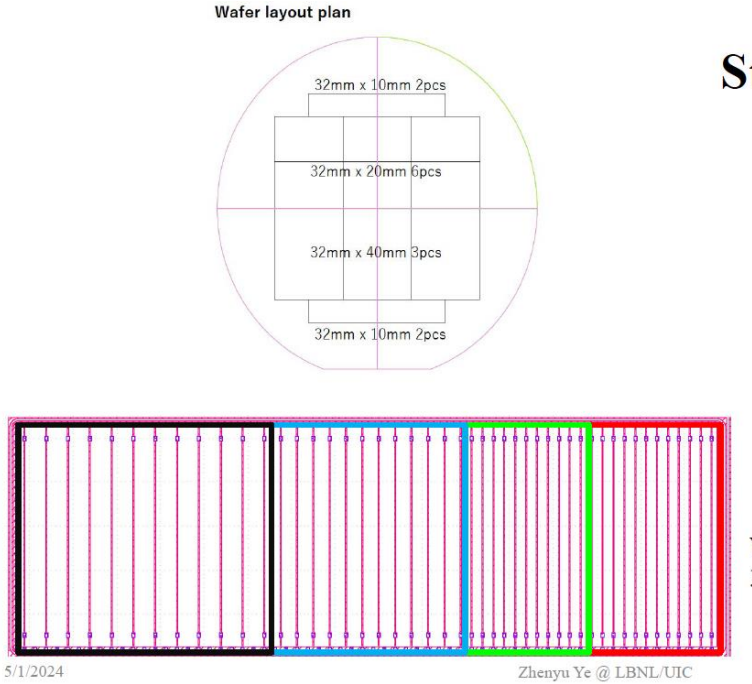
New HPK Production – 2nd

- Strip sensor (UCSC, UIC, LBNL)
  - Four 30-um thick wafers, no significant issue,
  - Four 50-um thick wafers, only 33x11 mm “work”: if the die have early breakdown than expected breakdown voltage (e.g. ~190V for 50um sensor) they just marked fail. Should re-test and judge by yourself



Strip Sensors

Make ALL the strip sensors with

- 12xN strips with 500 um pitch, 1 cm length, 40 um width

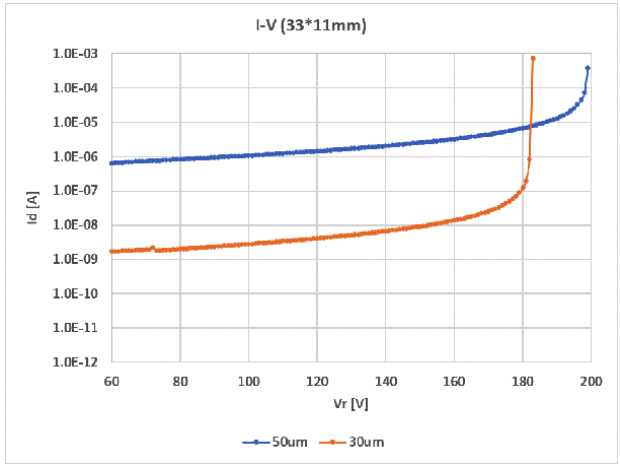
12xN strips with 500 um pitch, 1 cm length, 50 um width

12xN strips with 750 um pitch, 1 cm length, 50 um width

12xN strips with 1000 um pitch, 1 cm length, 50 um width

while the sensor area will still be 3.2*1, 3.2*2 or 3.2*4 cm^2

		OK chip					
	type	33*11(4pcs)	%	33*21(6pcs)	%	33*41(3pcs)	%
50um	W/No.1	1	25%	0	0%	0	0%
	W/No.2	4	100%	0	0%	0	0%
	W/No.3	2	50%	0	0%	0	0%
	W/No.4	1	25%	0	0%	0	0%
	W/No.5	1	25%	0	0%	0	0%
	W/No.6	3	75%	0	0%	0	0%
	W/No.7	2	50%	0	0%	0	0%
	W/No.8	2	50%	0	0%	0	0%
	W/No.9	2	50%	0	0%	0	0%
	W/No.10	1	25%	0	0%	0	0%
	W/No.11	2	50%	1	17%	0	0%
	W/No.12	1	25%	2	33%	0	0%
30um	W/No.13	3	75%	4	67%	2	67%
	W/No.14	3	75%	3	50%	0	0%
	W/No.15	4	100%	5	83%	2	67%
	W/No.16	3	75%	1	17%	0	0%
	W/No.17	4	100%	5	83%	1	33%
	W/No.18	2	50%	2	33%	0	0%
	W/No.19	4	100%	5	83%	1	33%
	W/No.20	4	100%	3	50%	1	33%
	W/No.21	4	100%	3	50%	1	33%
	W/No.22	4	100%	5	83%	1	33%
	W/No.23	4	100%	5	83%	3	100%
	W/No.24	3	75%	5	83%	1	33%



- Pixel sensor (two 20 and two 30-um wafers)
  - Order placed by UIC on 12/6/2024. May take 3-4 months for sensor production and shipping by HPK, Japan

Sensor Development PED Requests

LBNL

1. Integrate and commission the beam telescope with 6 babyMOSS and 4 DC-LGAD+ETORC2 reference planes => 0.25-month physicist (in-kind), 1.5-month EE (PED)

2. Design mechanical, electrical, firmware and software interfaces to integrate new HPK sensors into the beam telescope => 0.25-month physicist (in-kind), 1.5-month EE (PED), 0.5-month tech (PED)

3. Contribute to data taking at test beam facilities => 0.25-month physicist (in-kind)

4. Contribute to beam data analysis => 0.25-month physicist (in-kind)

UIC

1. Continue collaborating with other eRD112 Institutions on the telescope developments to integrate AC-LGAD sensors => Machine shop

2. Take part in commissioning and data-taking at FNAL's Test Beam Facility (or alternative testing sites, if necessary) => 0.2 FTE (in-kind)

3. Design and develop a cold-box setup for operations in a temperature-controlled environment and study of device functionality as a function of temperature and at its' extremes

Sensor Development PED Requests

LANL

1. Visit UCSC to perform irradiated pixel sensor performance studies => 0.05FTE (PED)

2. Participate beam test studies for pixel sensors at FNAL and JLab => 0.05 FTE (PED) and 0.05 FTE (in-kind)

3. Contribute to offline analysis for pixel sensor bench and beam tests => 0.1 FTE (PED) and 0.2 FTE (in-kind)

4. Work on a new LANSCE beam use proposal to request new irradiation tests for the relevant components of the ePIC HE TOF => If we will be granted the beam time, the shipping and equipment handling at LANL need some M&S funds to support.

Hiroshima University

1. Selection of devices to be purchased and establishment of temperature control system;

2. Measurement of the temperature dependence of leak current and sensor performance with the radiation source;

3. Measurement of the temperature dependence of sensor performance by the test beam in Japan (KEK, Tohoku University)

Sensor Development PED Requests

UCSC

1. Revise the readout board for large sensor testing.

2. Test the first full-size HPK sensors using laser TCT systems.

3. Participate in test-beam efforts in 2025 => 0.2 FTE

4. Test irradiated sensors from IJS and FNAL ITA. Organize new irradiation campaign with the new full-size HPK sensors.

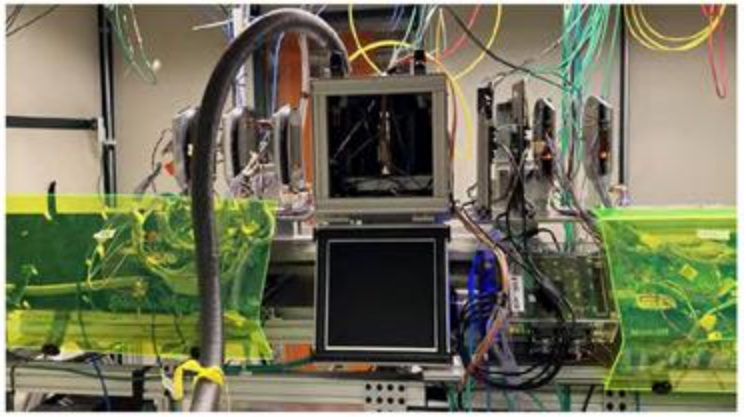
5. Run TCAD Sentaurus simulations to better understand the sensors behavior.

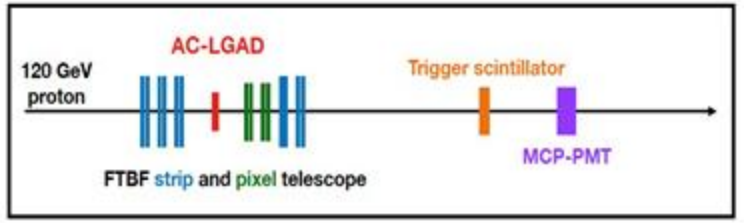
BNL

?

Test Beam Requests

- Fermilab Beam Test
  - FY25



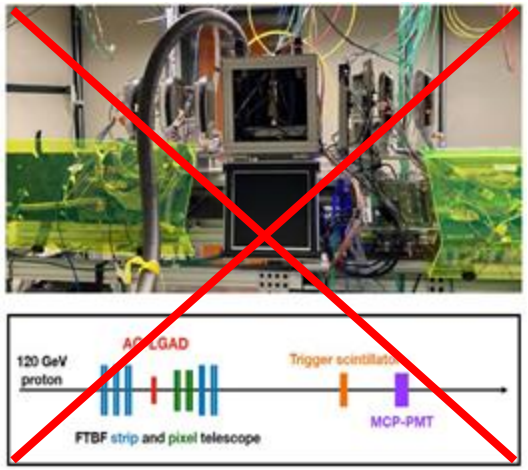


- Jlab Hall-D parasitic beam test
  - Feb 2025
    - Commission telescope setup, take data with HPK strip sensors
  - July 2025 (TBD)
    - ?

- KEK/Tohoku Univ beam test
  - April-September 2025

Test Beam Requests

- Fermilab Beam Test
  - ~~FY25~~



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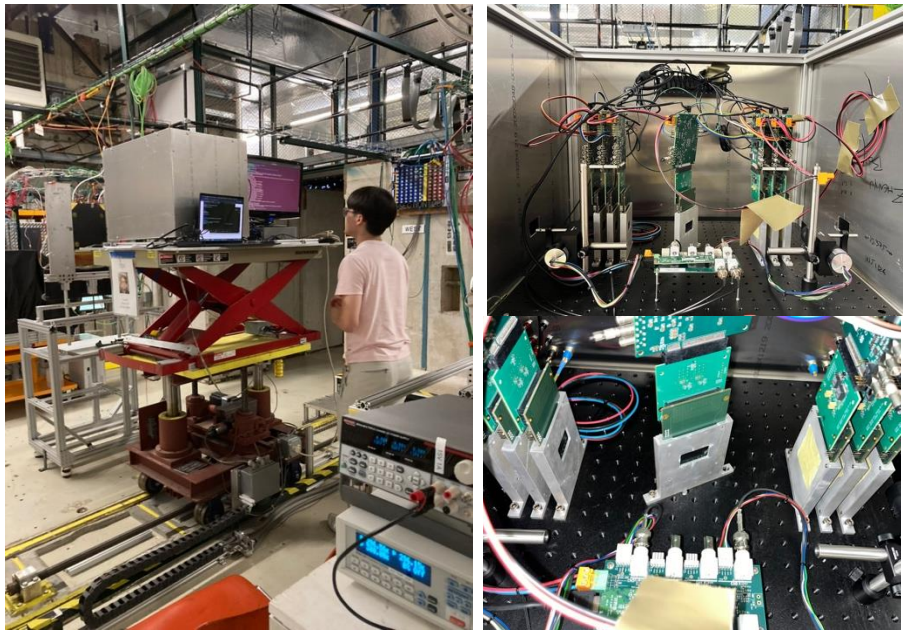

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