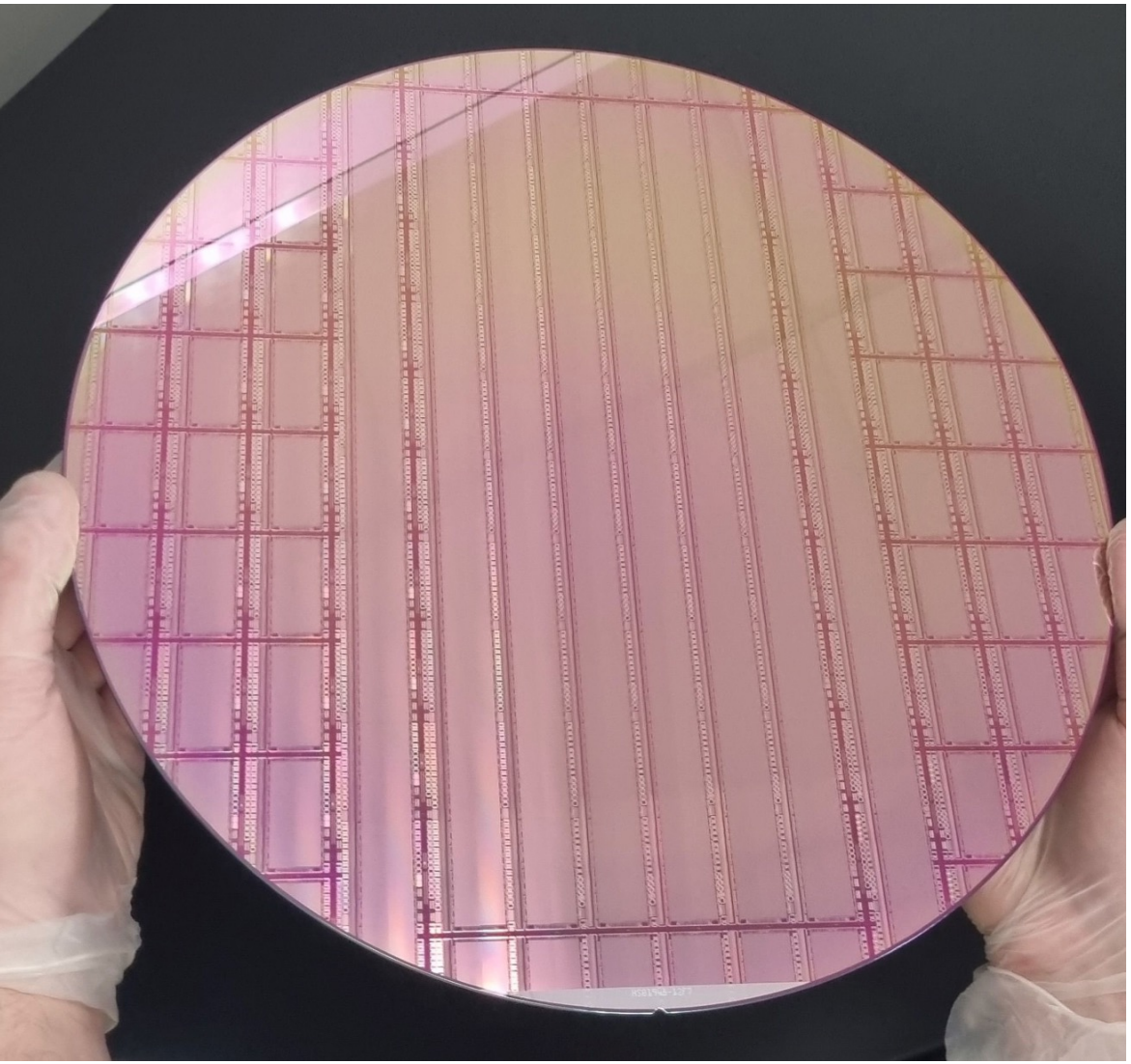
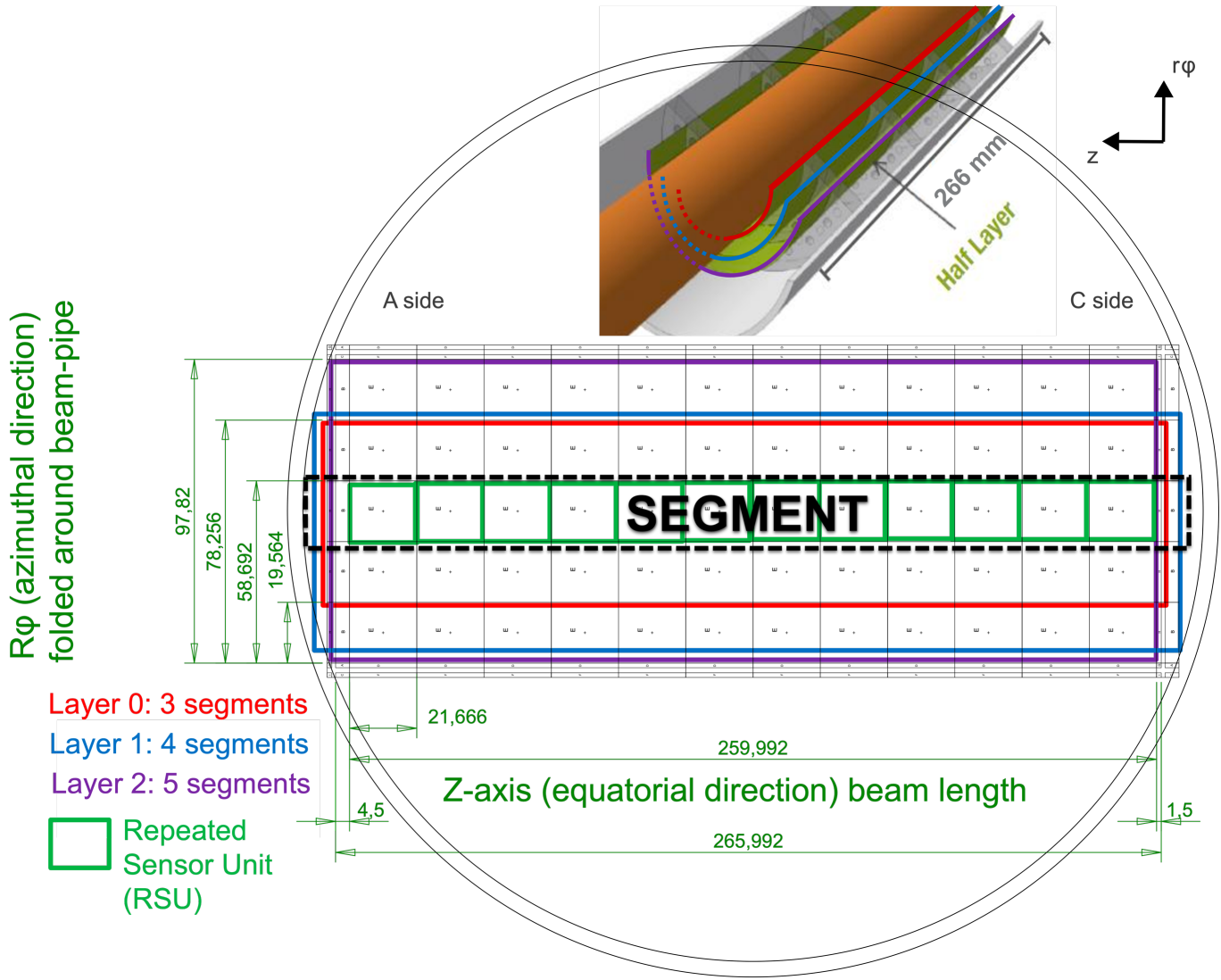
ALICE ITS3 ER1 Sensors



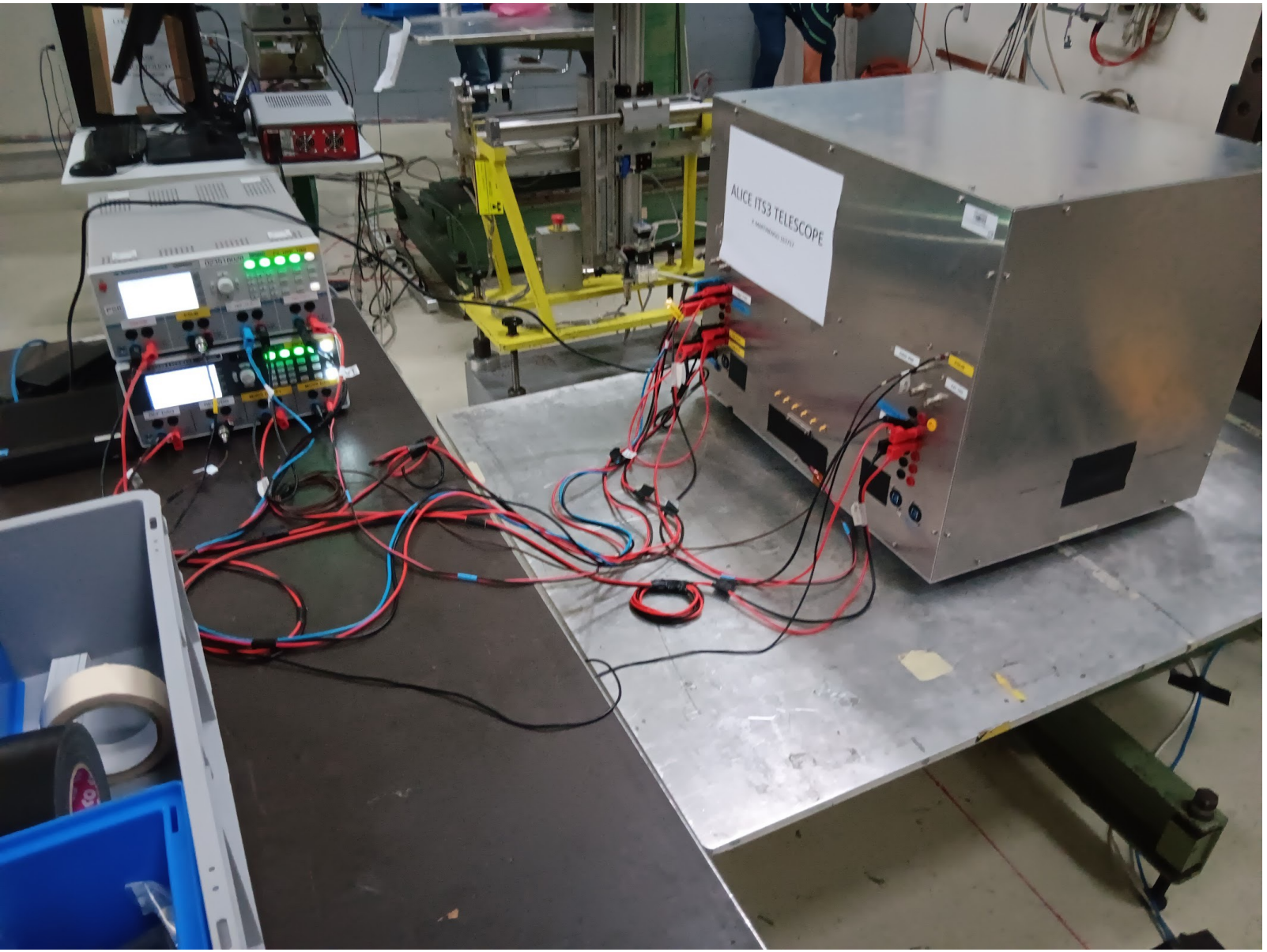


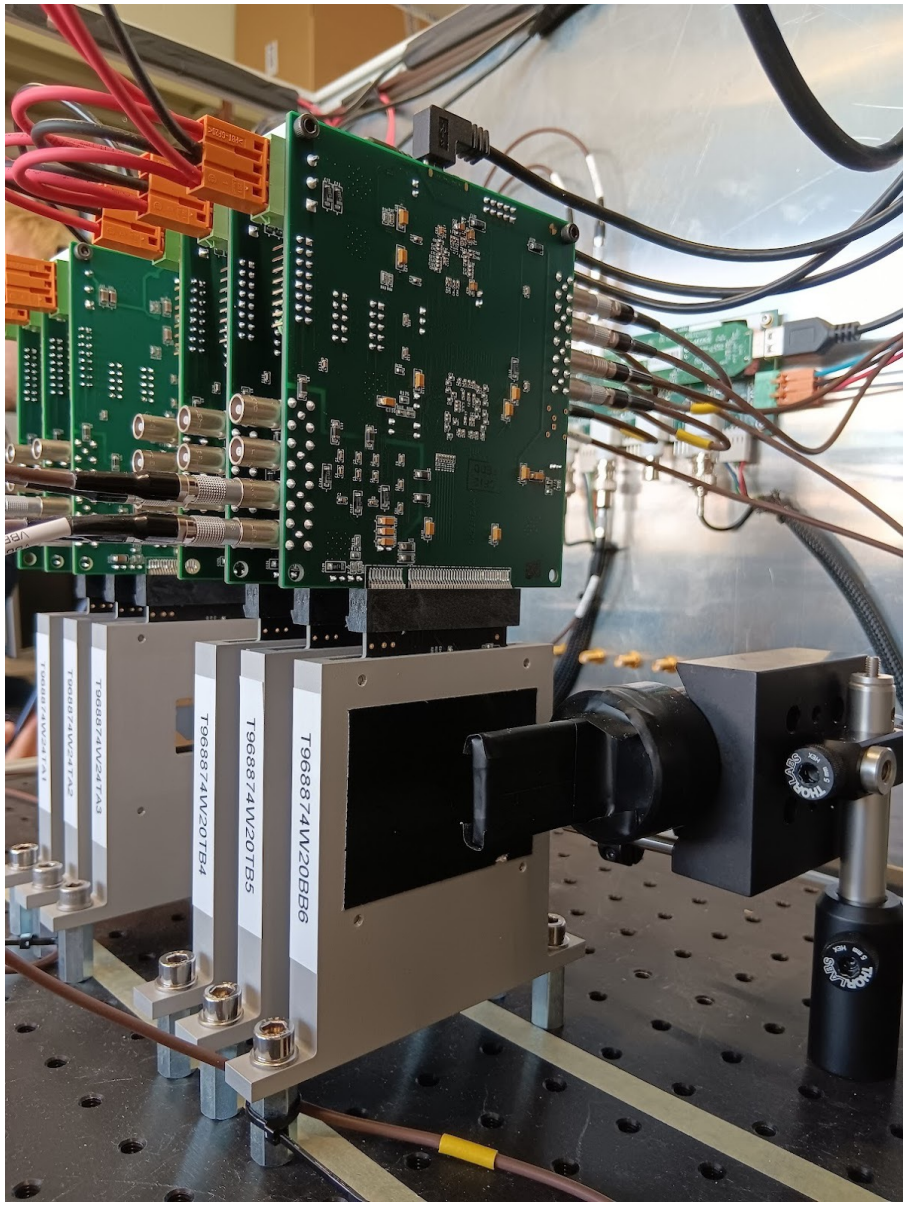
Beam Test Plans for ER1 Sensors

- BabyMOSS SEU/SEL tests with heavy ion beams at UCLouvain HIF Facility next week
- **BabyMOSS SEU/SEL tests with heavy ion beams at LBL BASE Facility in May/June?**

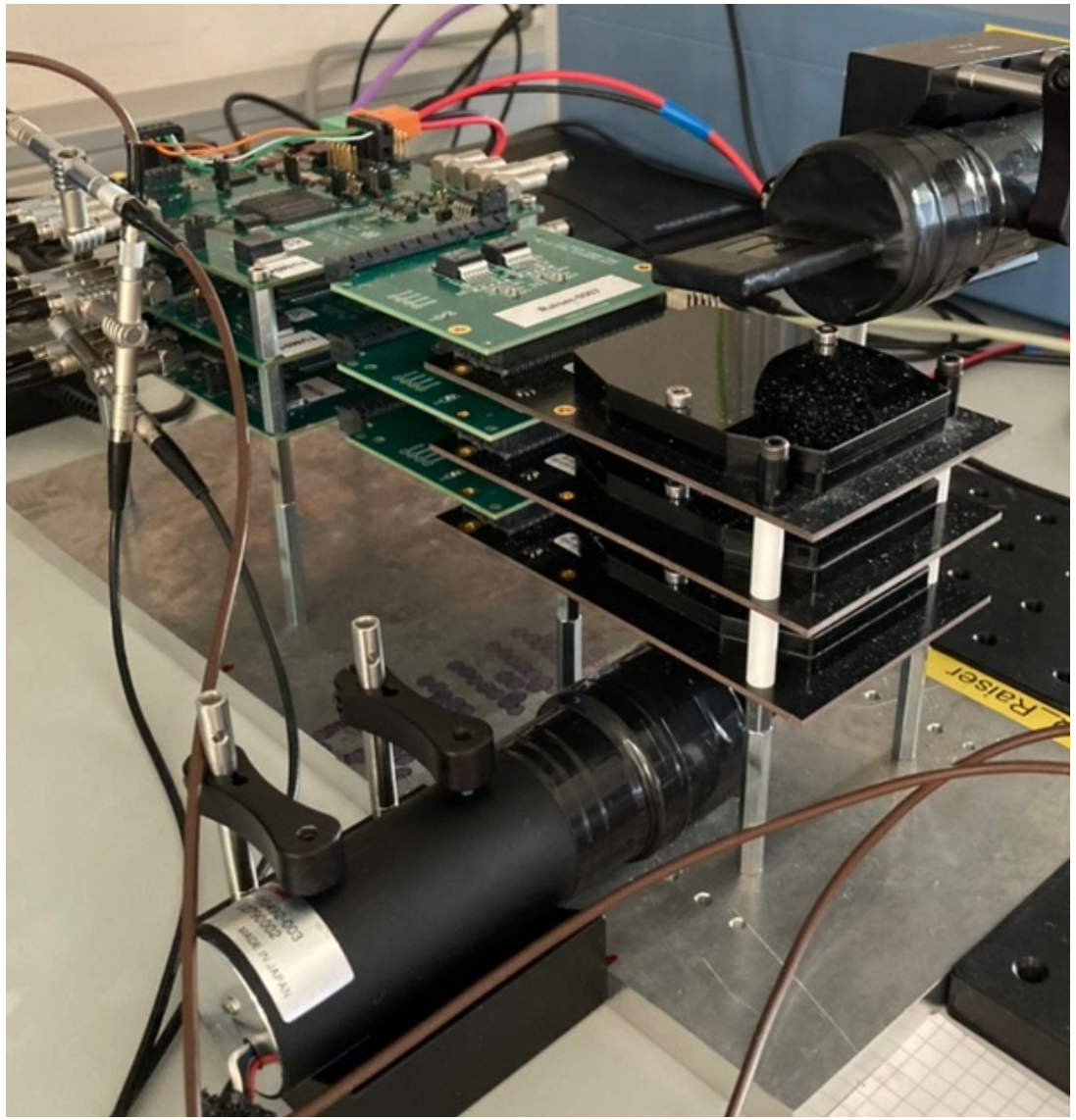
- MOSS beam test on March 22-26 at CERN
- **BabyMOSS beam test on April 10-16 at CERN**
- …
- **BabyMOSS with protons at UC Davis/FTBF? and electrons on June 10-23 at DESY, with a BabyMOSS telescope assembled at LBL**
  - ~6 BabyMoss (loan from CERN)
  - ~6 raiser boards (loan from CERN)
  - ~6 DAQ boards (Yuan: >5 good ones at LBL)
  - Power supplies
  - Trigger scintillators and PMTs
  - Box and support frames
  - Motors to move/rotate DUT

ALICE ITS3 Beam Telescope



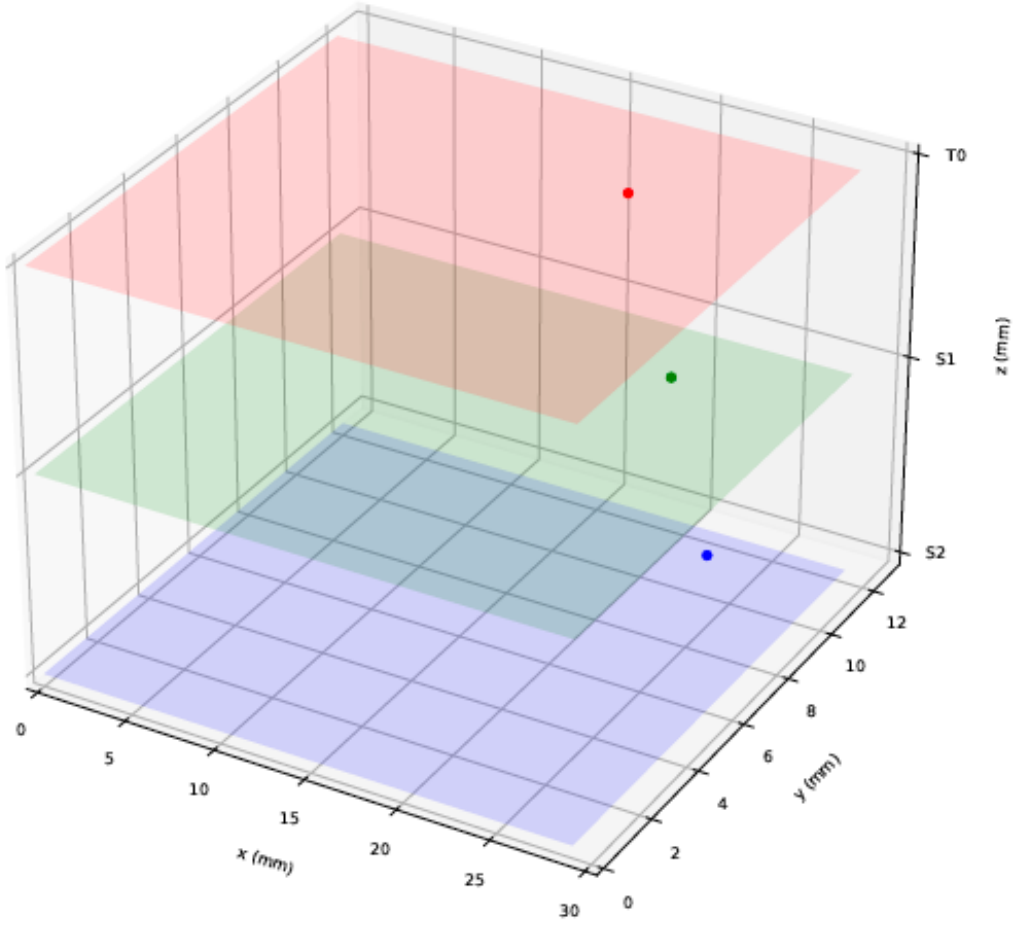


Baby Moss Telescope

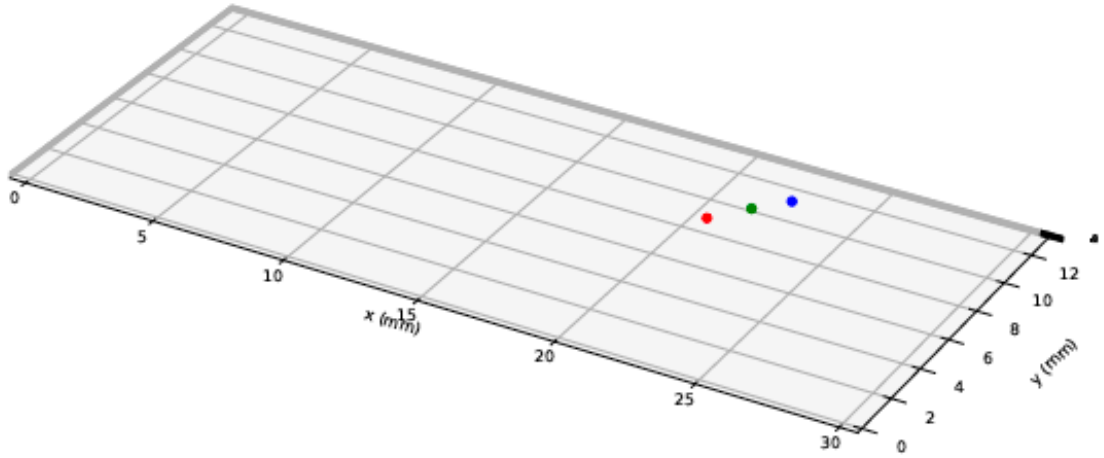


- Changes to the baby-moss FW (and SW) to fix DAQ hanging problem with high trigger rate
  - The trigger module output is enabled only when busy is low
  - Also added a control register to the trigger module to enable/disable output
  - When event FIFO is full, raise the busy signal until FIFO is empty
- The system was tested ok with triggers from a pulse generator at 2 kHz (in prep. for beam)
- Assembled a baby-moss telescope for cosmic
  - 1 trigger board, 3 sets of baby-moss sensor + DAQ + raiser boards separated by ~2.3 cm each, 2 scintillators on top and below for triggering
  - The trigger and busy lines of the DAQ and trigger boards are daisy-chained together
  - Recorded ~4k events at ~1.1 Hz over the weekend, ~10% having hits in all 3 sensors

Recorded Cosmic Events

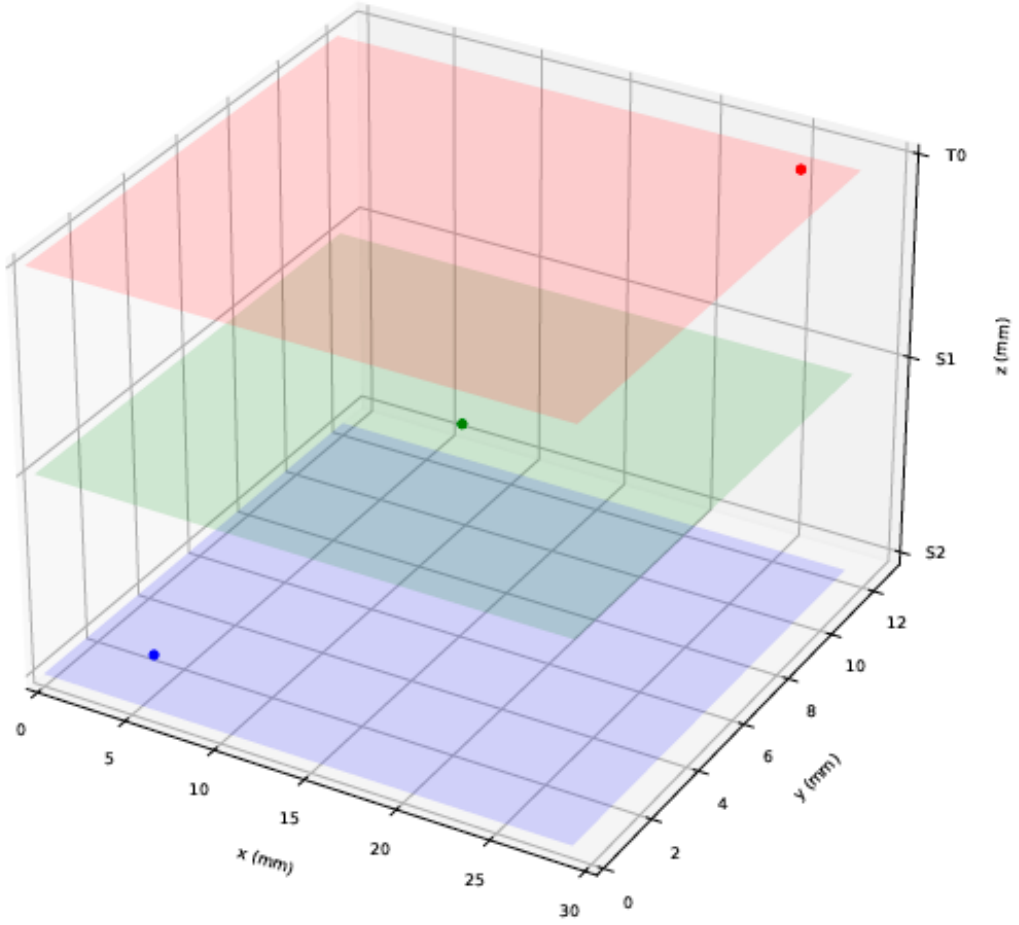


More can be found under [cosmic_event.pdf]

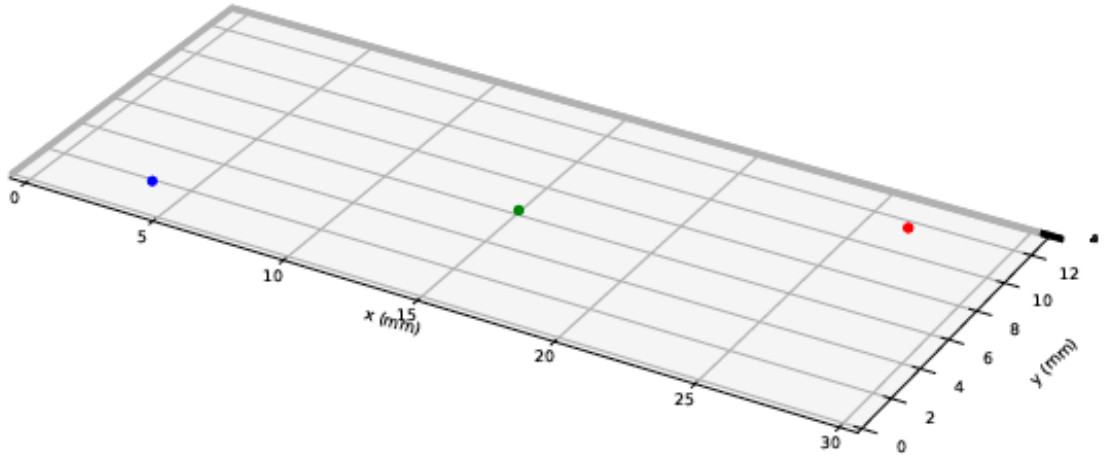


Very first event with hits in all 3 planes recorded on Feb 16, 2024

Recorded Cosmic Events

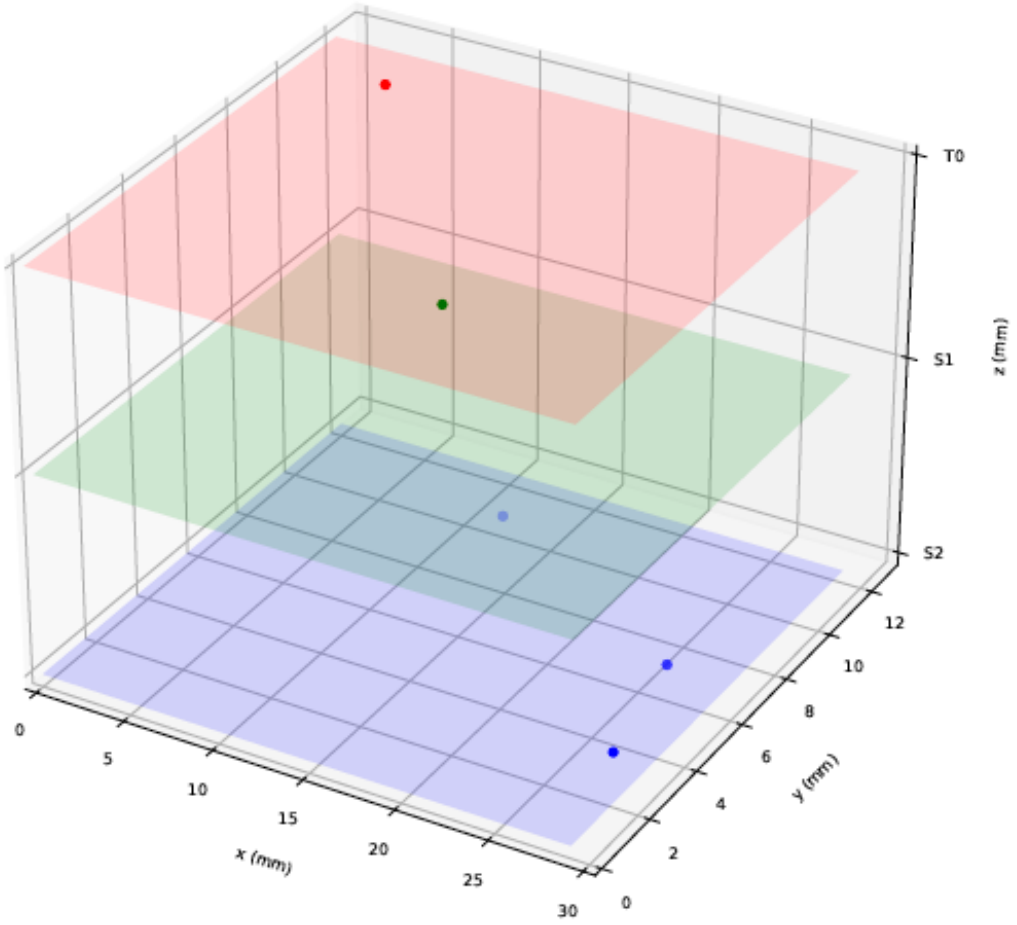


More can be found under [cosmic_event.pdf]

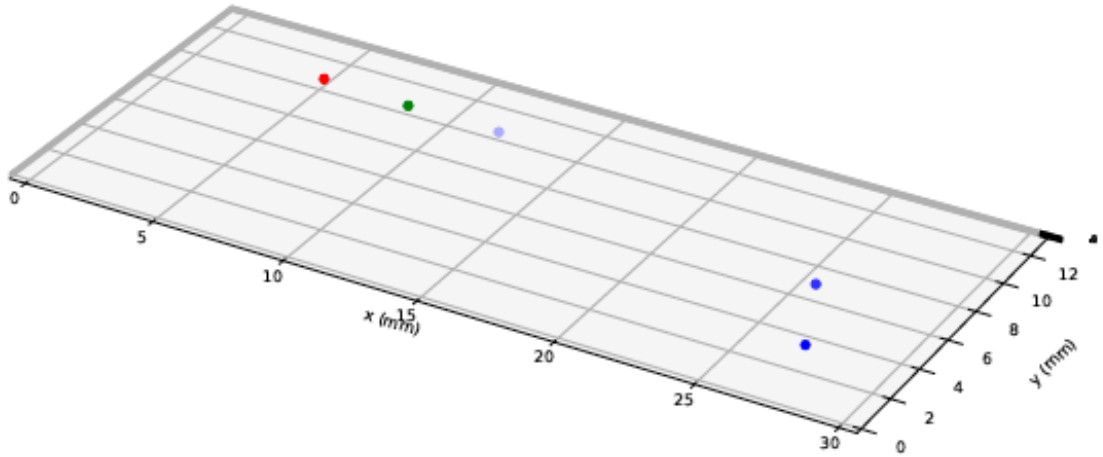


An event with large crossing angle to the baby moss sensors

Recorded Cosmic Events

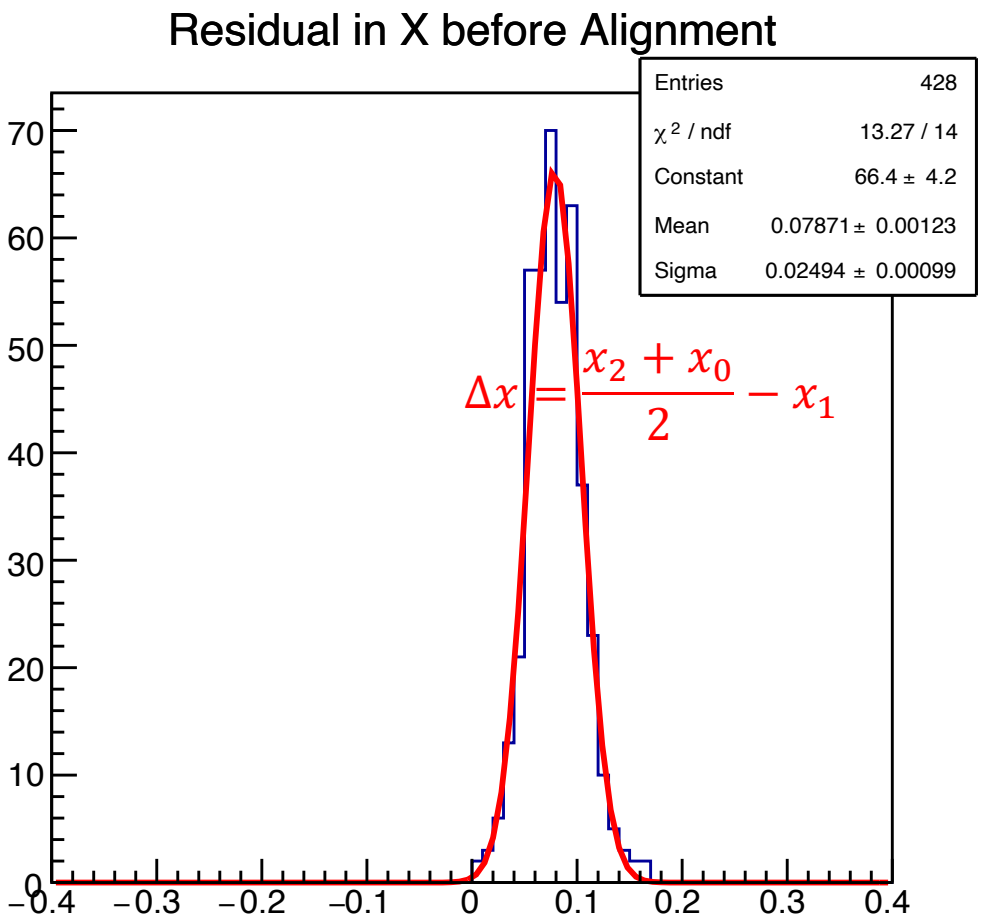


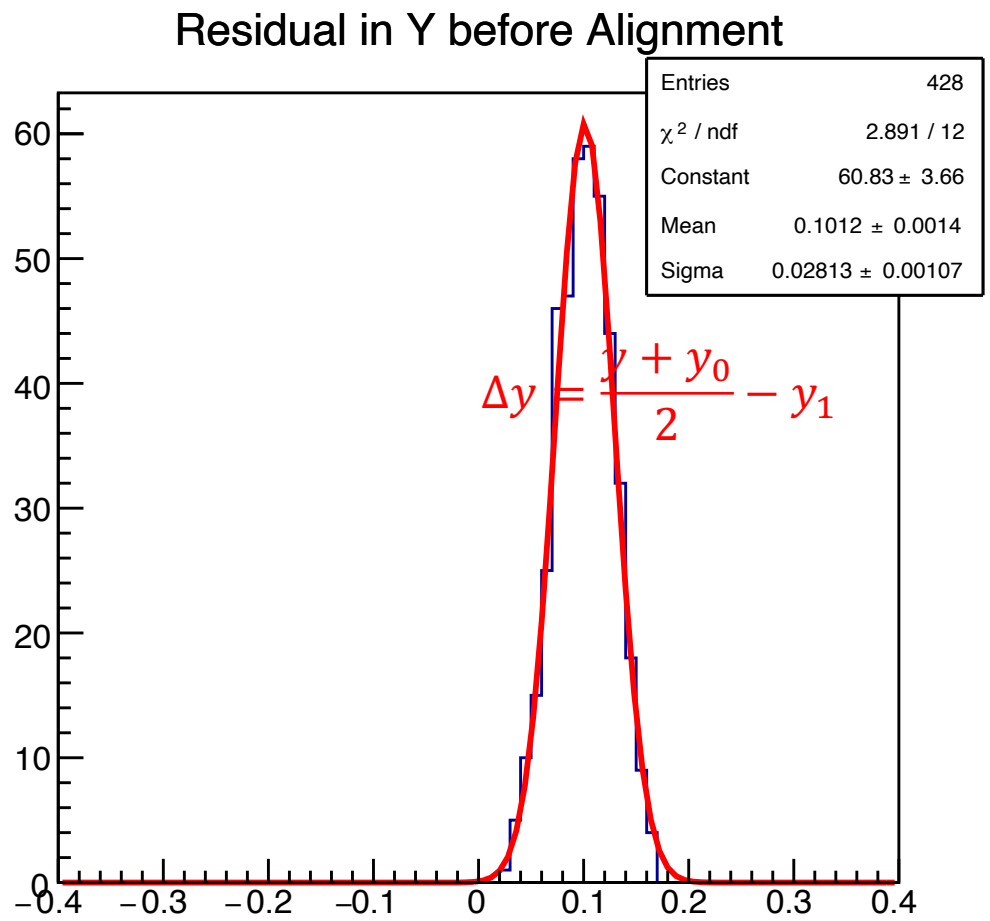
More can be found under [cosmic_event.pdf]



An event with both signal and noise hits

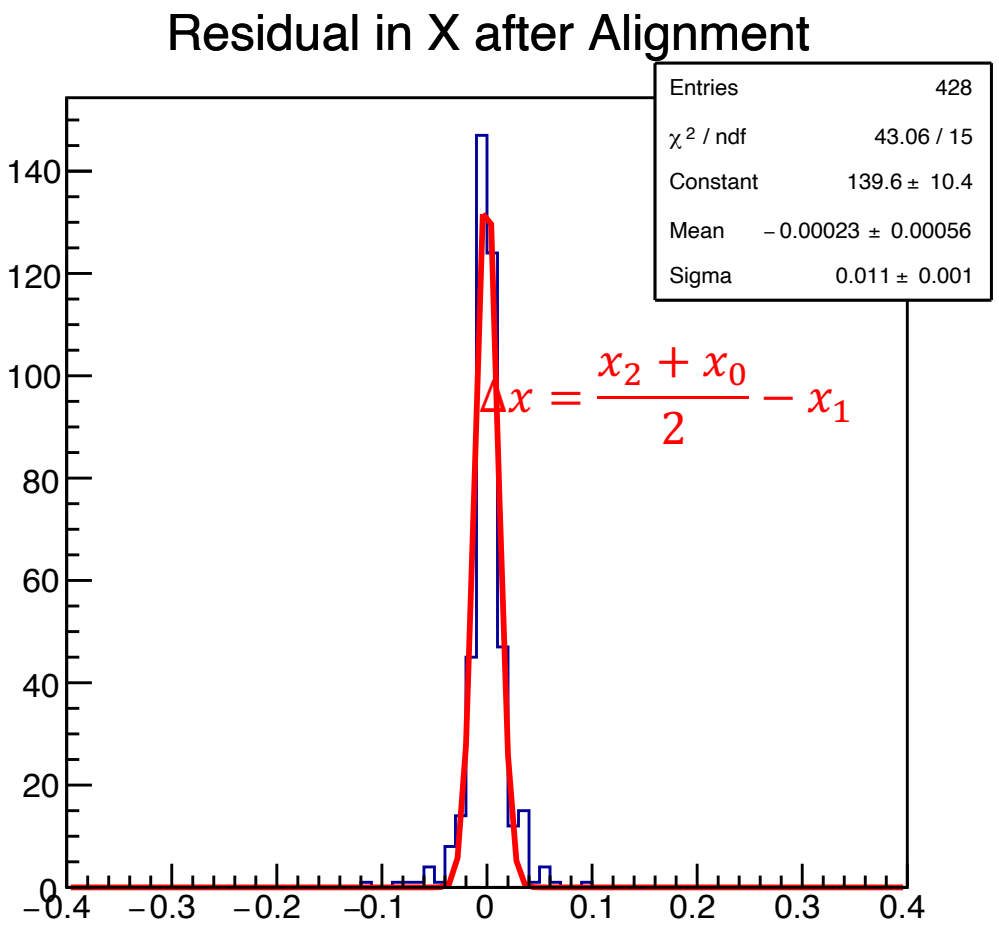
Residuals and Spatial Resolution

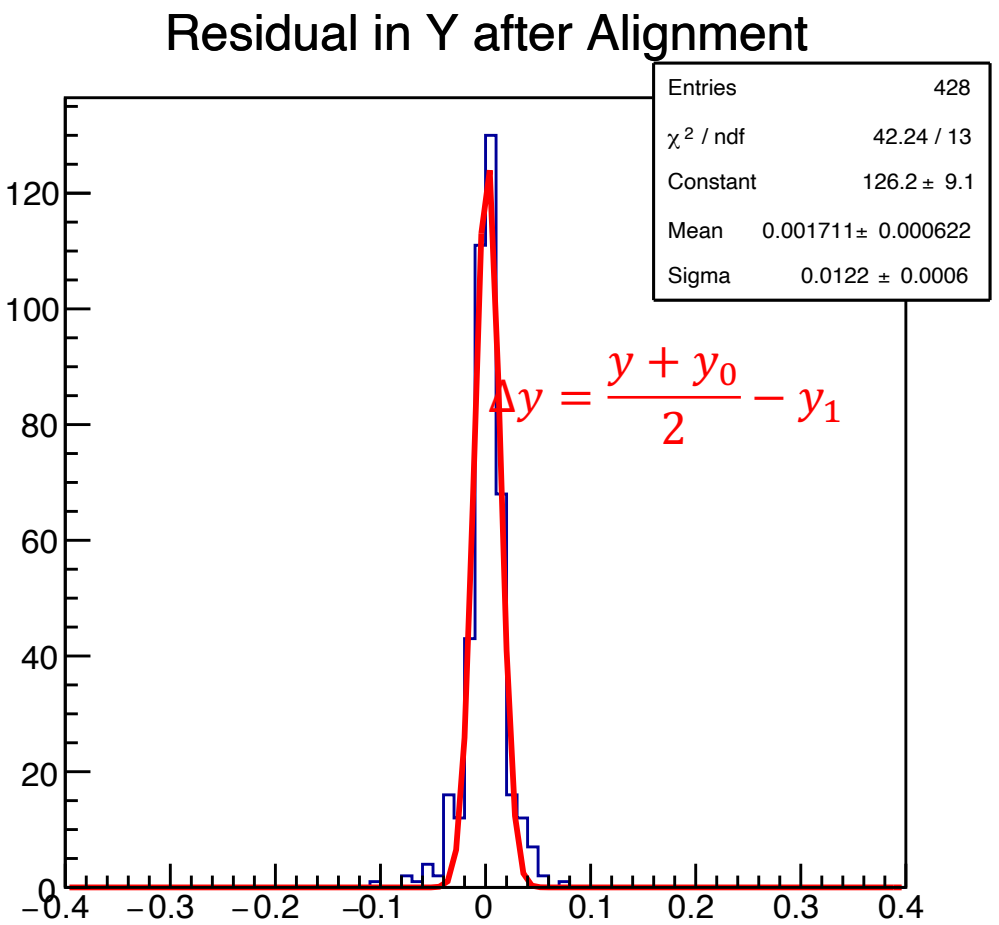




w/o alignment: 30 um residuals => ~17 um single plane resolution

Residuals and Spatial Resolution





with alignment: 12 um residuals => ~7 um single plane resolution