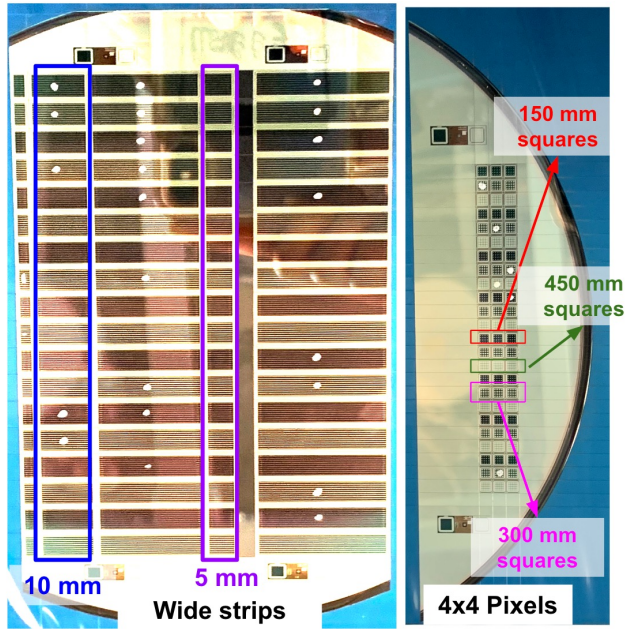
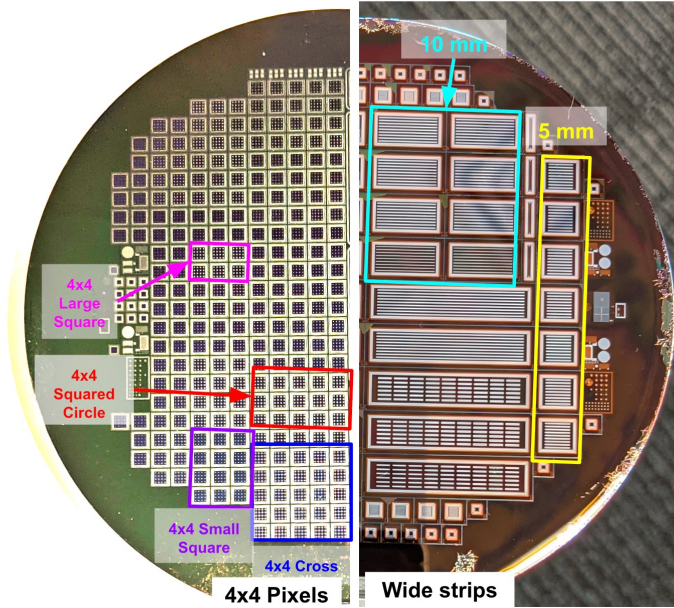


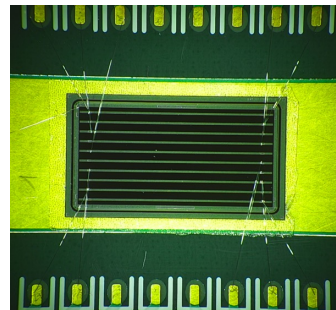
Systematic Study of Sensor Performance



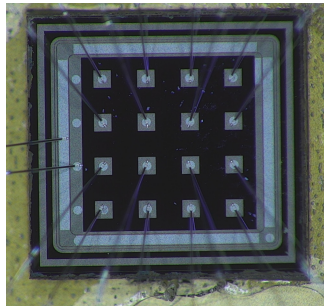
HPK



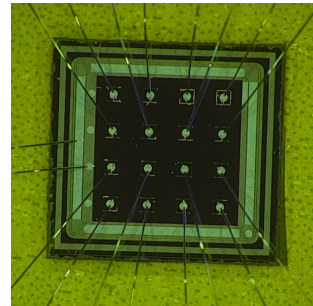
BNL-IO



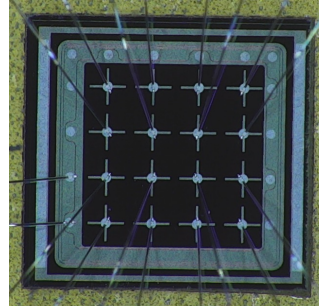
SH7



PB2



PB3

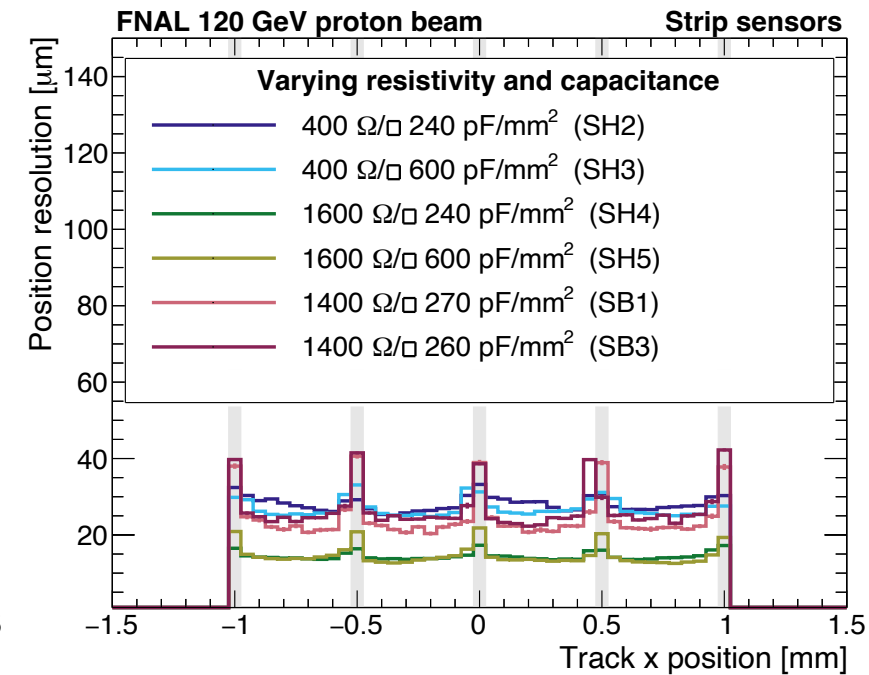
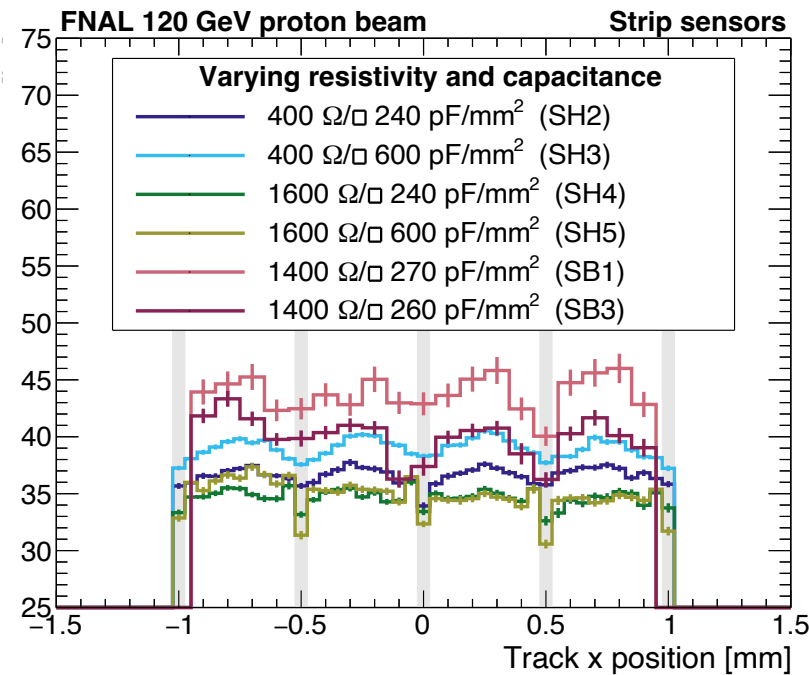
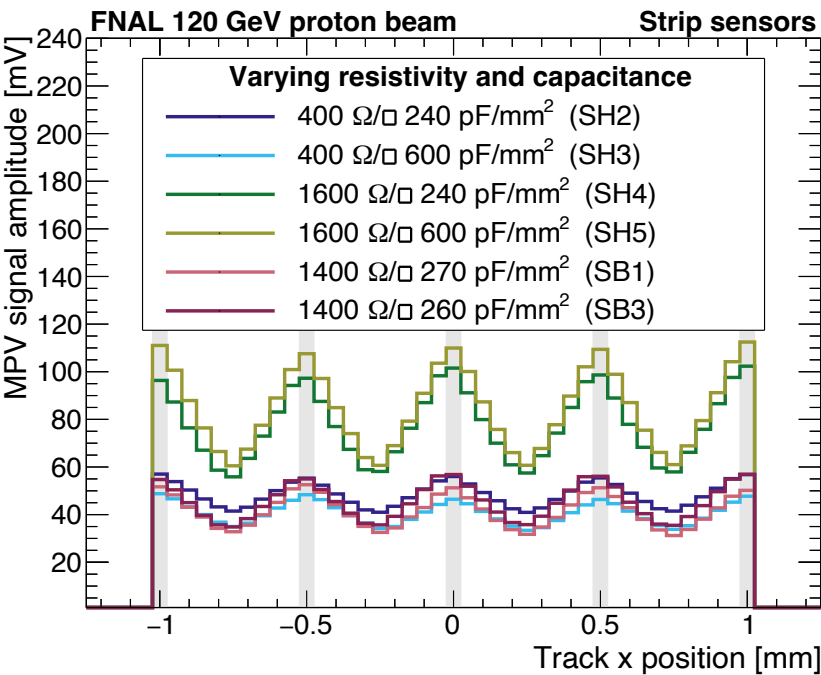


PB4

Name	Wafer	Pitch (μm)	Strip length (mm)	Metal width (μm)	Active thickness (μm)	Sheet resistance (Ω/\square)	Capacitance (pF/mm ²)	Optimal bias voltage (V)	
HPK Wide strip									
SH1	W9	500	10	50	20	1600	600	114	
SH2	W4				50		240	204	
SH3	W8				1600	600	200		
SH4	W2					240	180		
SH5	W5					600	190		
SH6	W9				100	20	1600	600	112
SH7	W8					50	400	600	208
BNL Wide strip									
SB1	WB1	500	10	50	50	1400	270	170	
SB2	WB1			100	50	1400	270	160	
SB3	WB2			50	50	1400	260	185	

Name	Wafer	Pitch (μm)	Metal width (μm)	Active thickness (μm)	Sheet resistance (Ω/\square)	Capacitance (pF/mm ²)	Optimal bias voltage (V)
HPK 2 x 2 Square pixel							
PH1	WP1	510	500	20	1600	600	105
PH2	WP2			30	1600	600	140
PH3	WP3			50	1600	600	190
HPK 4 x 4 Square pixel							
PH4	W11	500	150	20	400	600	116
PH6	W8			50	400	600	200
PH7	W5		300	20	1600	600	185
PH8	W9				1600	600	112
BNL 4 x 4 Square pixel							
PB1	WP4	500	100	20	1400	385	76
PB2	WP4		200	20	1400	385	80
BNL 4 x 4 Squared Circle pixel							
PB3	WP4	500	110(*)	20	1400	385	85
BNL 4 x 4 Cross pixel							
PB4	WP4	500	400x25(**)	20	1400	385	80

Test Beam Results on Strip Sensors



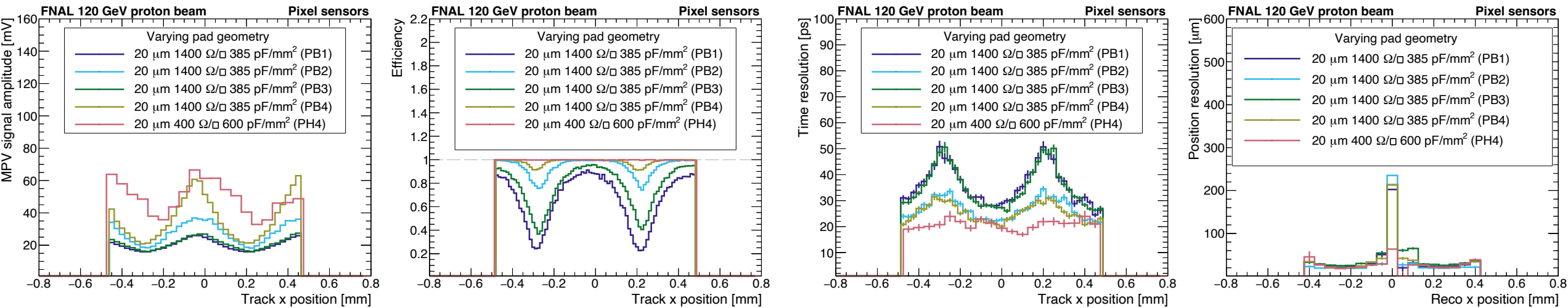
- **HPK (SH2, SH3, SH4, SH5):**

- Higher n+ resistivity = less charge sharing = higher signal amplitude = less jitter = better timing resolution
- Higher AC-coupling capacitance = less charge sharing = higher signal amplitude

- **HPK vs BNL (SB1, SB3)**

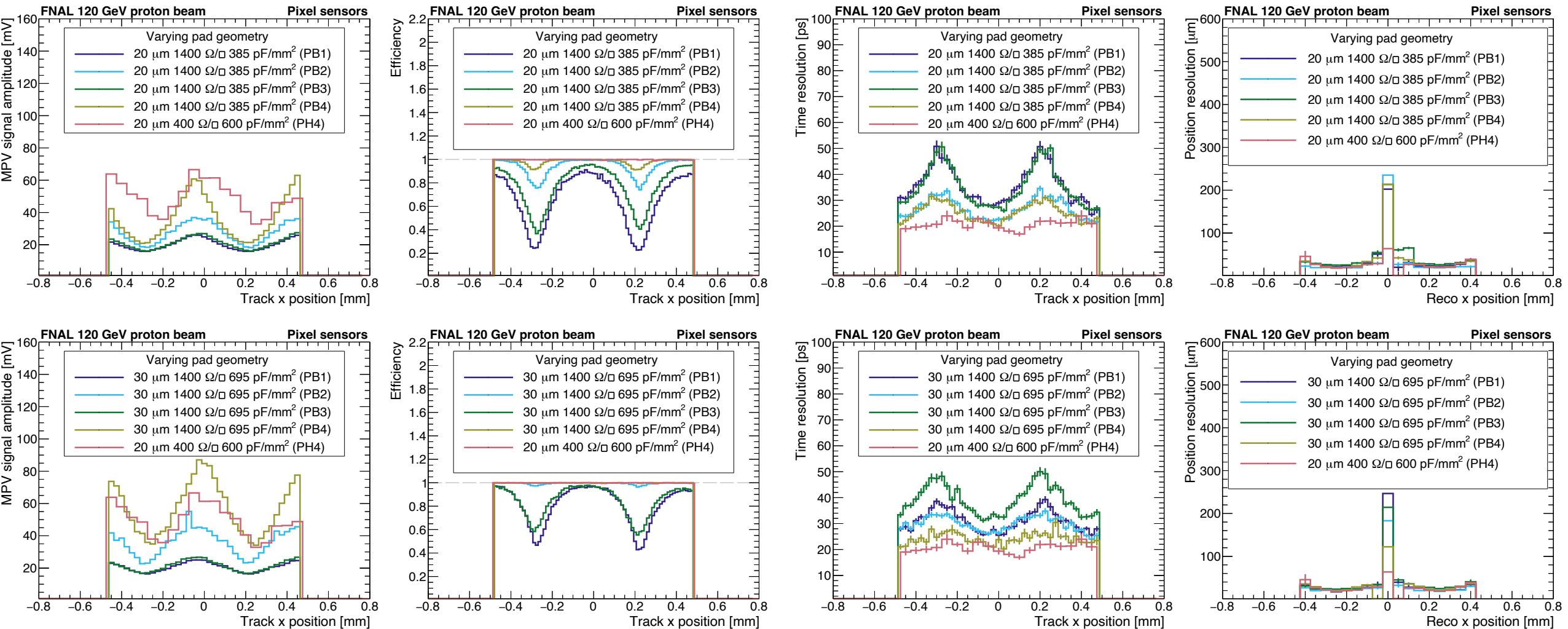
- Signal amplitude, timing and position resolutions of HPK sensors are much better than BNL-IO sensors

Test Beam Results on Pixel Sensors



- **HPK 20 μm (PH4) vs BNL 20 μm (PB1, PB2, PB3, PB4)**
 - Signal amplitude, efficiency, timing and position resolutions of HPK sensors are much better than BNL-IO sensors

Test Beam Results on Pixel Sensors



- **HPK 20 μm (PH4) vs BNL 20 μm (PB1, PB2, PB3, PB4)**
 - Signal amplitude, efficiency, timing and position resolutions of HPK sensors are much better than BNL-IO sensors
- **HPK 20 μm (PH4) vs BNL 30 μm (PB1, PB2, PB3, PB4)**
 - Signal amplitude, efficiency, timing and position resolutions of HPK sensors are better than BNL-IO sensors