



In2p3

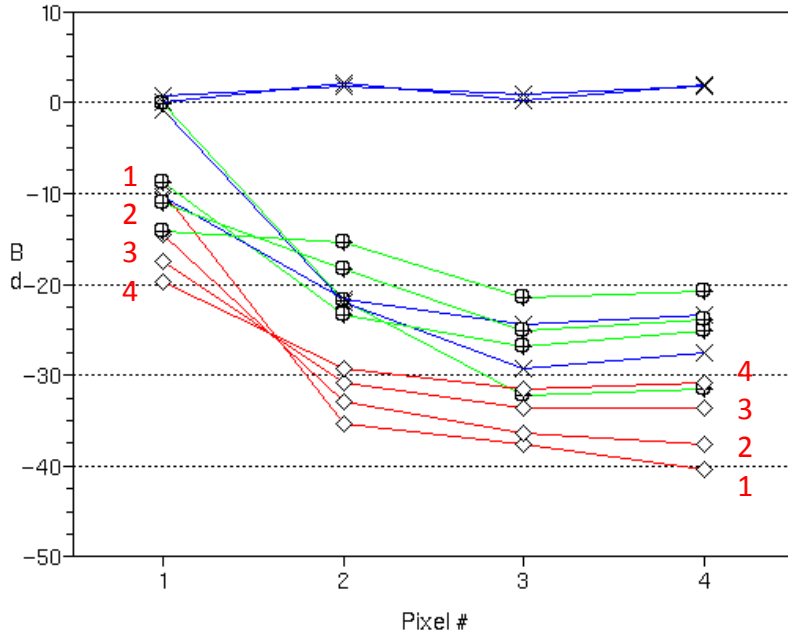
LIR

Wafers

Segmented guard rings
New Hamamatsu sensors
Test bench

R&D on segmented guard rings crosstalk

Crosstalk measurements vs pixel number

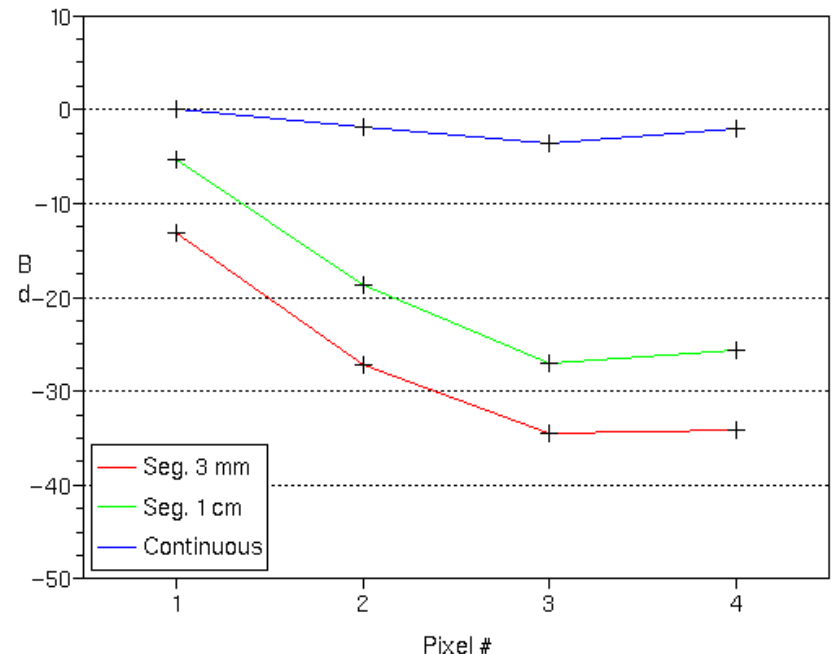


Sum of GRs contribution
Xtalk lowered by a factor 80 (with 3 mm segments)

One lot (no statistics)

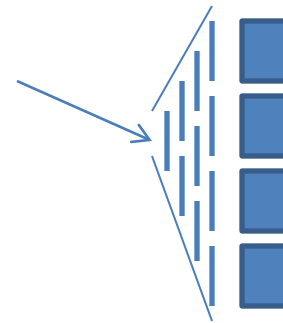
Far from the injection point, the injection through the outer GR is dominant

Total crosstalk vs pixel number



R&D on segmented guard rings crosstalk

Interpretation: distributed capacitance due to the couplings between GR segments, to be modeled ?



More statistics needed

- Test bench at LPC (Clermont)
- Time for meas. (2h < / sensors)

bounding attempt (CERN)

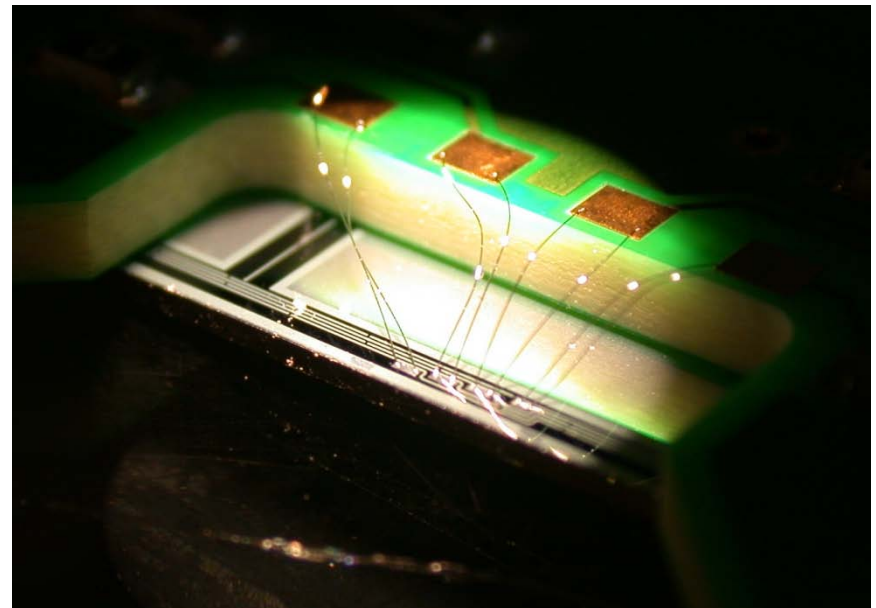
But add some Xtalk

S1

	128	29	28
G1 800mV	572	28	30
	59	30	30

S1

	64	67	69
G4 800mV	156	69	68
	216	90	70

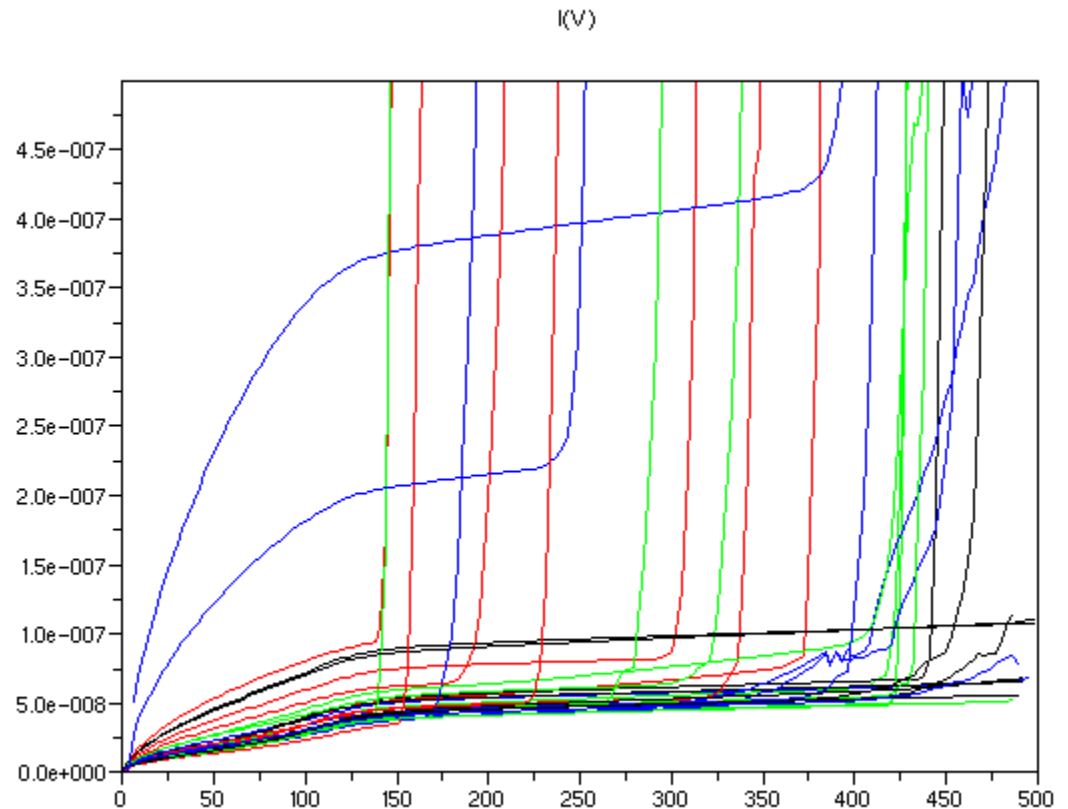


R&D on segmented guard rings

Electrical characteristics

- Breakdown >250V
- Continuous: 100%
 - 1 cm: 85%
 - 3 mm: 40%
 - Mixed: 70%

T and RH impact to be studied



R&D on segmented guard rings

Next test matrices

Inter segment gap :

1 cm segment with 5, 10, 25 (actual: 50 um)

Distrubuter capacitance:

Mixed: inner 2cm, 1 cm , outter 3mm, 1mm

Similar sensors from BhaBha (Anita Topkar)

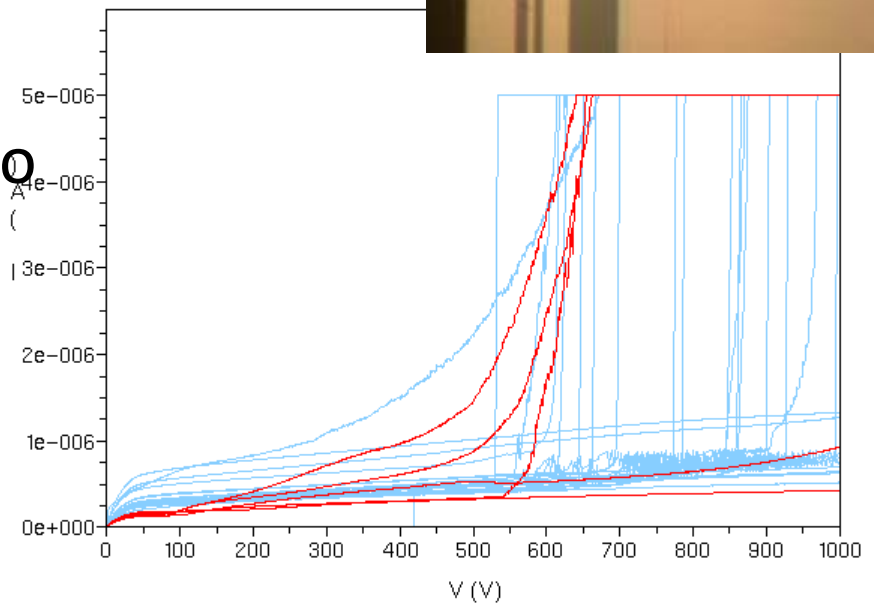
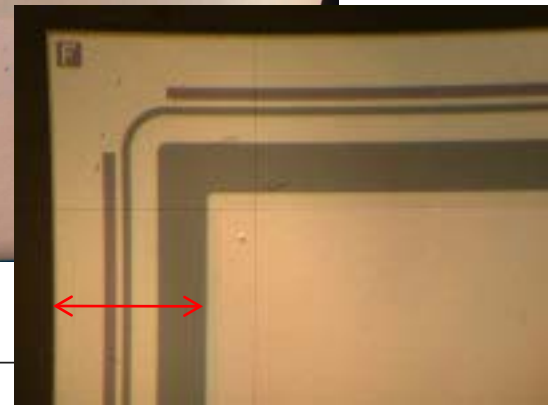
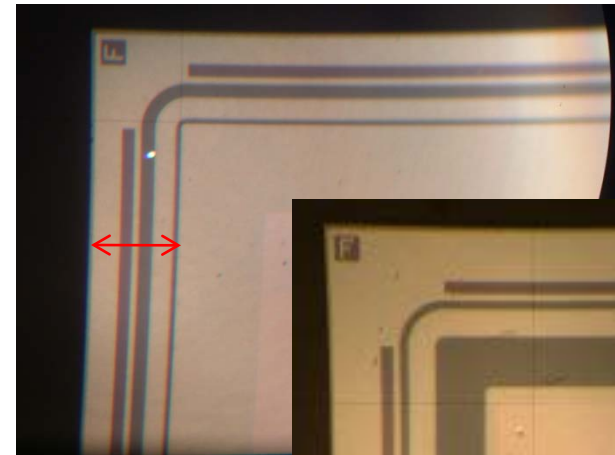
Back from foundry by the end of June

Tests at LPC & LLR

Arrrgh! COST!

New Hamamatsu sensor

- **Dead area decreased to 750 μm (1200 μm previous)**
- Leakage current issue seen at Hamamatsu
 - Level: x 5-10 wrt previous sensors
 - Non uniformity
- 5 samples
- Breakdown ok but seems to be slightly lower
- Overall current is better !
 - Full matrix is biased



Test bench

- Crosstalk:
 - New instrumentation board
 - New support
 - Mechanics
- I-V, C-V
 - T and RH dependency (by hands or with another lab?)
 - Automation: Switch board (4k€ up to 6 k€)
- LPC ?

Conclusion

- COST ($\sim 10\text{€}/\text{cm}^2$, expected to be $2\text{€}/\text{cm}^2$ for ILC)
 - Orders according to money...
 - Can have 40 wafers from Hamamatsu = 10 ASUs
 - Equipment of ASU with wafers have to be optimized
- Dead space at the edge can be lowered
- Guard-Ring R&D program Conference:
IEEE sensors 09, **Accepted!**