

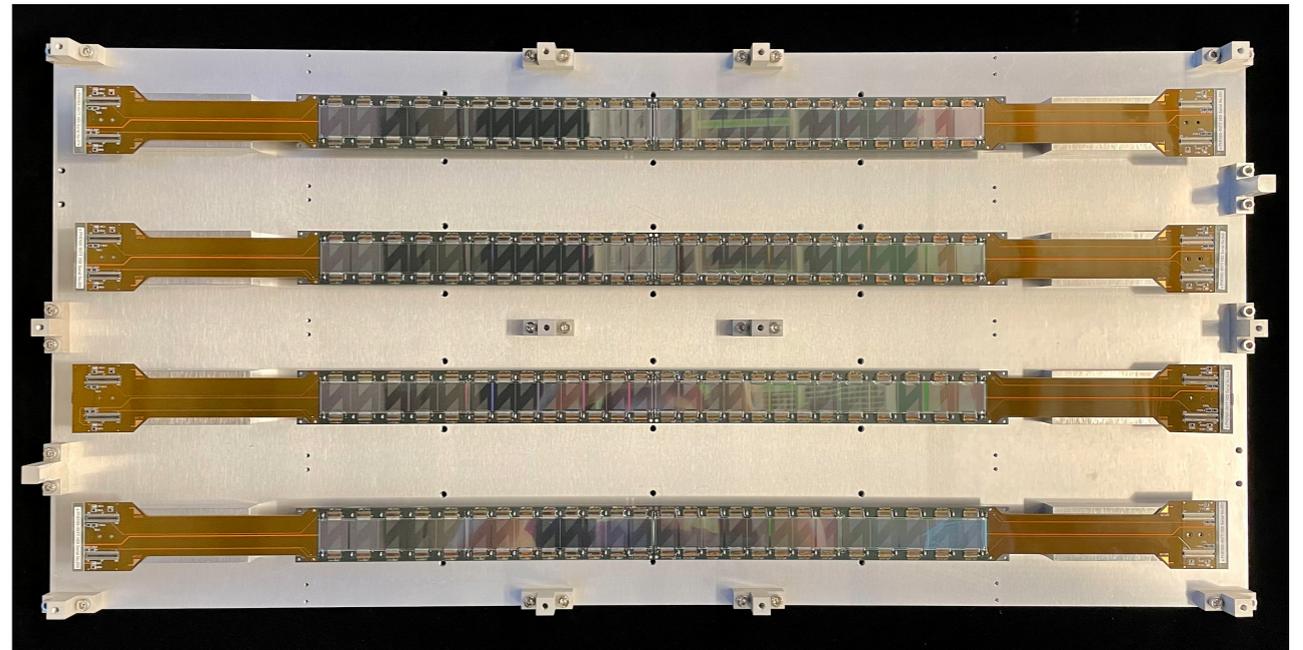
INTT ladder assembly progress in Taiwan

Goal : 40 ladders assembled in Taiwan

- All materials were received
- 17 ladders have been assembled
 - Class-1 : 11 ladders
 - Class-2 : 2 ladders
 - Not yet tested : 2 ladders

Practice, bad modules were used

Stave ID	Module		done ?	# bad channel	class
	N	S			
"01-0015"	74	262	Y	2460	5
"01-0060"	51	264	Y	144	3
"02-0028"	44	pre004	Y	43	2
"02-0049"	263	48	Y	0	1
"02-0052"	254	49	Y	0	1
"02-0046"	255	257	Y	1	1
"02-0039"	77	78	Y	2	1
"02-0040"	73	71	Y	6	1
"02-0019"	53	54	Y	0	1
"02-0016"	52	55	Y	3	1
"02-0013"	58	59	Y	0	1
"02-0001"	253	256	Y	0	1
"02-0074"	76	261	Y	63	2
"02-0080"	24	258	Y	4	1
"02-0077"	57	259	Y	31	1
02-0083"	247	246			
"02-0056"	267	333			

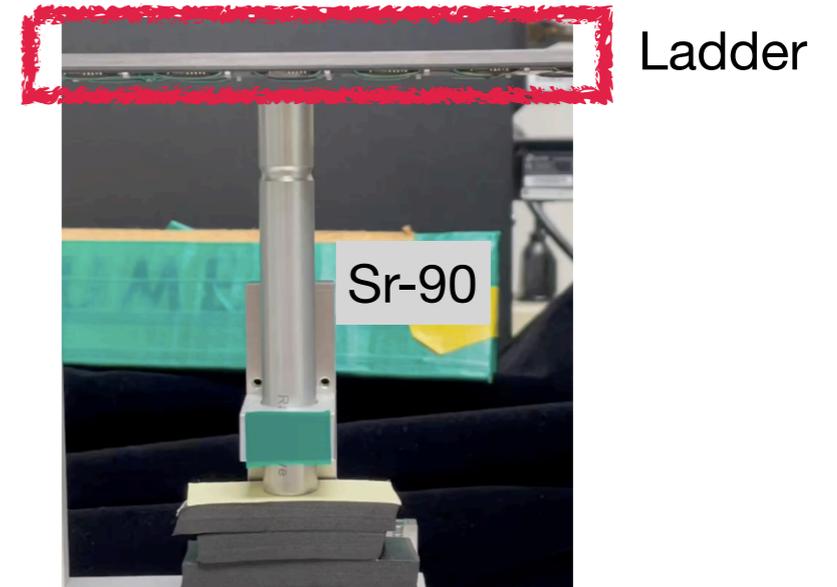
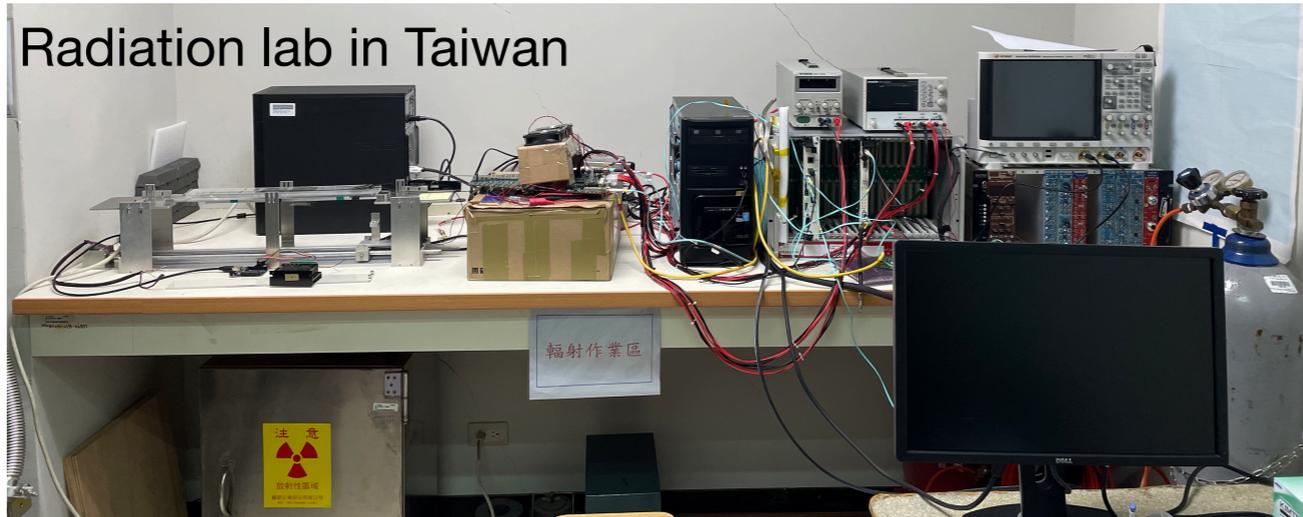


		Total	Good	Not yet tested
Half-ladder	Chip assemble on HDI	3	1	2
	Sensor assemble on HDI	5	1	4
	Post-encapsulation	6	0	6
	Post-thermal cycle	22	22	0

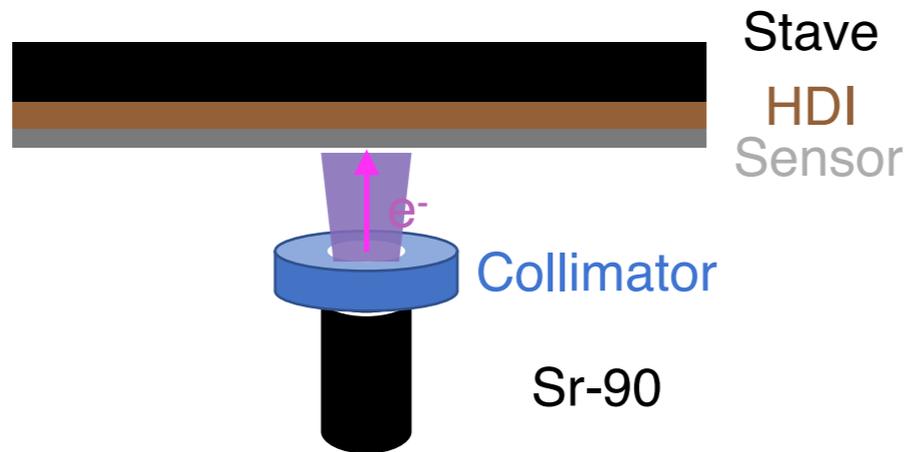
28 half-ladders are ready for ladder assembly
(2 half-ladders + 1 stave = 1 ladder)

Assembly working in progress, it will be finished in the spring.

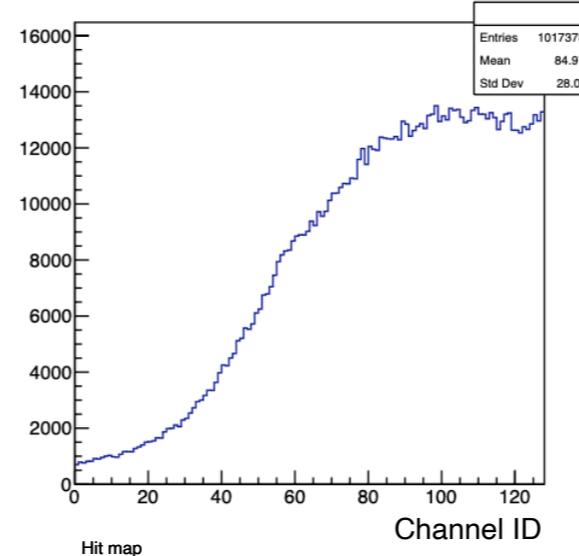
INTT ladder tested with source



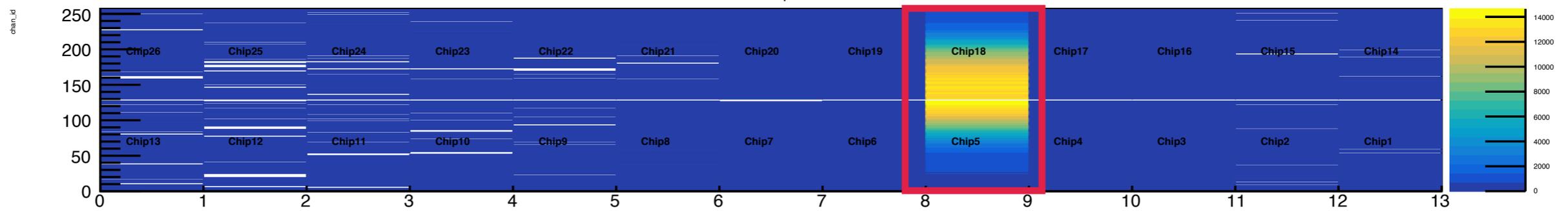
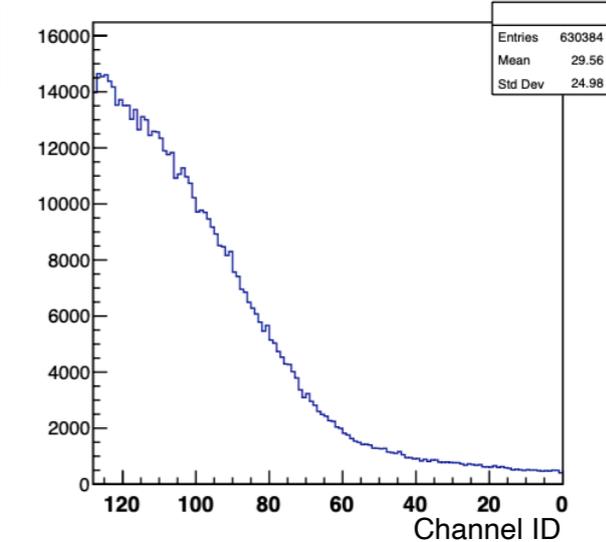
Silicon faces down



chip id : 18



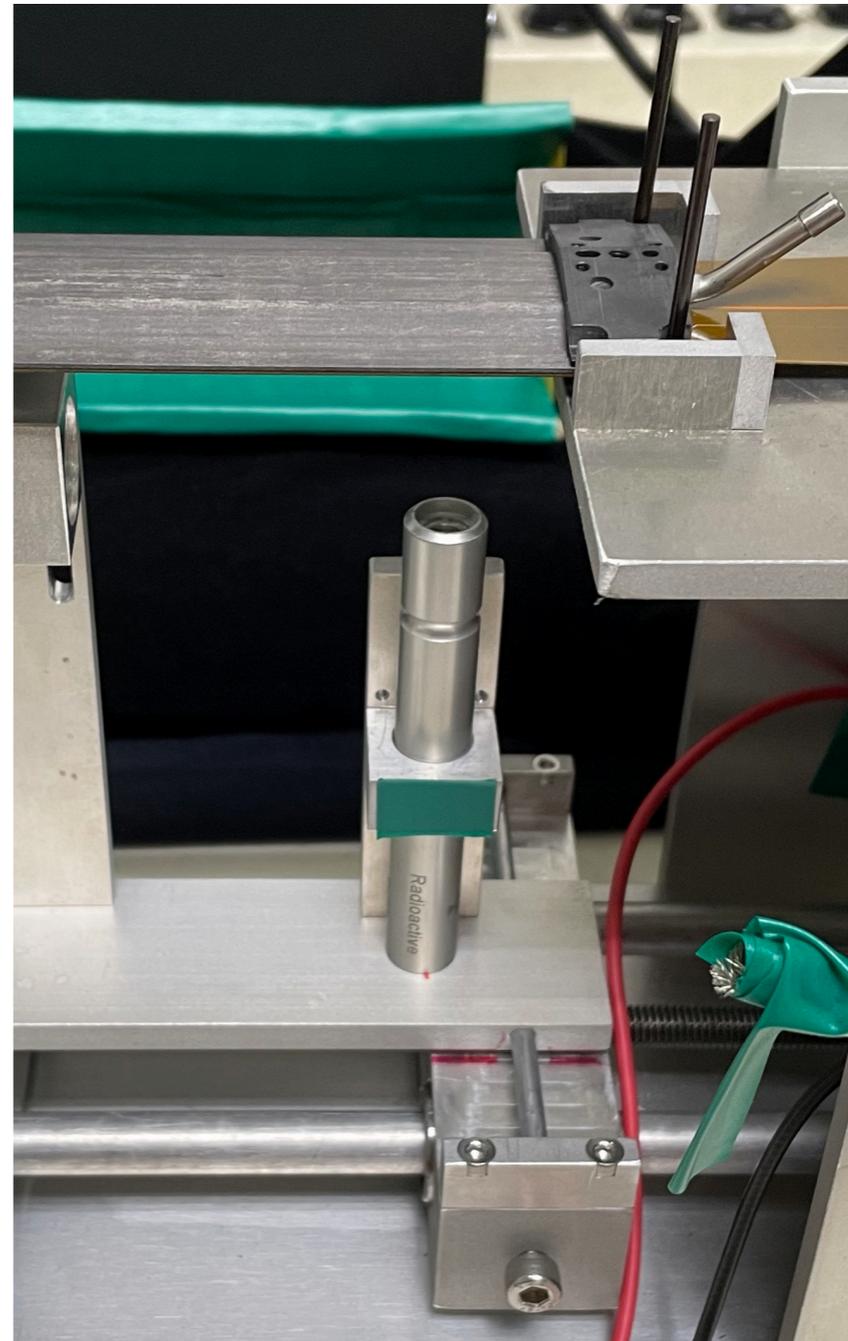
chip id : 5



Taiwan ladder is proved to be functioning, all TW ladders will test with source

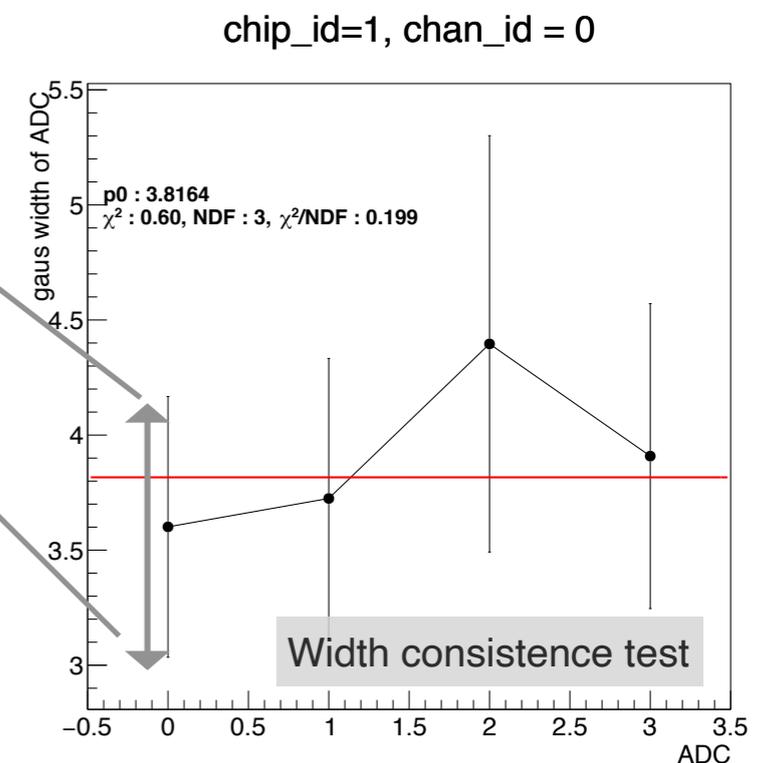
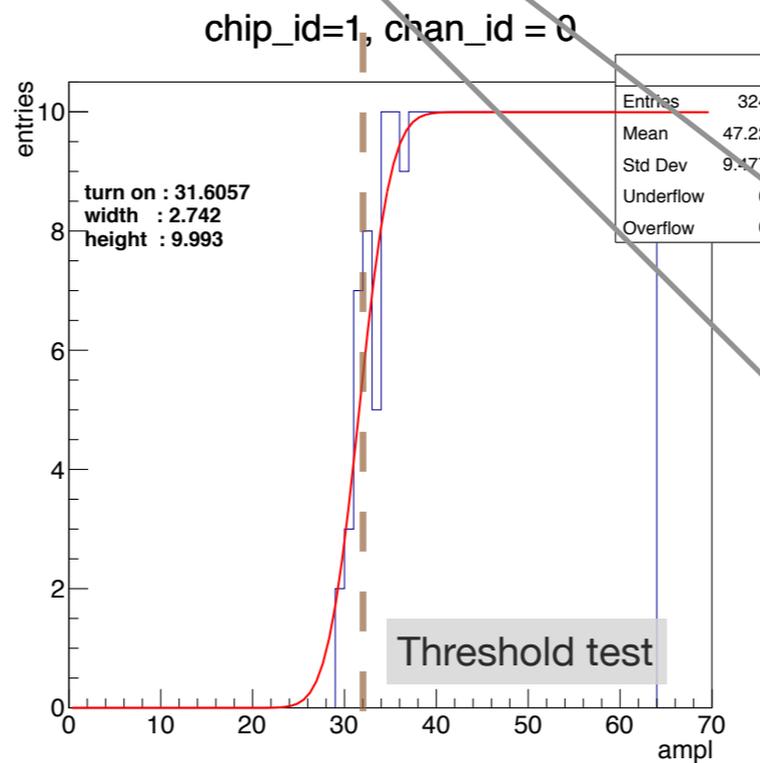
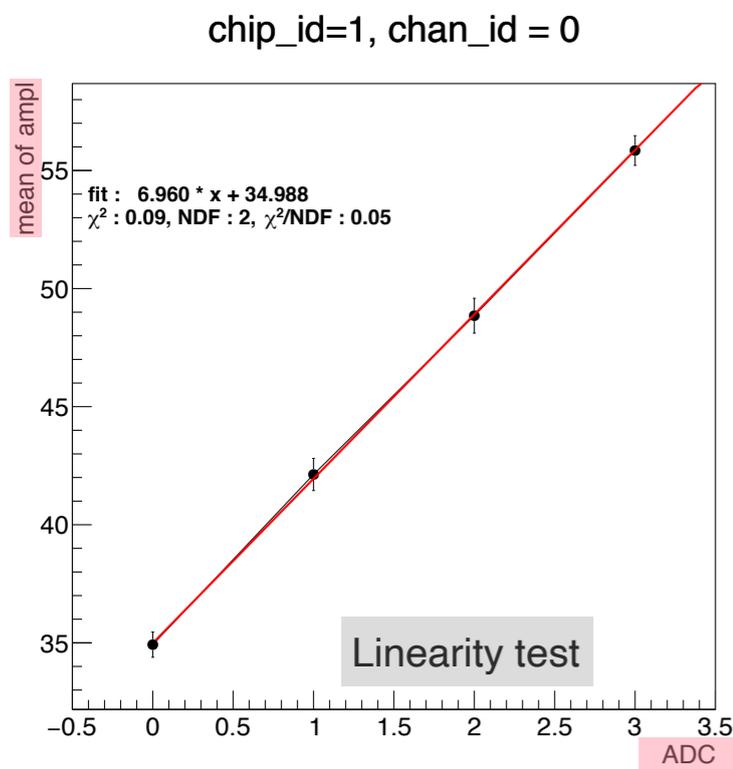
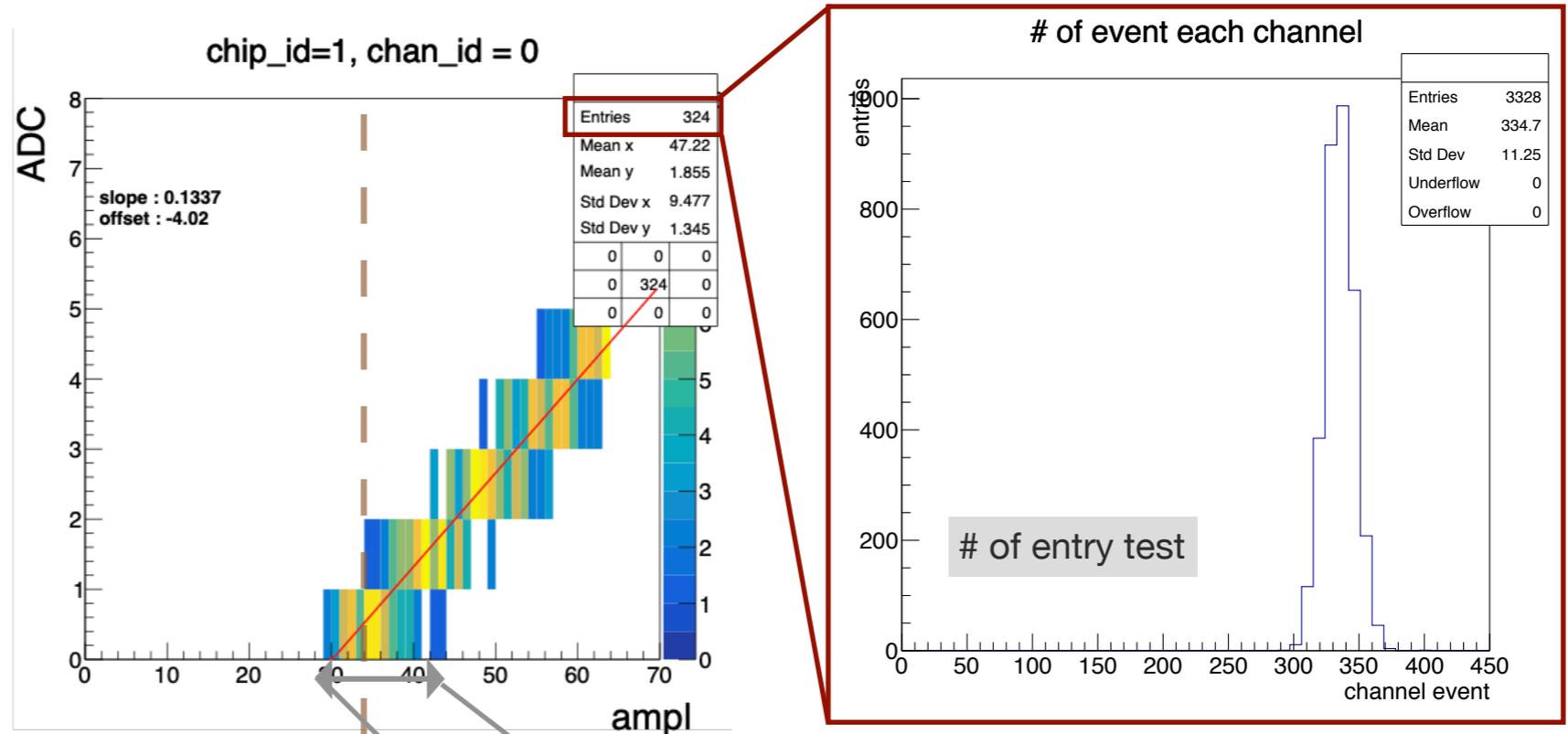
INTT ladder tested with source

- The rest photos

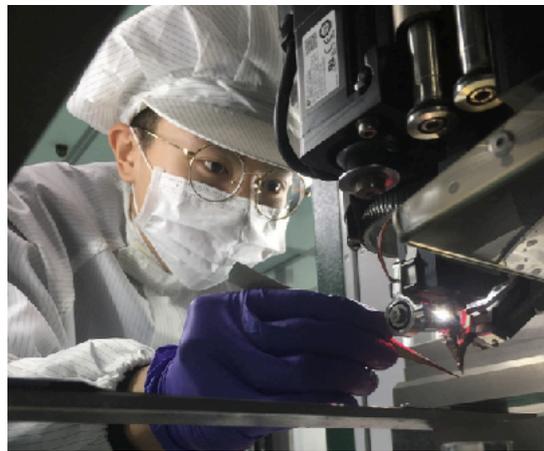


INTT Ladder QA

- The calibration test is performed for the ladder channel QA
- Each channel has to be checked
- Several tight criteria are applied to ensure the channel quality.
- Some criteria are introduced here



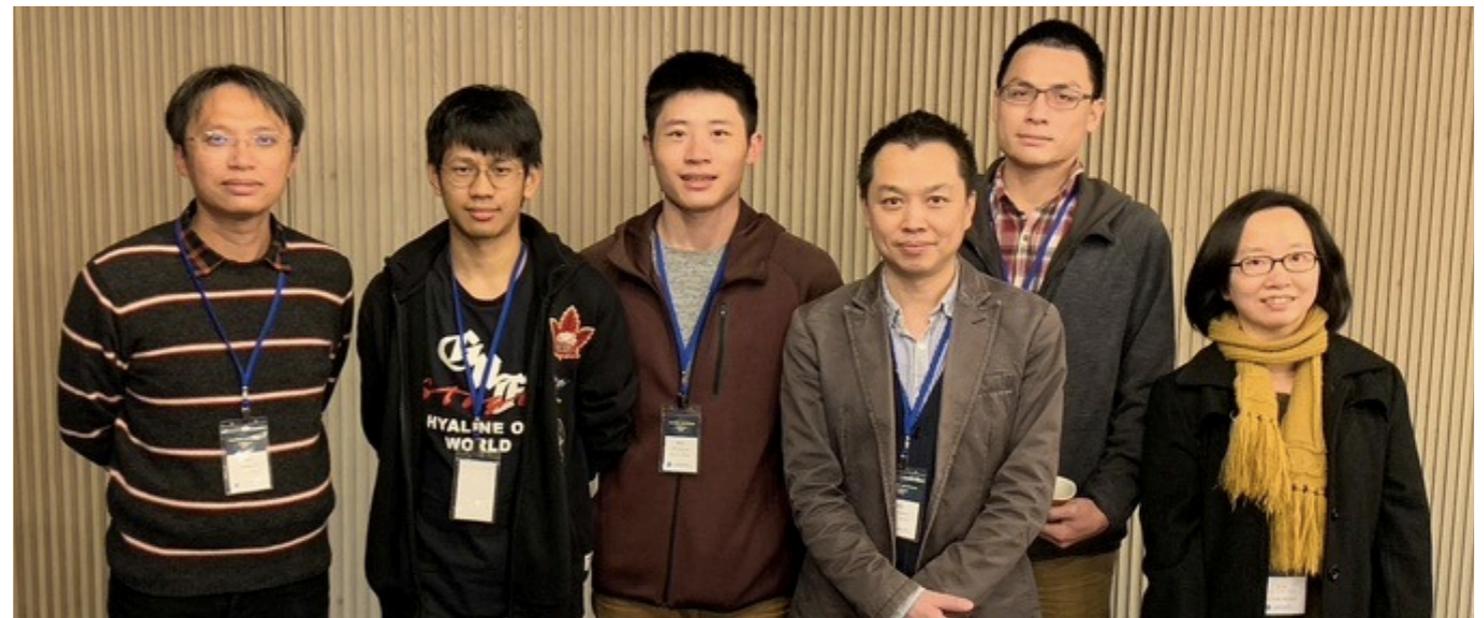
Taiwan INTT team



Ou-Wei Cheng



Kai-Yu Cheng



Chia-Ming Kuo Cheng-Wei Shih Lian-Sheng Tsai
Wei-Che Tang Rong-Shyang Lu Jenny Huang

Summary

- Ladder assembly :
 - All materials were received.
 - 17 ladders have been assembled.
 - The assembly is estimated to be finish in spring.
- Source test :
 - TW ladder is prove to be functioning by running the source test
 - All TW ladders will test with source
- Ladder QA :
 - The calibration test is performed for ladder channel QA.
 - Several tight criteria are applied to ensure the channel quality.
- Testbeam 2021 :
 - The preliminary results show that the detection efficiency can be up to 99%

Back up

Testbeam results

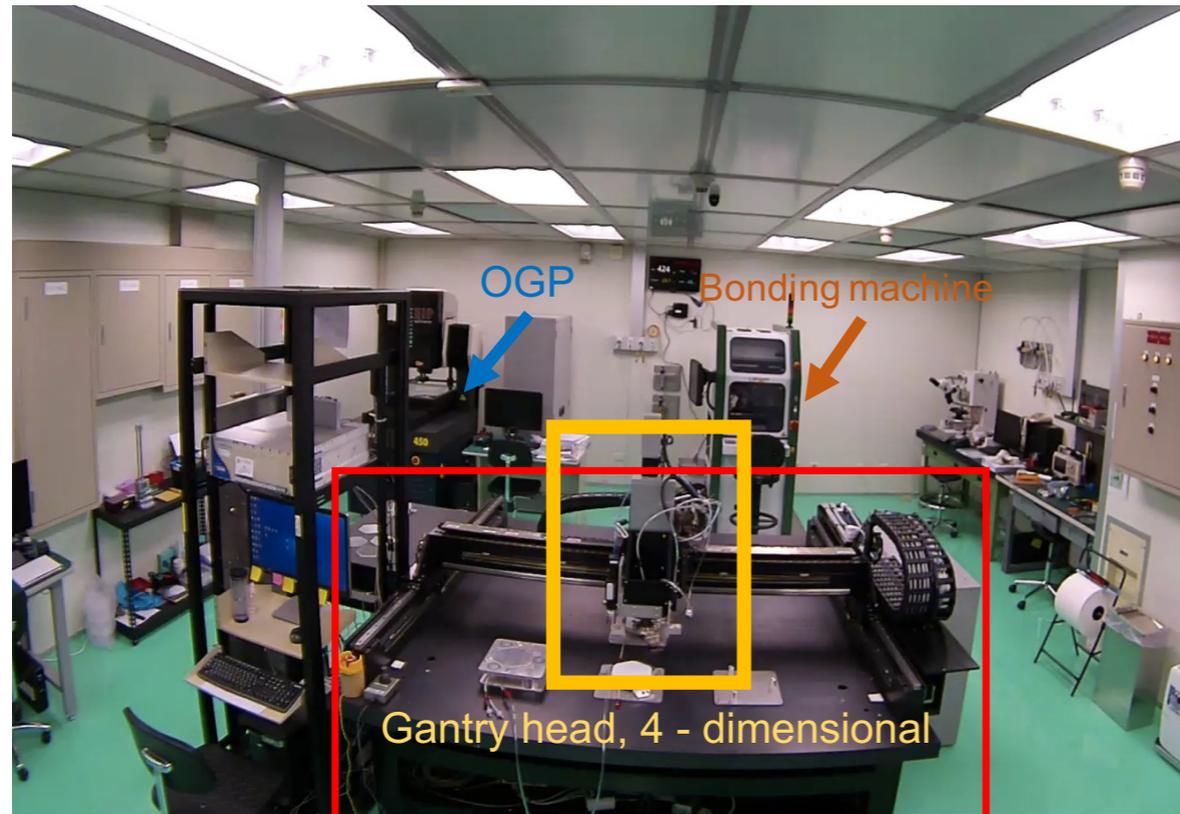
window size : 0.21 mm

		taking time	note	I0 effi.	I1 effi.	I2 effi.	DSE	align_I	amount
52	BeamData_20211210-0302_0	25 mins	U9	99.648	99.438	98.676	0.08%	I1	0.2846
53	BeamData_20211210-0329_0	25 mins	U9	99.569	99.255	98.241	0.09%	I1	0.2835
54	BeamData_20211210-0427_0	30 mins	U9	99.661	99.492	98.629	0.04%	I1	0.2856
55	BeamData_20211210-0458_0	30 mins	U9	99.539	99.511	98.183	0.20%	I1	0.2848
57	BeamData_20211210-0609_0	31 mins	U10	99.349	99.321	98.320	0.06%	I1	0.2247
58	BeamData_20211210-0642_0	31 mins	U10	94.364	99.444	98.665	0.06%	I1	0.2235
88	BeamData_20211210-2018_0	30 mins	final	98.646	99.545	96.530	0.13%	I1	0.2841
89	BeamData_20211210-2043_0	30 mins	final	99.252	99.512	97.073	0.10%	I1	0.2958

	adc0 L	adc0 R	adc1 L	adc1 R	adc2 L	adc2 R	adc3 L	adc3 R	tdc3 L	tdc3 R
52	-1	50	200	400	250	500			400	1200
53	-1	50	200	400	250	500			400	1200
54	-1	50	200	400	250	500			400	1200
55	-1	50	200	400	250	500			400	1200
57	-1	50	200	400	250	500			400	1200
58	-1	50	200	400	250	500			400	1200
88	75	300	100	350	250	500			400	1200
89	75	300	100	350	250	500			400	1200

INTT assembly in Taiwan

Taiwan Silicon Detector Facility (TSiDF)



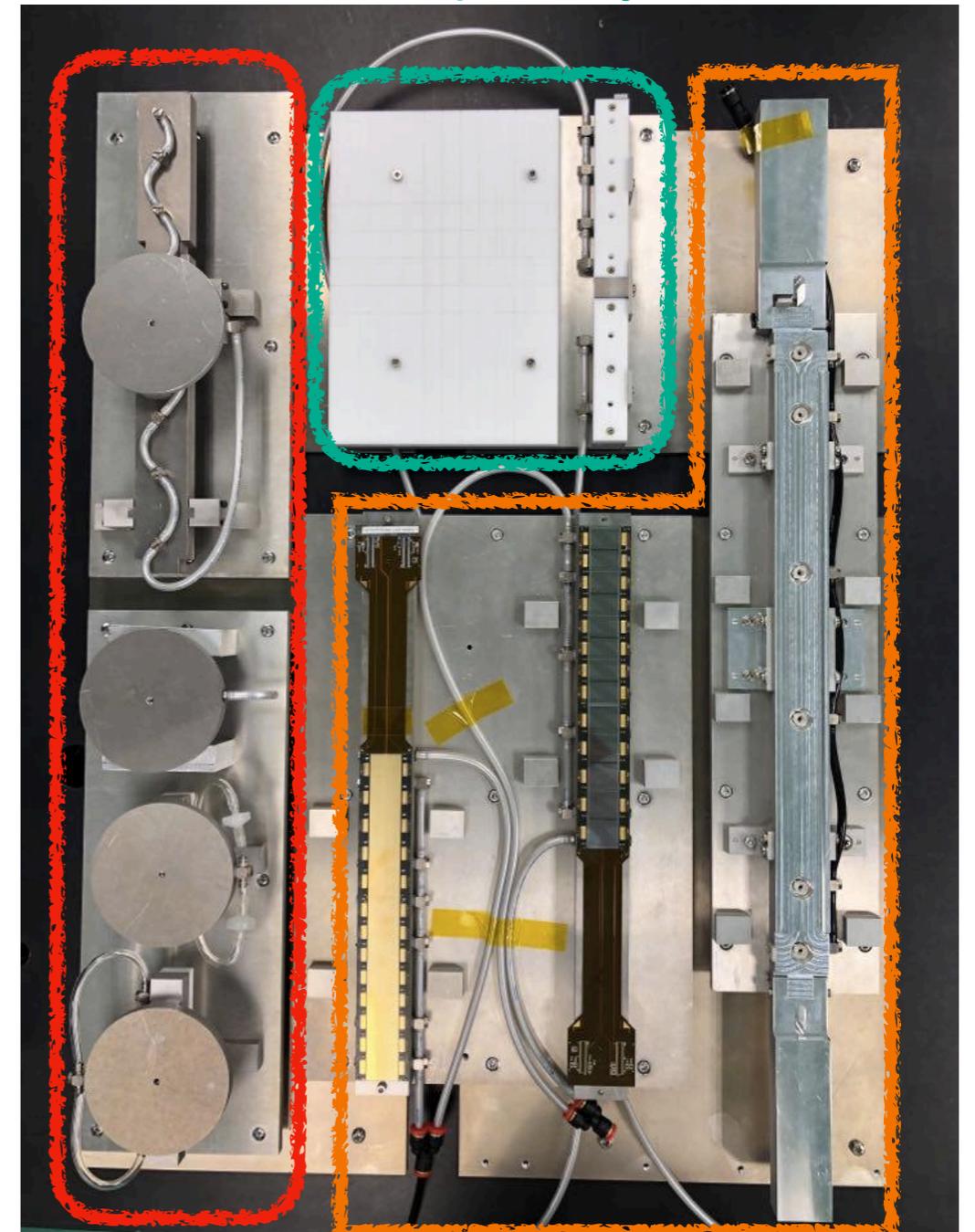
Gantry

Assembly Unit : Half-ladder

- Half-ladder assembly procedures :
 1. Chips glued on HDI then wire-bonded
 2. Sensors glued on HDI then wire-bonded
 3. Encapsulate all wire-bonds
 4. Thermal cycles modules
- Ladder assembly procedures :
 - 2 half-ladder glued on stave

INTT assembly family on Gantry

Sample tray



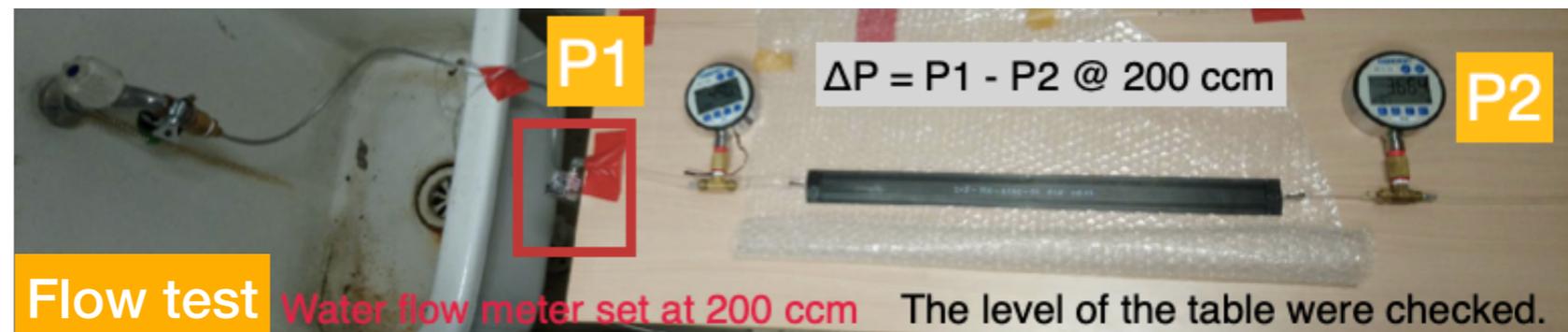
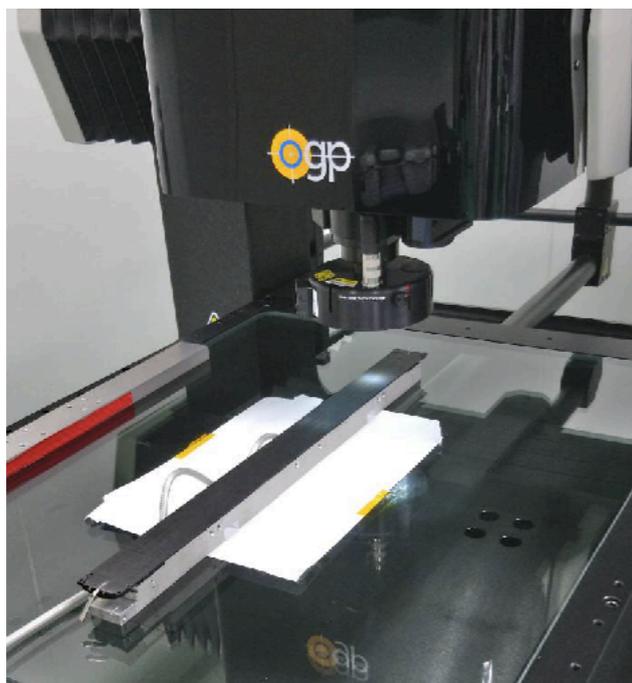
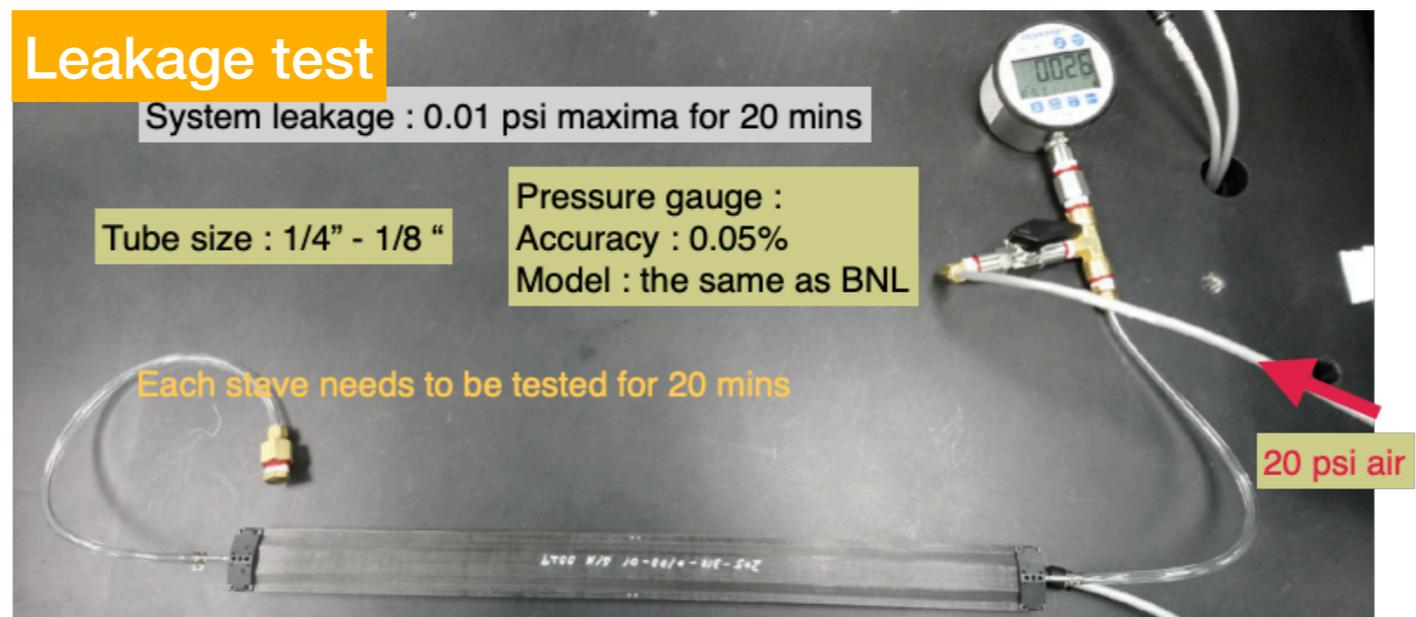
Pick up tools

Assembly tray

Stave quality test

- Stave has to pass series of tests before assembly.
- We set up all the tests in Taiwan, criteria are identical to BNL.

1. Visual inspection
2. Twist test
3. Ground pins conductivity test
4. Leakage test
5. Submersion test
6. Flow test
7. Flatness measurements



Ladder QA, class definition

classification	bad channels	range	%
1		33.28	<0.5%
2	33.28	133.12	0.5% ~ 2 %
3	133.12	266.24	2 % ~ 4%
4	266.24	399.36	4% ~ 6 %
5	399.36		>6%

The table of half-ladder assembly progress

		Total	Good	Not yet tested
Half-ladder	Chip assemble on HDI	3	1	2
	Sensor assemble on HDI	5	1	4
	Post-encapsulation	6	0	6
	Post-thermal cycle	22	22	0