SPAD Array Chips in CMOS Technology – Two versions presented

- 5 × 5 mm² sensitive area, 88 × 88 pixels
- SPAD fill factor 38% / 55% (1st / 2nd chip)
- Double buffering in pixel → 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 kcps/mm² at 20°C with 10% of killed pixels
- Crosstalk < ~5% between adjacent pixels
- Dark Trigger rate of few Hz for Multiplicity ≥4
Identification of LYSO Arrays

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

Laser 2D Scan

- Scan over region of 1.5 × 2.0 pixels in 30 × 40 steps (~ 2.8 µm / Step)
- Plot # hits in one pixel for 3000 laser shots (~ 4V overvoltage, I_{SPAD} ~ 6µA)