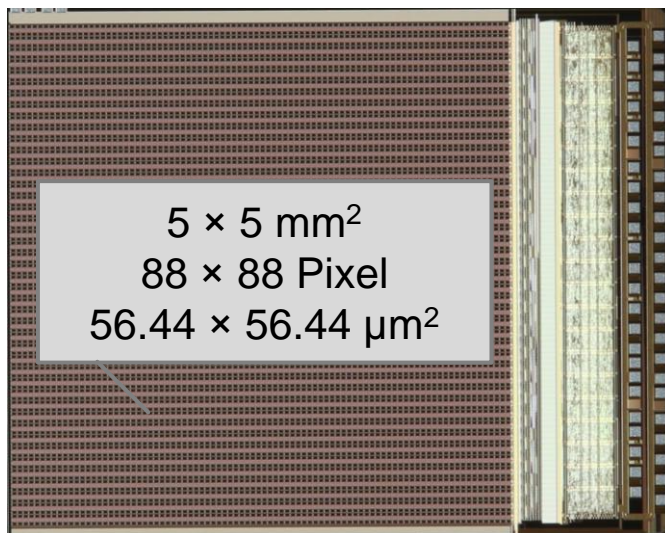


SPAD Array Chips with Full Frame Readout

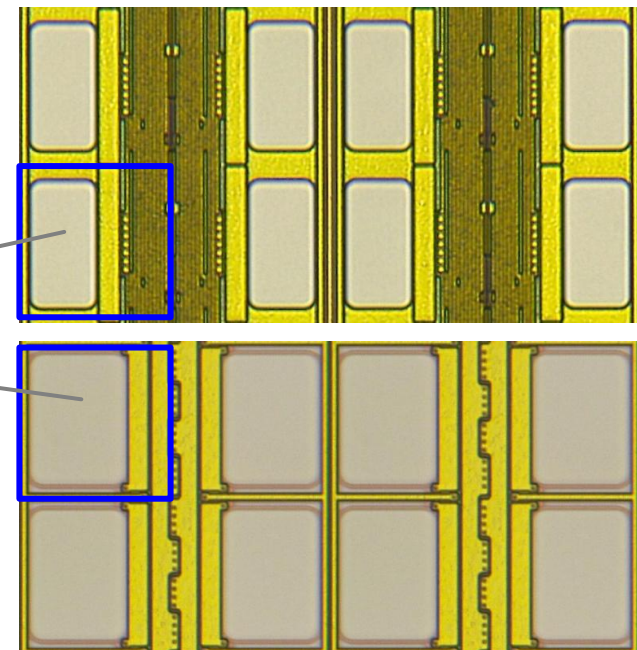


- SPAD Array Chips in CMOS Technology – Two versions presented
- $5 \times 5 \text{ mm}^2$ sensitive area, 88×88 pixels
- SPAD fill factor 38% / 55% (1st / 2nd chip)
- Double buffering in pixel \rightarrow pixel immediately ready after one hit
- Readout of 400.000 full frames in the second generation
- Center of gravity reconstruction on-chip
- Dark Count Rate $< 100 \text{ kcps/mm}^2$ at 20°C with 10% of killed pixels
- Crosstalk $< \sim 5\%$ between adjacent pixels
- Dark Trigger rate of few Hz for Multiplicity ≥ 4



38 % fill factor

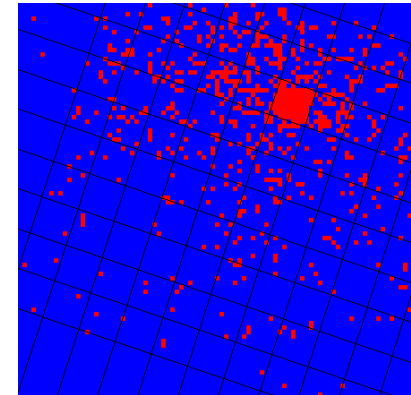
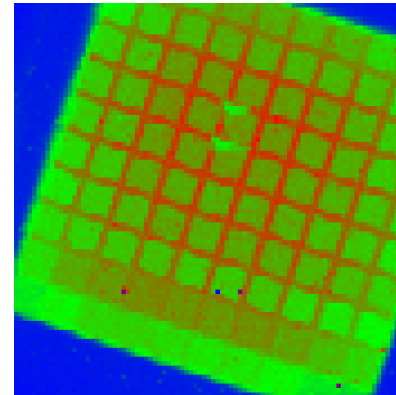
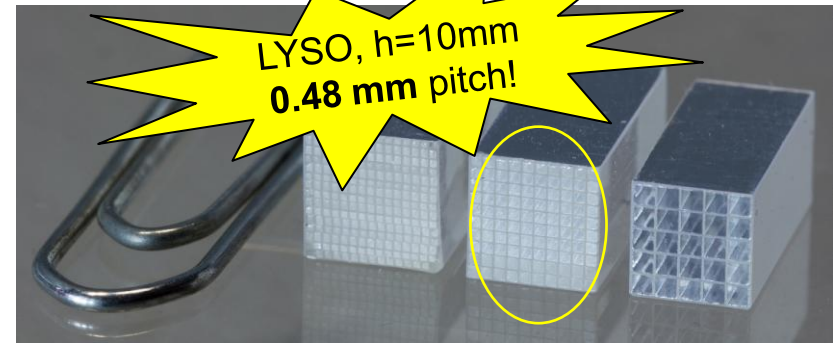
55 % fill factor





Identification of LYSO Arrays

- 0.88 / 0.48 / 0.33 mm pitch
- 10 mm height
- 65 μ m ESR reflectors between crystals
- Measured @ 30°C so far
- Self triggered multiplicity ≥ 4



Laser 2D Scan

- Scan over region of 1.5 \times 2.0 pixels in 30 \times 40 steps ($\sim 2.8 \mu\text{m}$ / Step)
- Plot # hits in one pixel for 3000 laser shots ($\sim 4\text{V}$ overvoltage, $I_{\text{SPAD}} \sim 6\mu\text{A}$)

