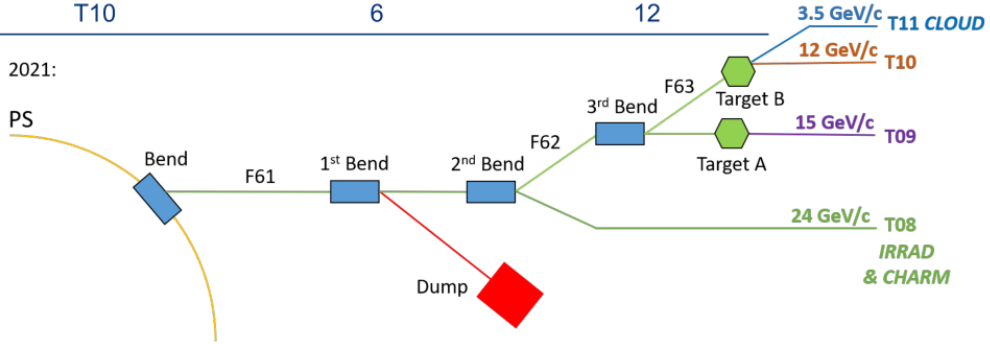
PS beam facility

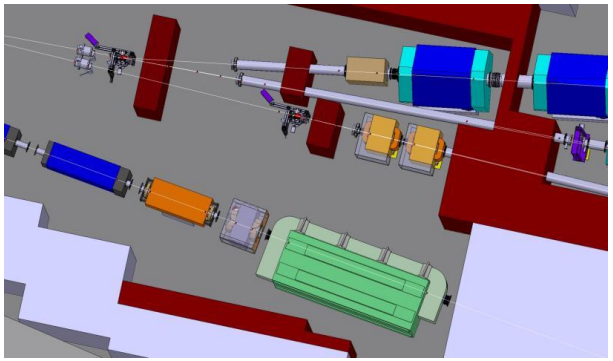
- East Area





Testbeam	Previous p (GeV/c)	Future p (GeV/c)
T9	10	15
T10	6	12





SPS beam facility

- North Area
- Spill duration normally **~5 s**
- Usually : 2 cycles / SPS supercycle for NA
- Max. intensity to the NA - 4·10 13 ppp
- spills per year - ~5·10 5
- Extracted intensity per year - 1.7·10 19
- Spill length / repetition frequency

dependent on the physics program of all the facilities served by SPS and LHC

- Variability to be expected.