FCFD status

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EPIC Electronics & DAQ WG meeting : eRD109 Monthly Progress Reports

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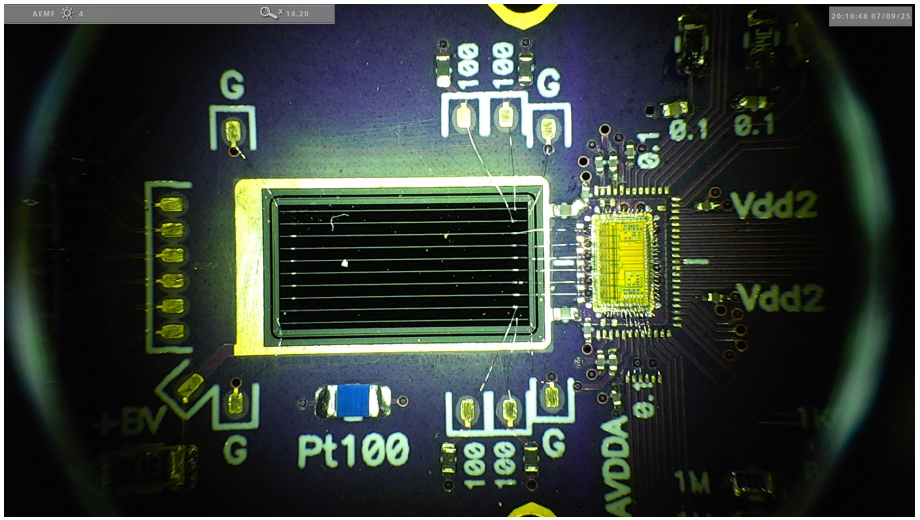
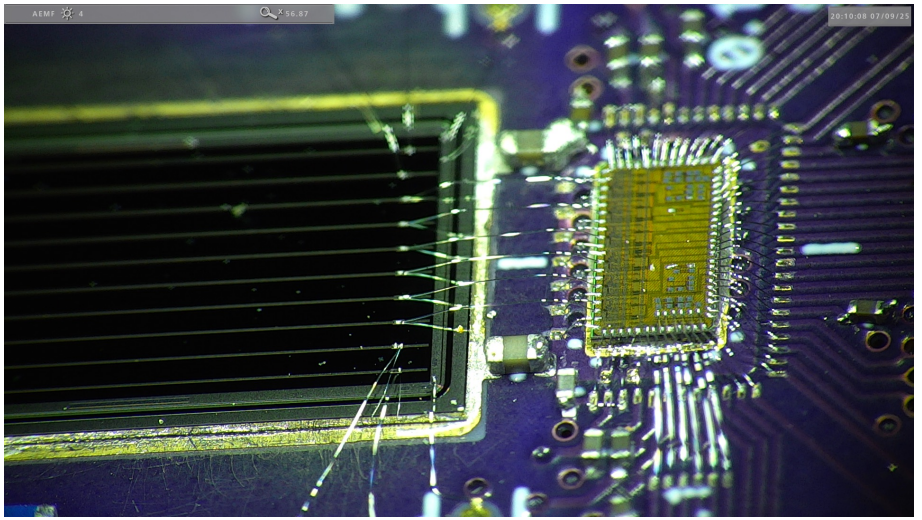
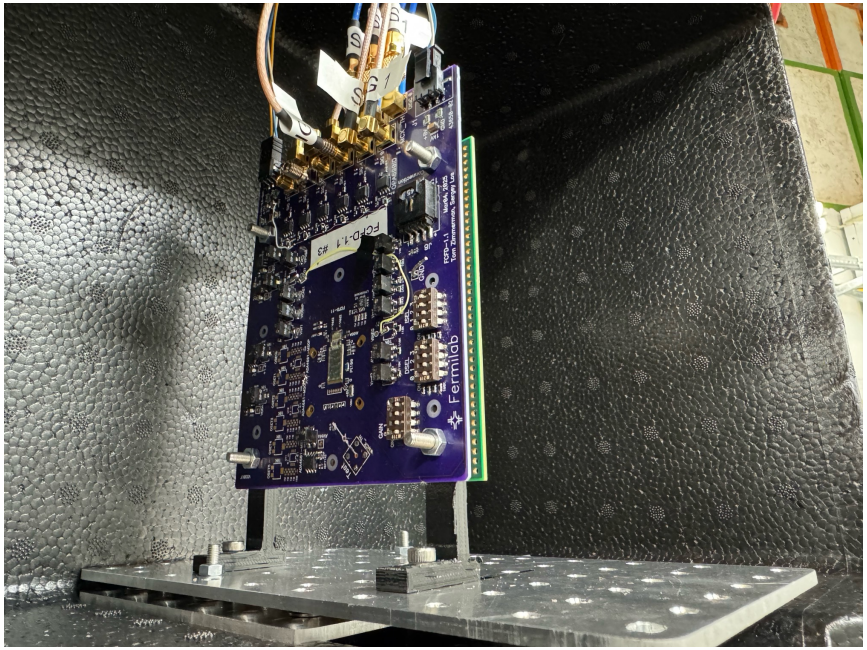
FCFDv1.1 testing status

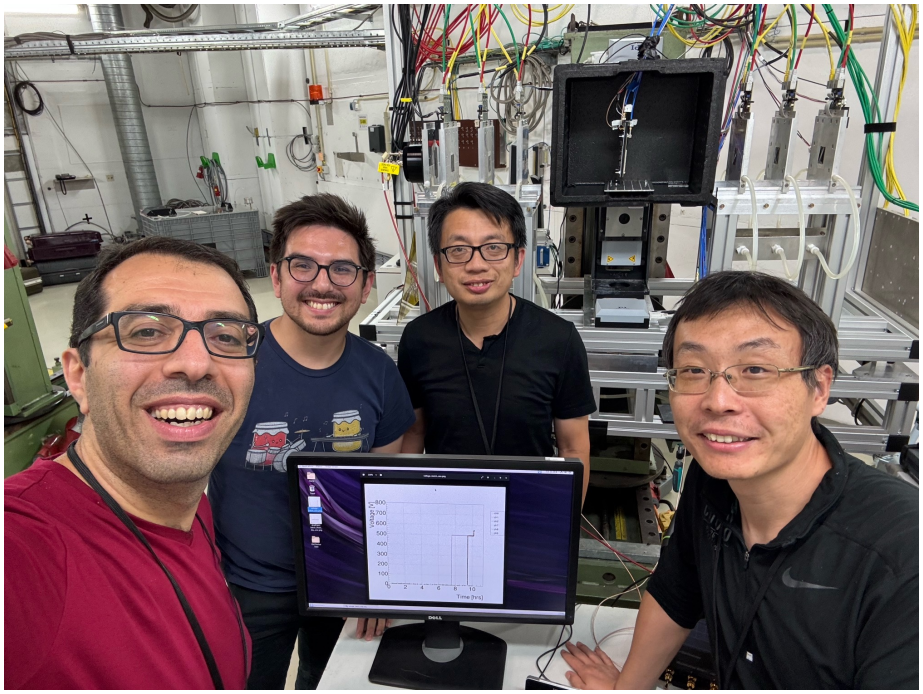
- Chip was received in Fermilab in early June.
- Mounted on testing board and testing started immediately
  - Wirebonded to a HPK 1-cm strip sensors, 6 strips connected
  - Sensor specs as we agreed in the previous presentations
- Test-beam campaign in DESY and CERN in Summer 2025





Test beam campaigns in DESY and CERN

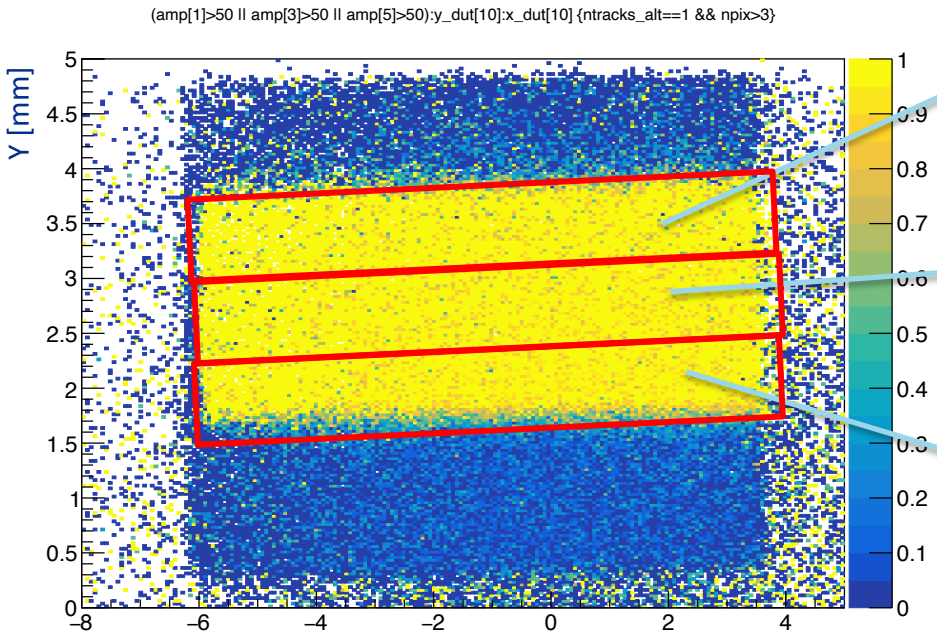


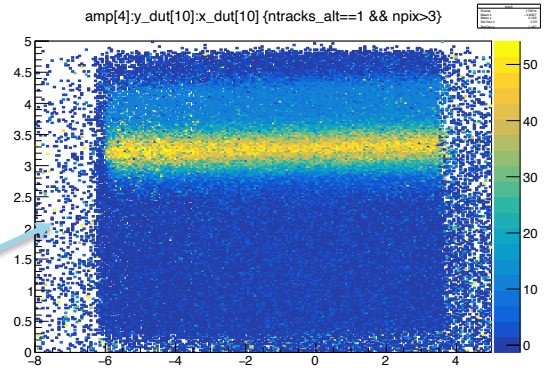


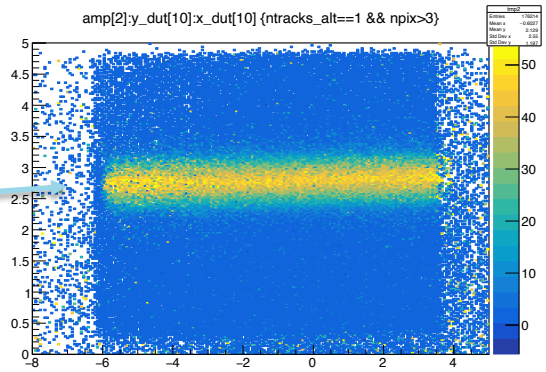
Fermilab

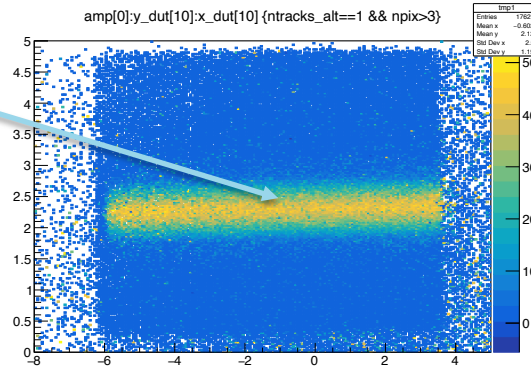
Test beam measurements with FCFD1.1

- Demonstrated 100% detection efficiency with particle beams
- Readout is fully analog for this prototype
  - All channels fully functional, perform as expected





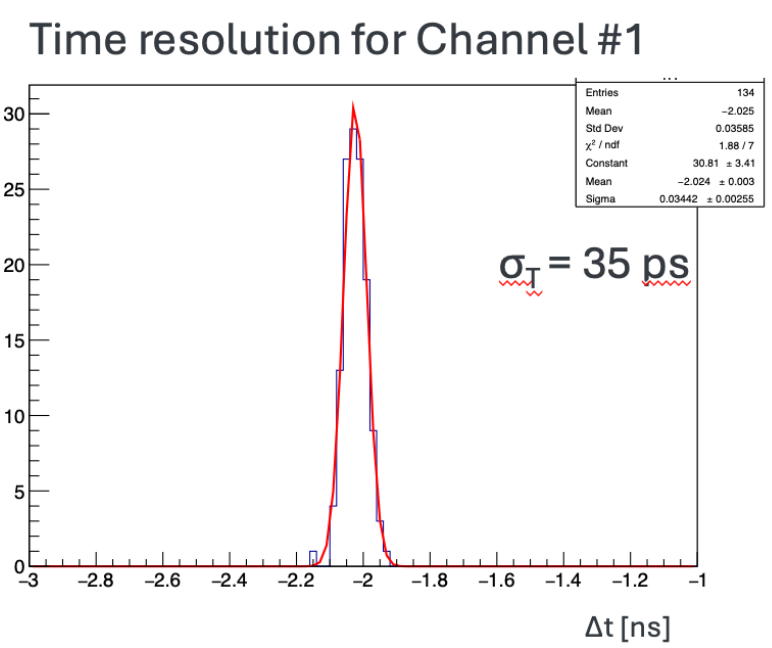


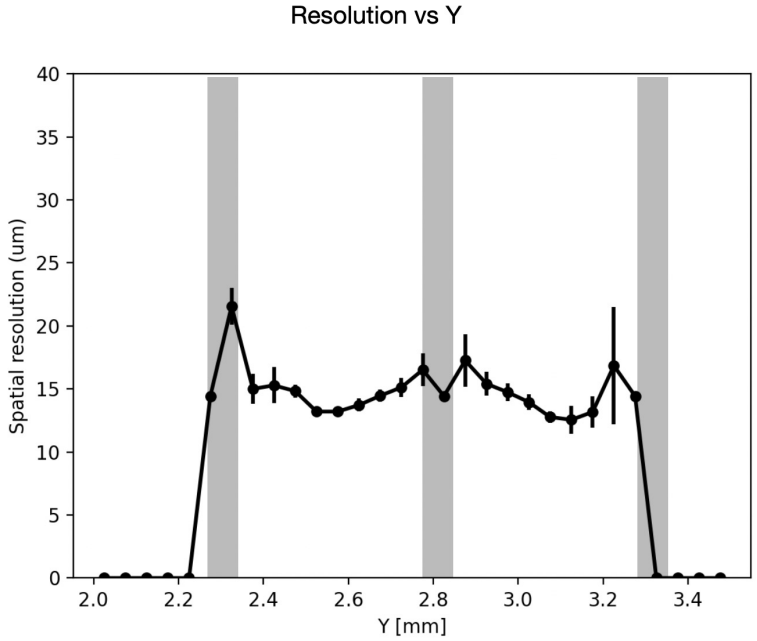


100% detection efficiency across 3 channels

Test beam measurements with FCFD1.1

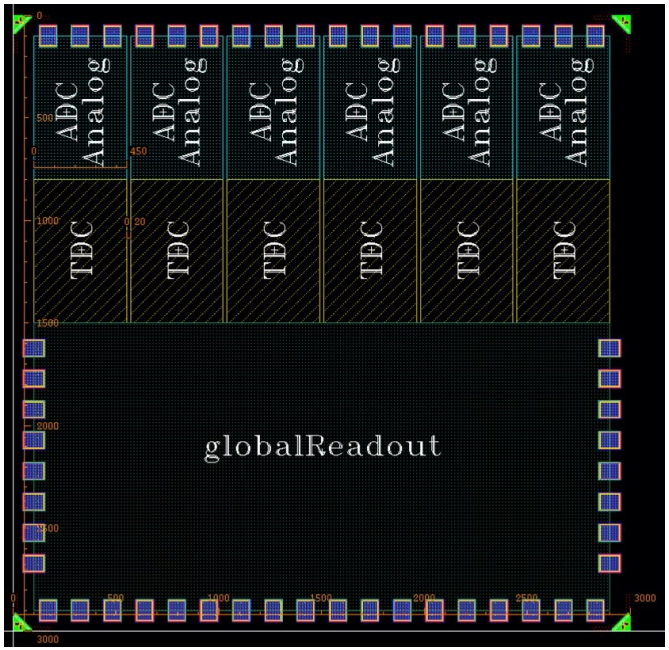
- Time resolution demonstrated to be within specifications
  - Measured **time resolution ~40 ps** across sensor surface
  - Measured **spatial resolution ~15-20 µm**
  - Compatible with reference measurements from same sensor performed with commercial, high-power amplifiers





Design status for FCFD1.2

- FCFD1.2 will implement TDC, ADC, I2C, and simplified readout on a 6-channel chip
  - Goals: test and verify all main components
  - Aim to submit by the end of 2025
- Design status
  - Design of the TDC and I2C is complete
  - Data format defined
  - ADC design in progress
  - Started to work on integration and verification of various blocks



Floorplan and I/O