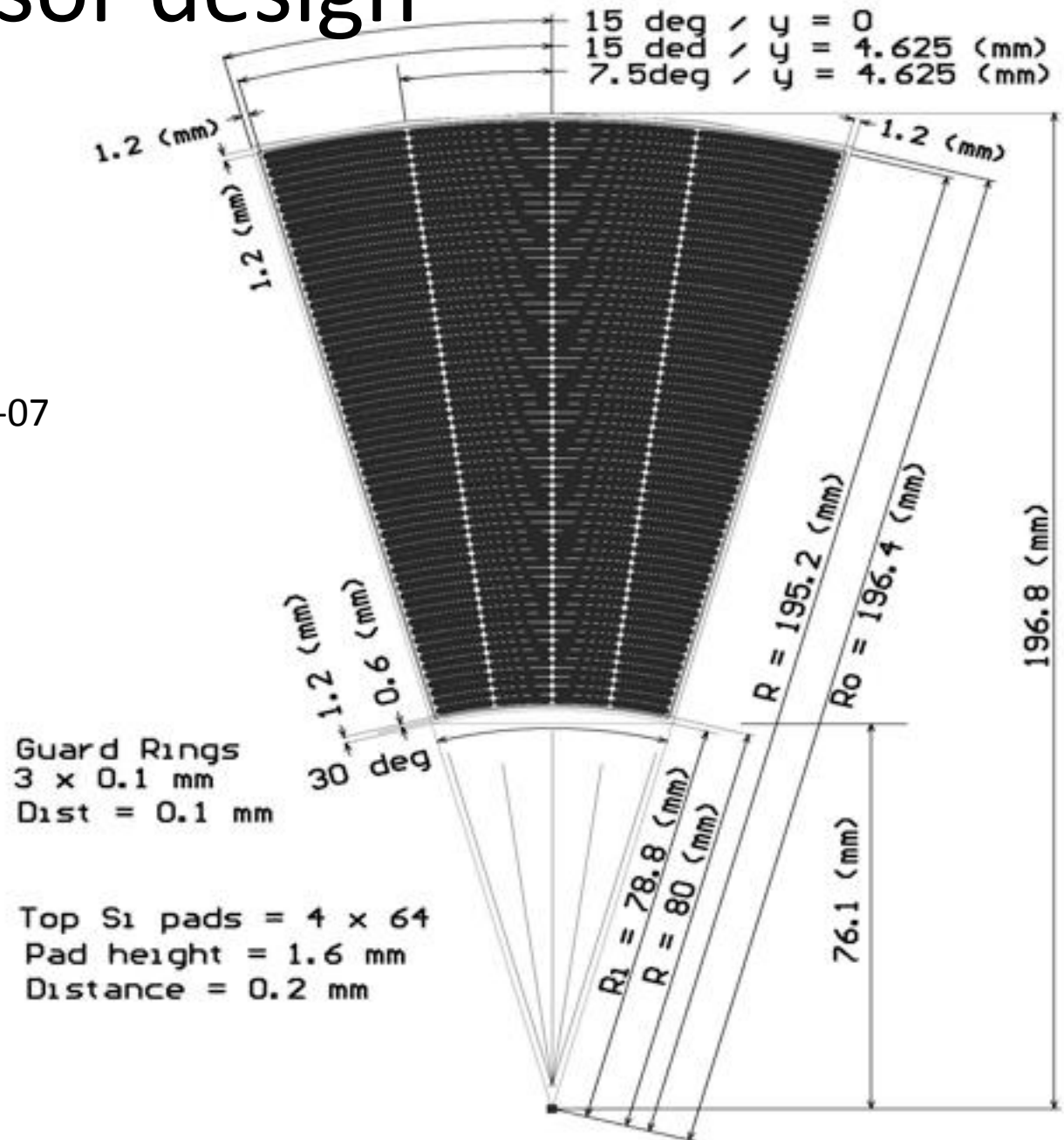


New LumiCal sensor design

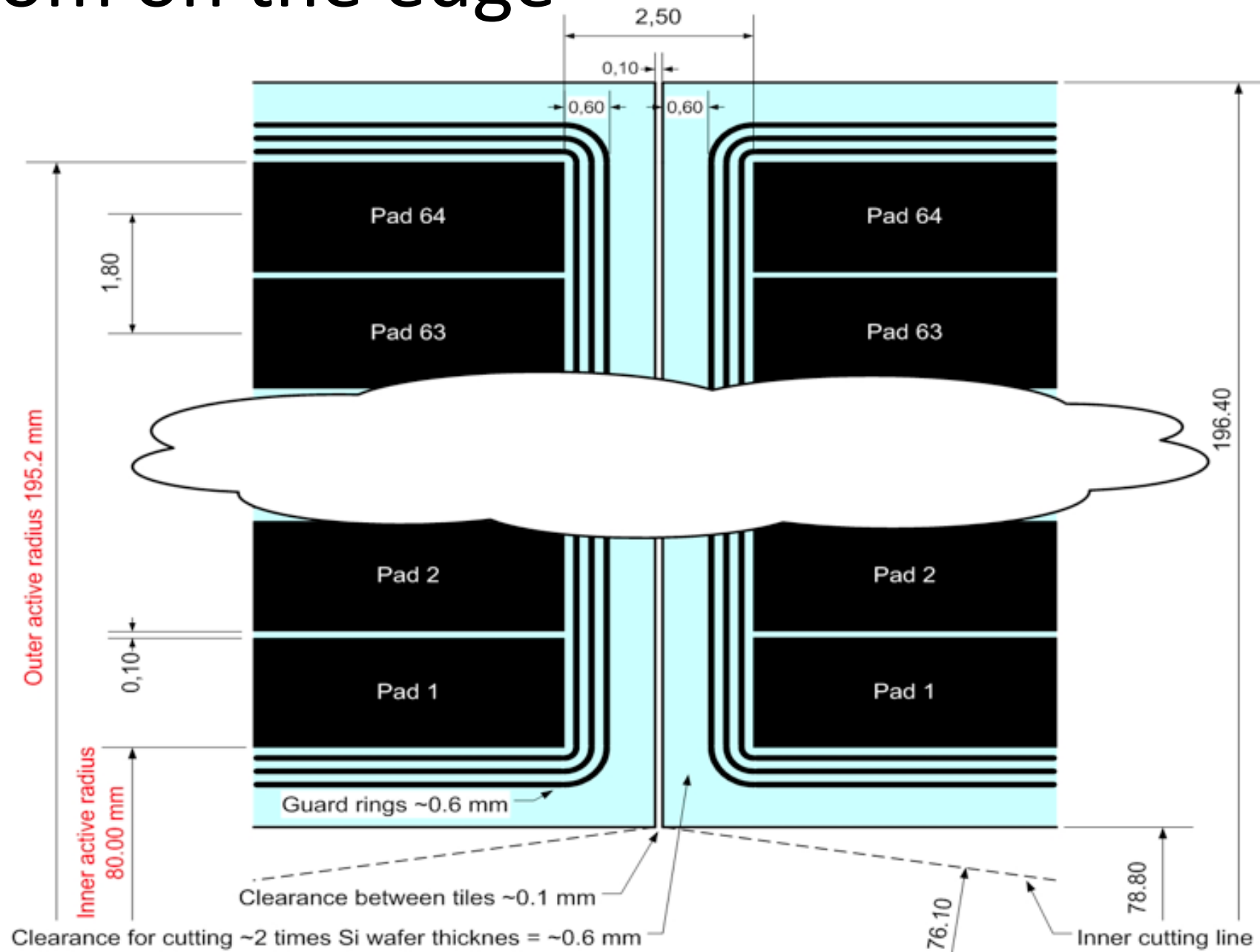
Yan Benhammou
Tel Aviv University

Actual sensor design

From EUDET-MEMO-2009-07



Zoom on the edge

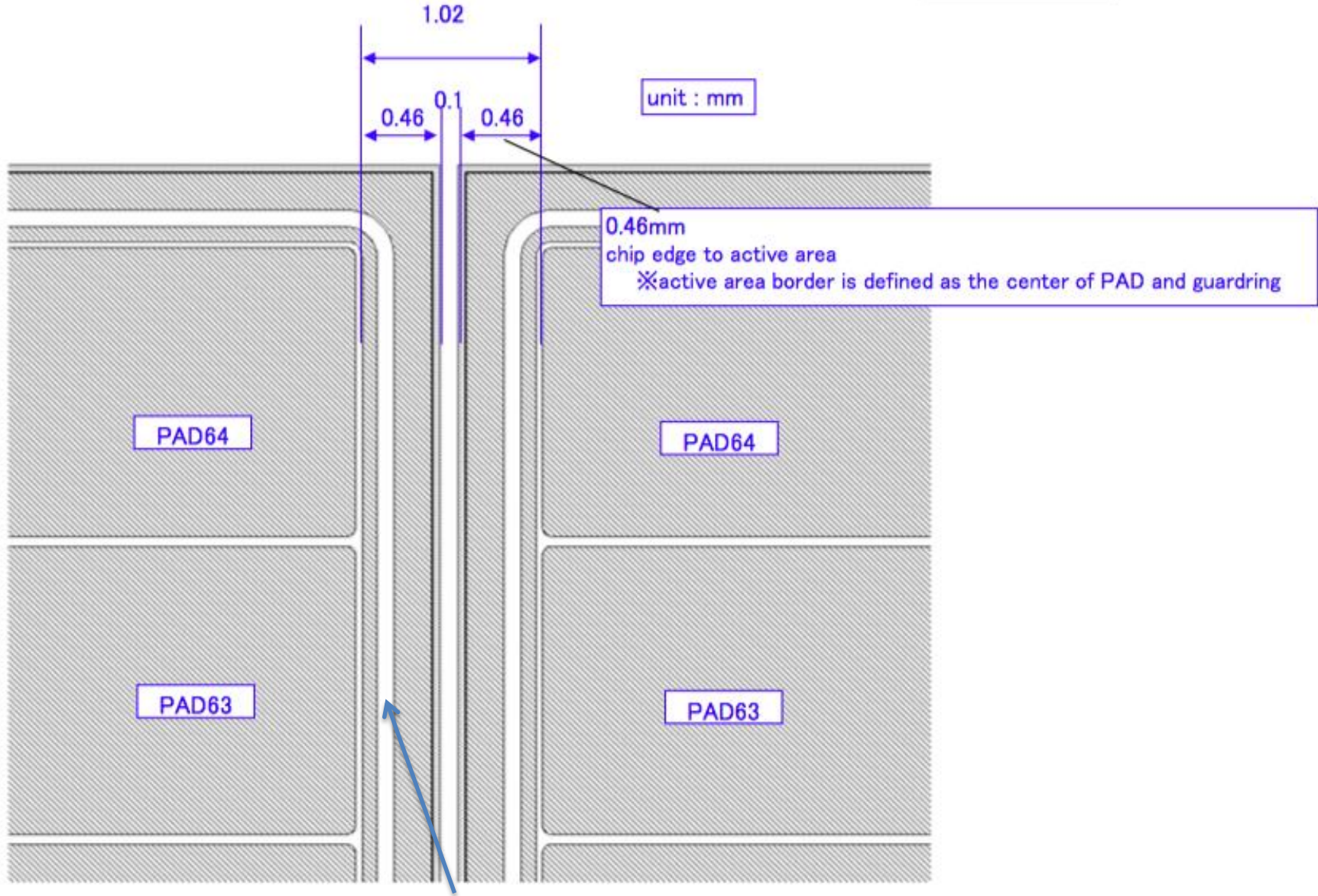


Simple calculation :

- Surface of the sensor : 8299.83 mm²
- Edge dead area : $2.4 \times 115.2 = 276.48$ mm²
- Sensor active area : 8023.35 mm²

New Hamamatsu proposition

2016/2/24



Single guard ring

Simple calculation

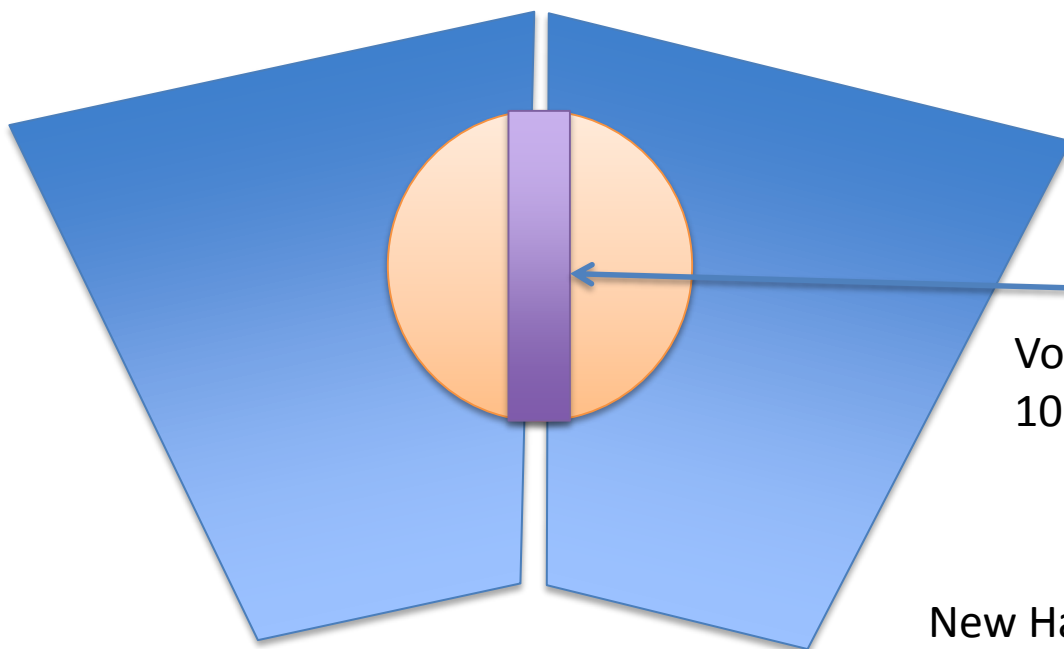
- Actual dead area : 276.48 mm²
- New design dead area : 105.89 mm²
- New Hamamatsu dead area 68% smaller than the actual one

This is for the whole detector. What for a particle in between two sensors ?

Moliere radius : 15 mm
Shower volume : ~49490 mm³



20 W layers = 70mm



Dead area

Volume : $30 \times 2.5 \times 70 = 5250 \text{ mm}^3$
10.6% of the shower is lost

New Hamamatsu :
Volume : $30 \times 1.02 \times 70 = 2142 \text{ mm}^3$
4.3% of the shower is lost

Conclusion

- New design from Hamamatsu : one guard ring, smaller dead area
- Hamamatsu dead area : $0.92 \times 115.2 = 105.98 \text{mm}^2$
- Actual dead area : 276.48mm^2
- New design area : 105.98mm^2

Price :

NRE FEE : 2.7million JPY ~ 24200 \$

Unit Price: 170,000JPY each x 40pcs ~1524 \$ each

Need simulations !!!