Silicon Photomultiplier Industry – Academia matching event

CERN - 17 February, 2011

Overview

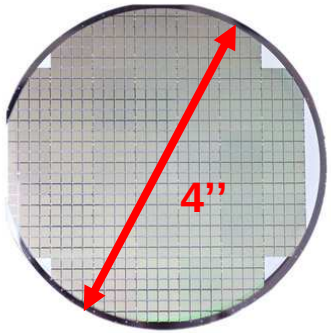
- SensL - Recent SPM Developments
- SPM Roadmap
- SensL product families
- Solutions example - PET
- Summary

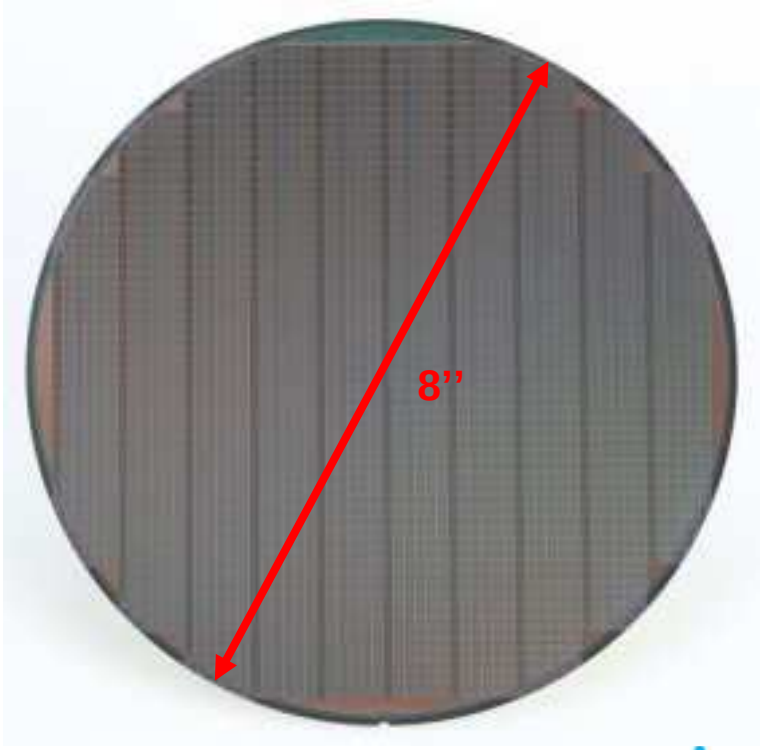
SPM Fabrication…

… Transferred to a high volume CMOS foundry

- Scalable production capacity
- 3 weeks from Tape-Out to Dice
- Flexibility to innovate

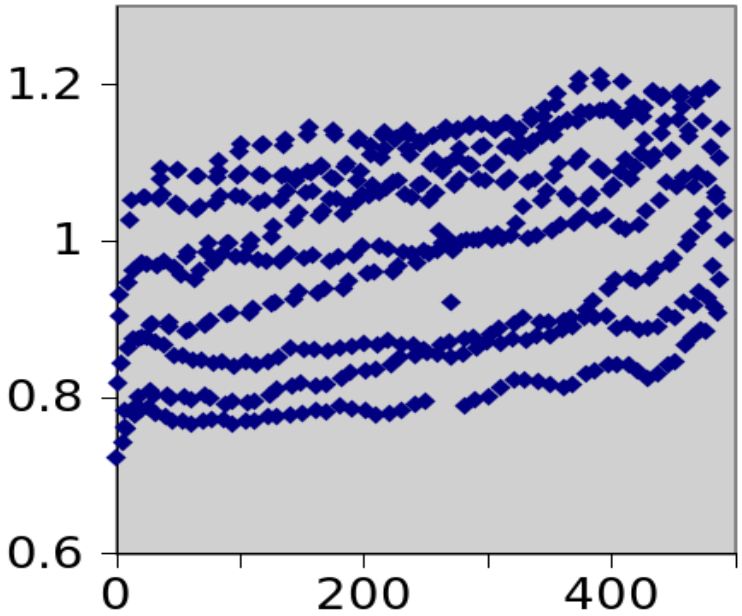
and much more….



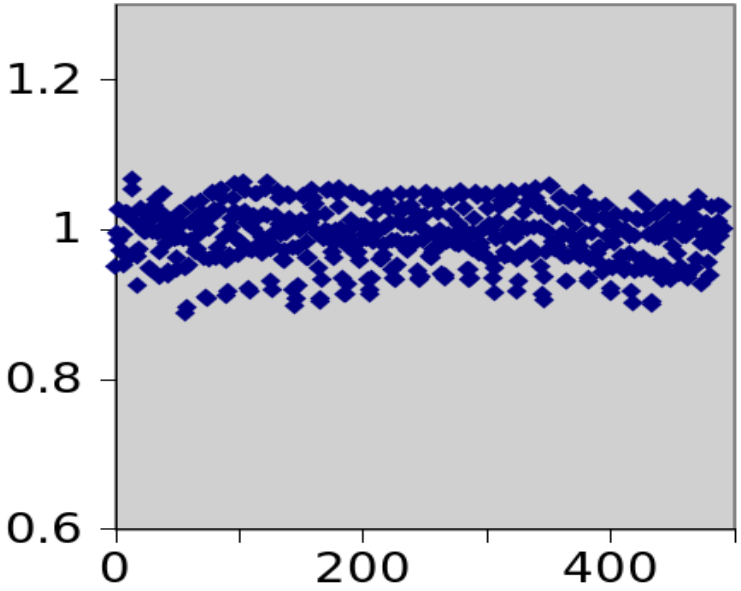


Optical Current Uniformity

4″



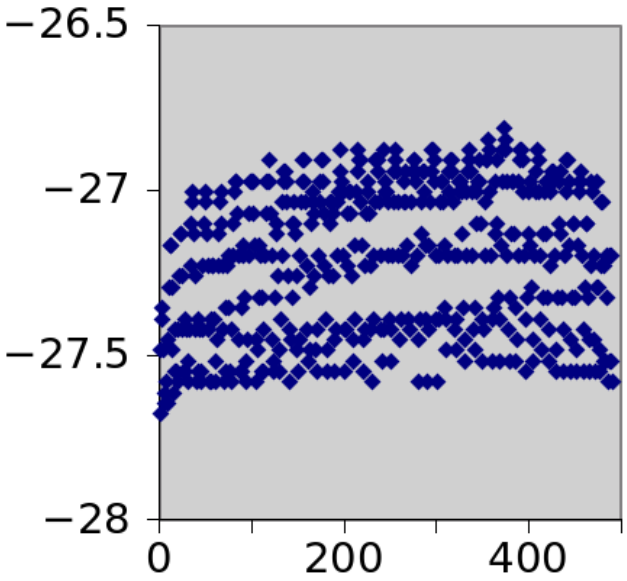
8″



Spread reduced by ¼ - packaged die within ±10%

V_{br} Uniformity

4″



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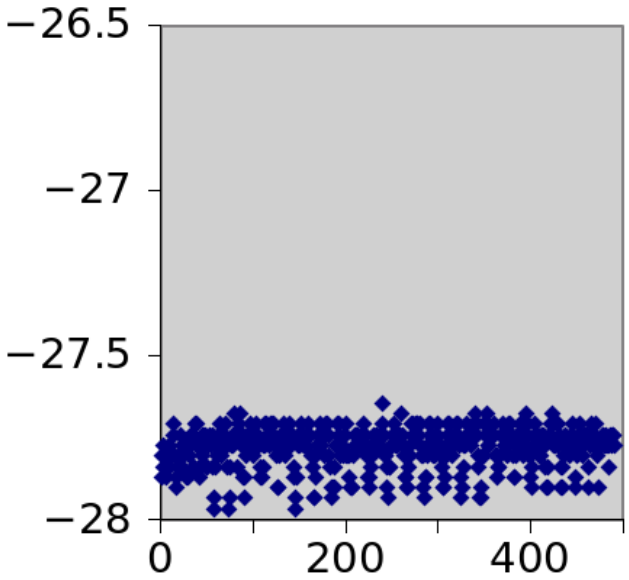
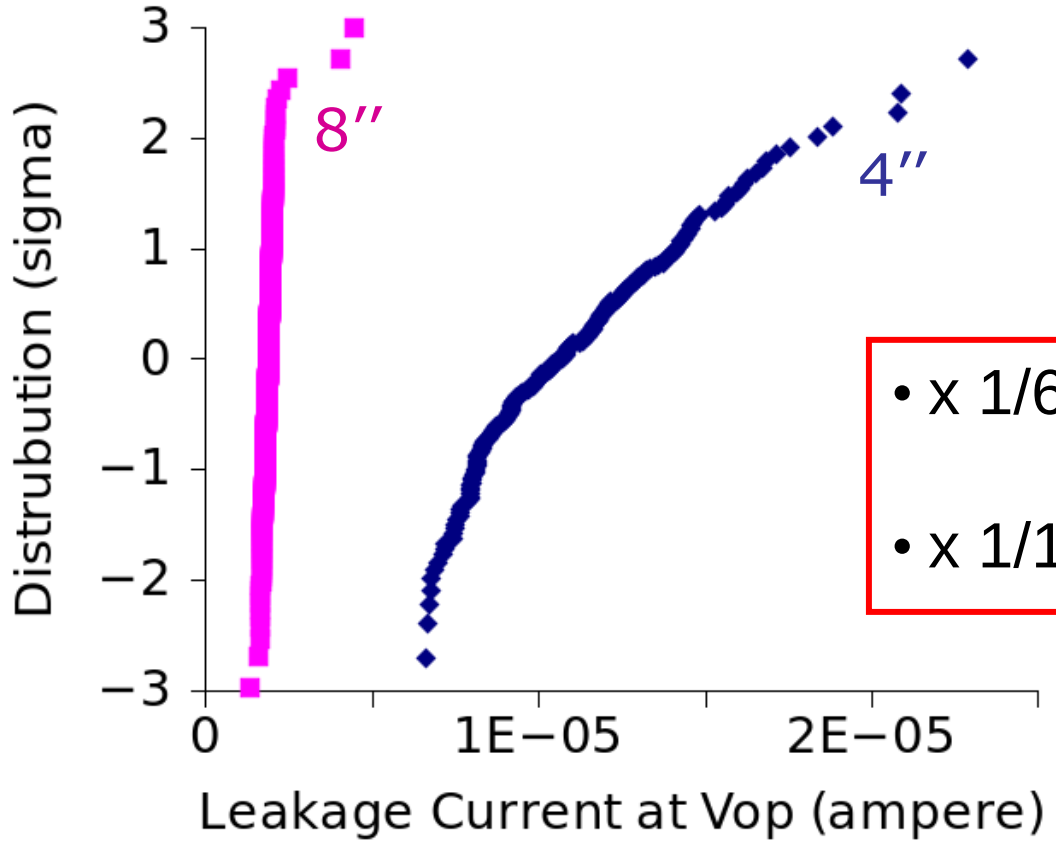


Std Dev 0.22 V
Range 0.86 V

~ ¼

Std Dev 0.06 V
Range 0.32 V

Dark current



- x 1/6 dark current
- x 1/16 dark current spread

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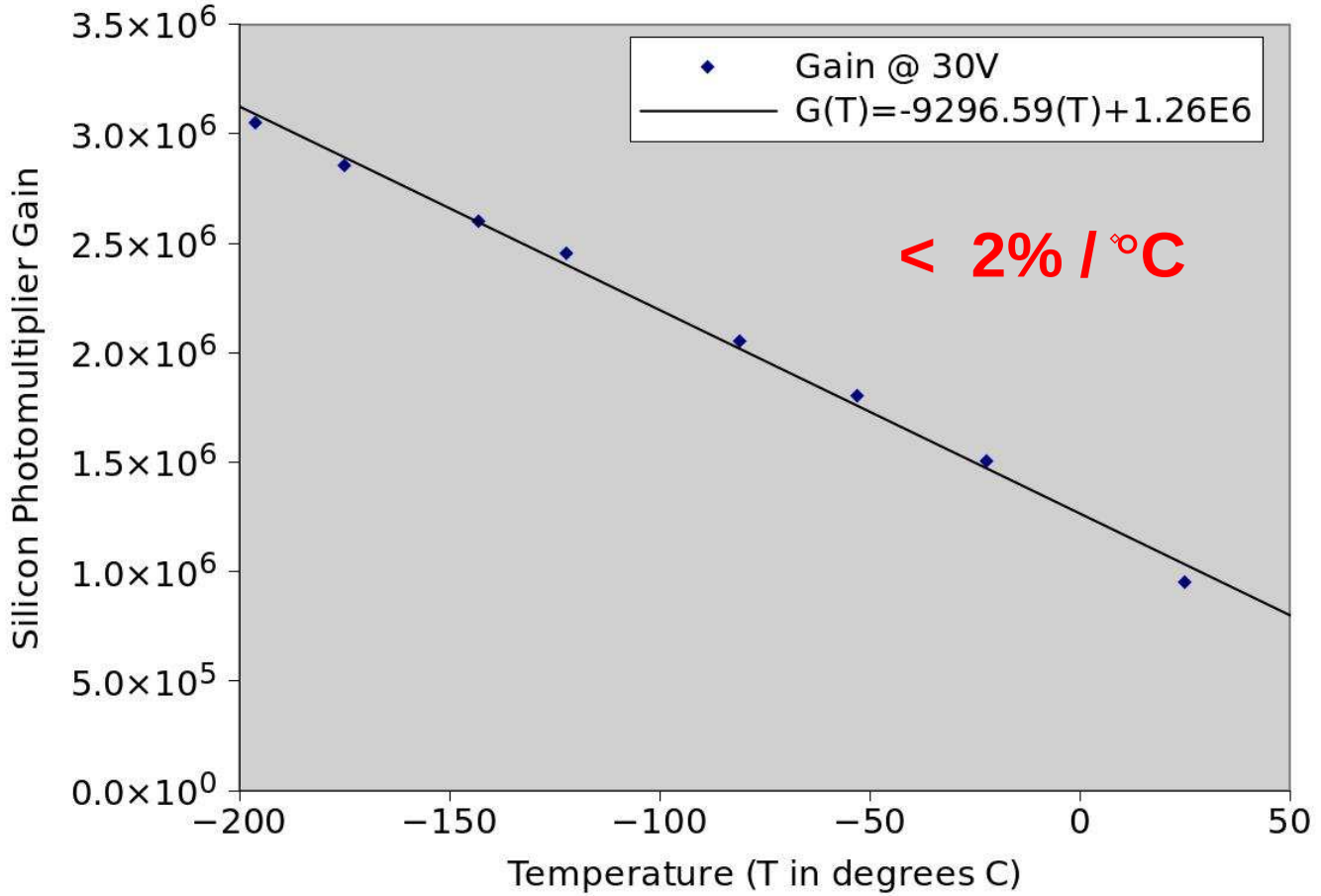
Low Gain(T)



Fab Improvements:

- High uniformity ➔ reduce the number of “die bins”
- Simplify & minimize wafer probing
- High yields

Provide “application targeted” uniformity

Attractive economies of scale

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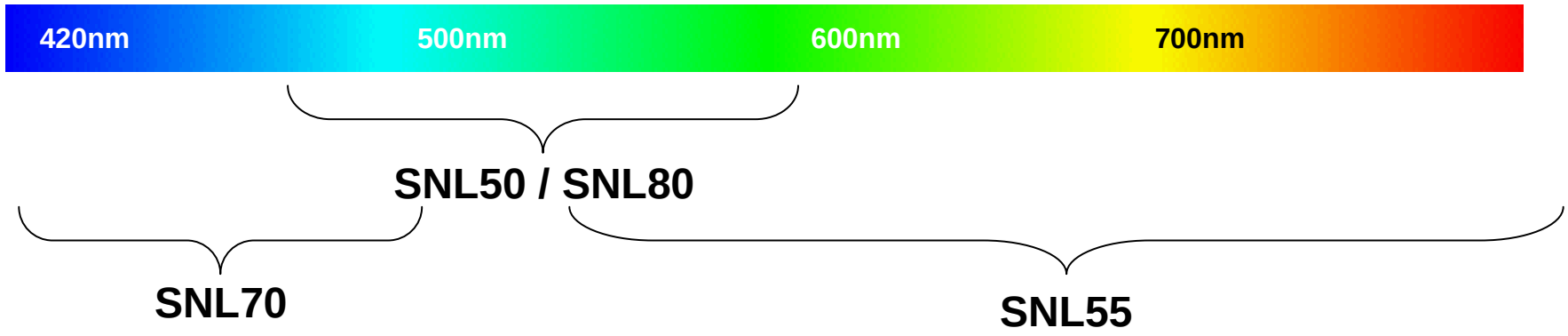
SPM Roadmap



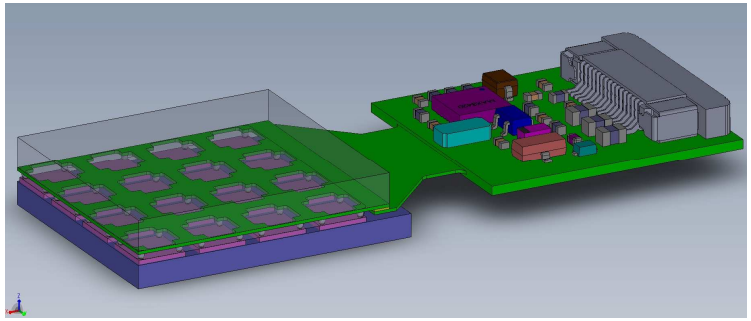
• SNL50	480nm	Today	
• SNL80	500nm	Q2 - 2011	BGO
• SNL55	530nm ~ 660nm	Y.E. 2011	Y11; Cy3&5
• SNL70	420nm	Q3 - 2011	L(Y)SO

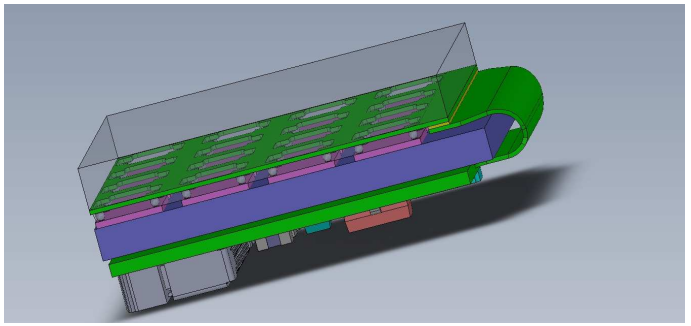
SPM Roadmap

- Die size [mm2] 1 x 1 3 x 3
- µ-cell size [µm] 20, 35, 50, 100
- R_q [kΩ] 200 ~ 600
- Fast timing << 1ns for both n on p and p on n
- Package options Ceramic, Metal (incl. Peltier), Plastic, PCB, Flex-PCB
- Contacts Today: 2 Front 1 Front / 1 Back
  2012: 2 Back

Package developments

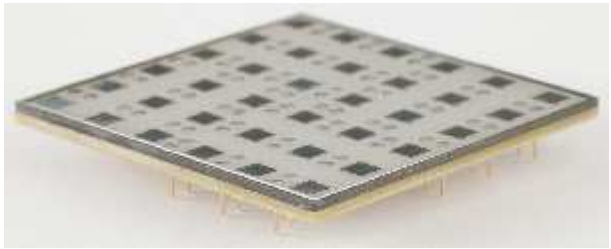
Flex-PCB mounted SPM array - Medical imaging (CT)





Endoscopic dosimeter

Mammo - PET



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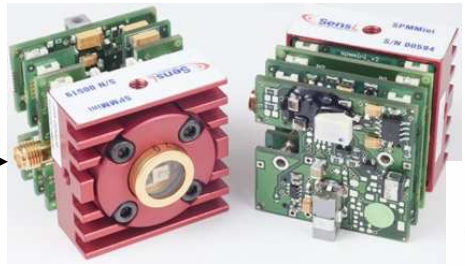
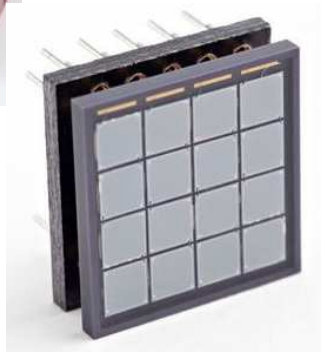
SensL Product Families

- **MICRO**

- **MINI**



- **ARRAY**

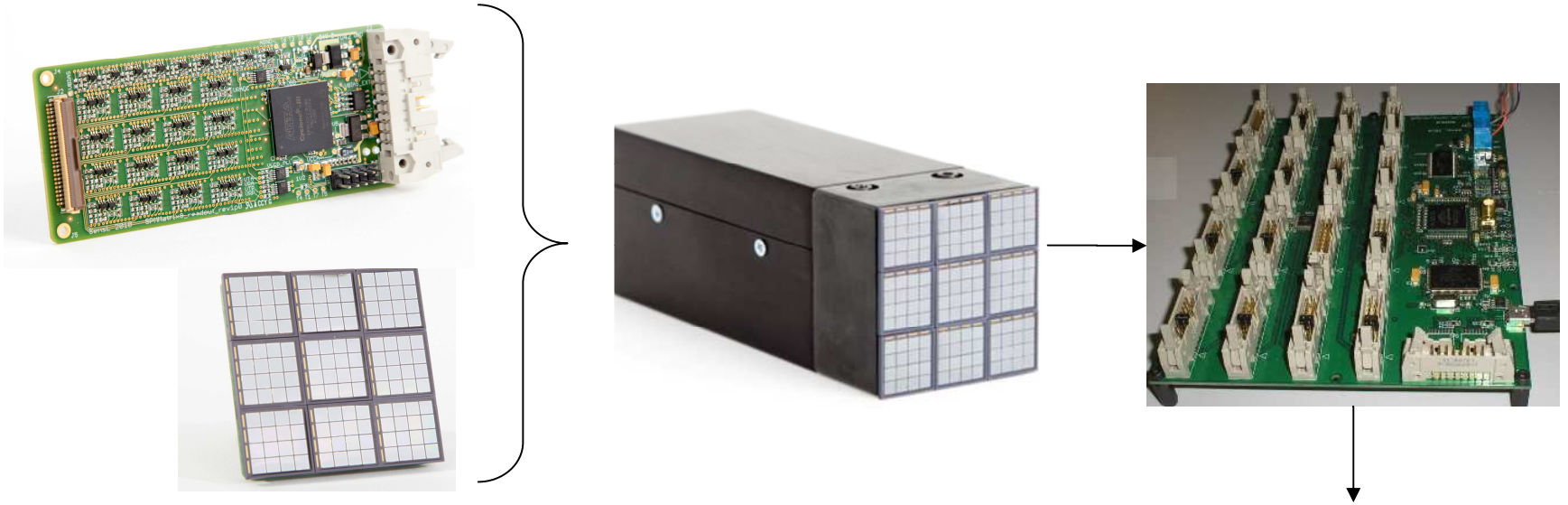


- **MATRIX**

- **HRMTime**

Focus – PET
Matrix9

Turn key readout system for L(Y)SO based PET



PC via USB

Summary

- SPM production – now at high volume fab

- Obtaining encouraging results
- Pursuing aggressive R&D program

- SensL both a detector & solutions house
- Open to academic and tech. trans. initiatives

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