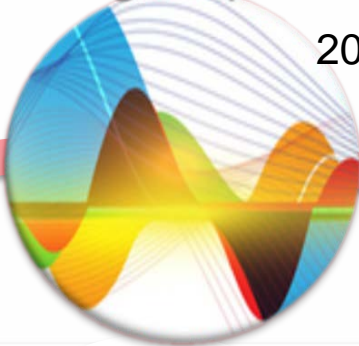


TACKLING IMAGE SENSORS CHALLENGES: CEA-LÉTI APPROACHES

A COMPREHENSIVE SET OF TECHNOLOGIES FOR IMAGE SENSORS

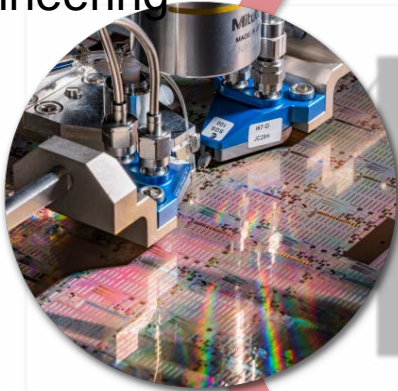
Image & Signal processing

200 signal processing researchers



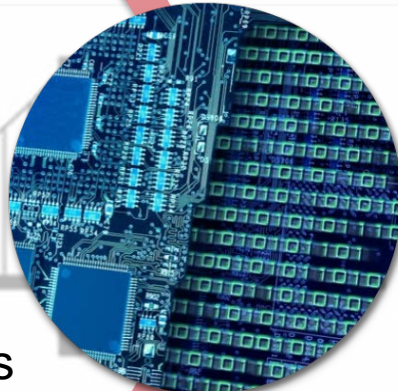
Process & Technology

600 Process engineering



Hardware implementation

250 IC researchers



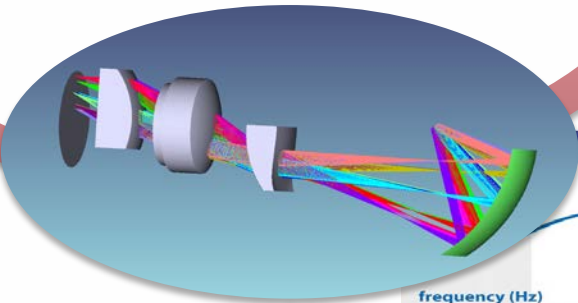
200 Optronic researchers



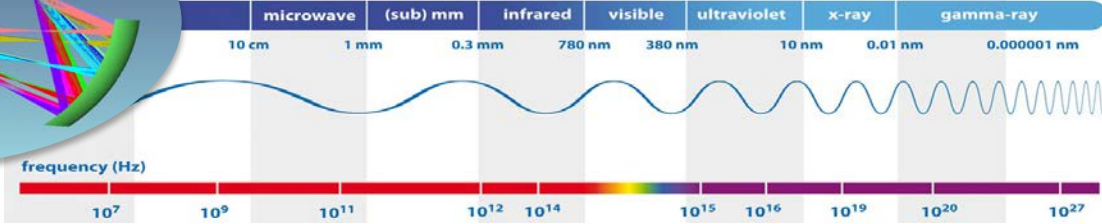
Key figures:

- 10,000 m² cleanrooms
- 3,000 patents
- 700 publications yearly

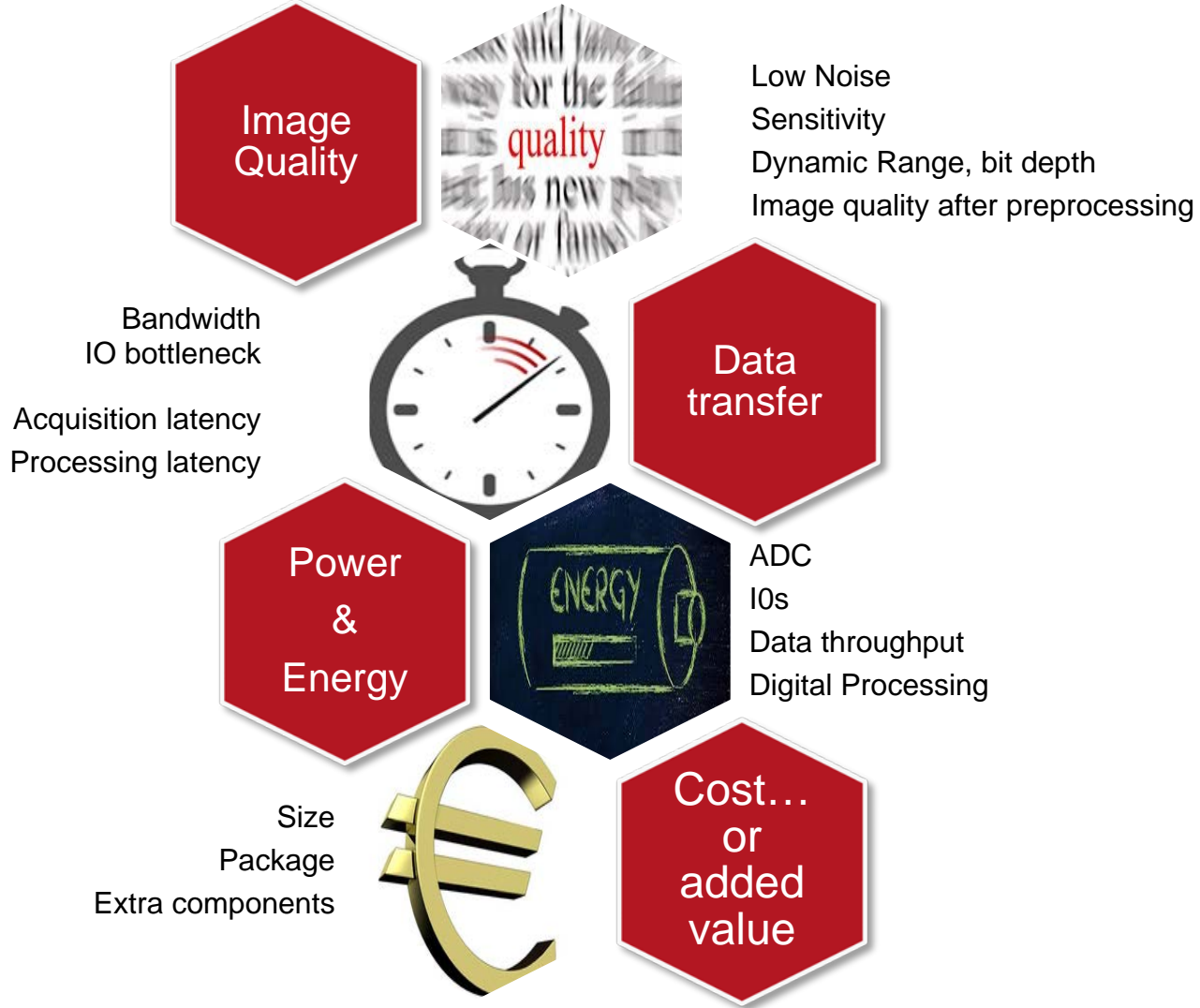
Developments over a wide spectrum...



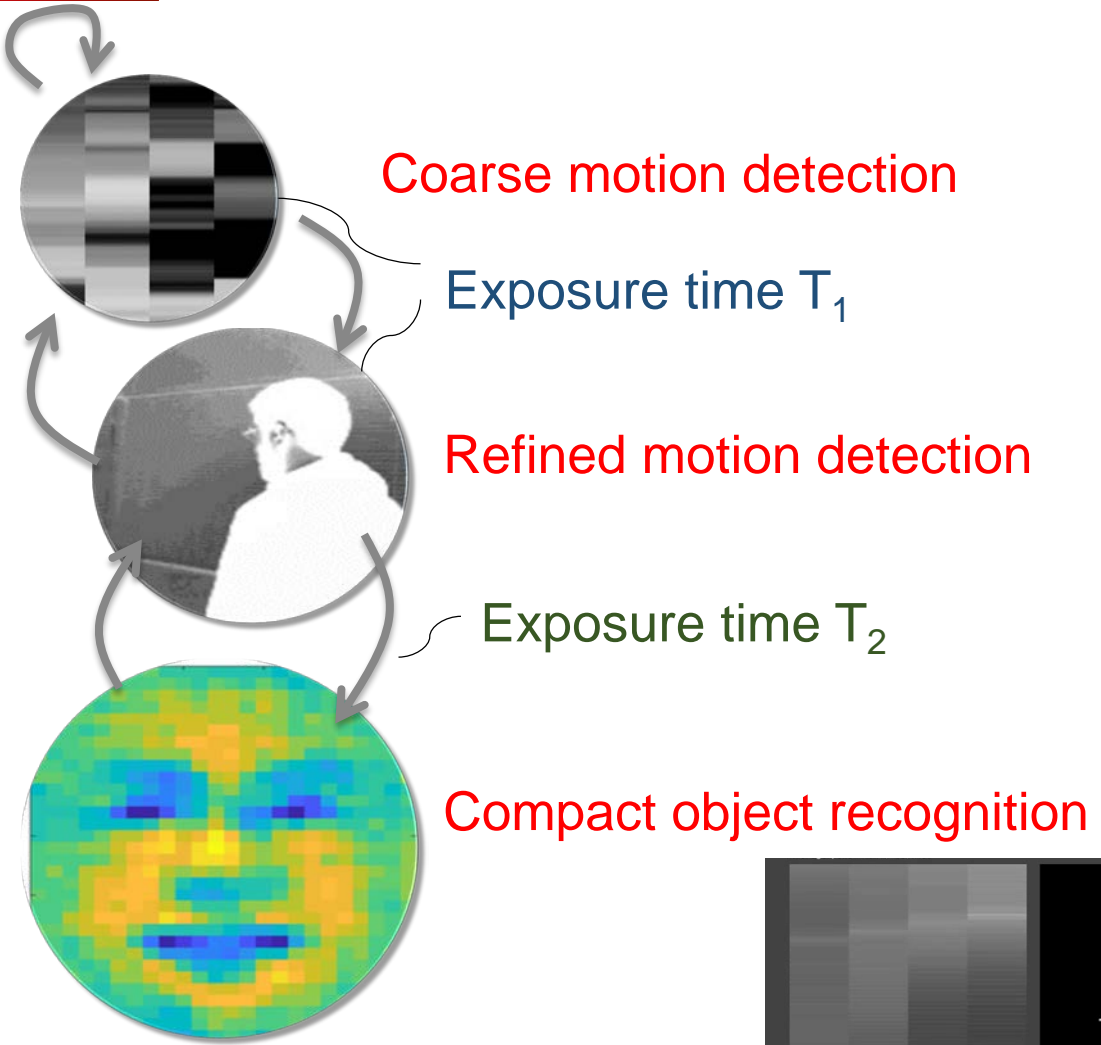
Optics



SOME CHALLENGES FOR IMAGE SENSORS



ENERGY EFFICIENCY: WAKE-UP IMAGER CASE STUDY



Key features

- Motion and recognition: $<6 \mu\text{W}$
- Auto-exposure, 90dB DR
- $>95\%$ detection rate

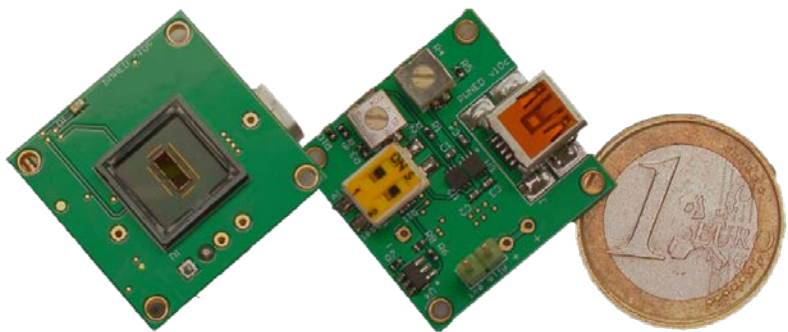
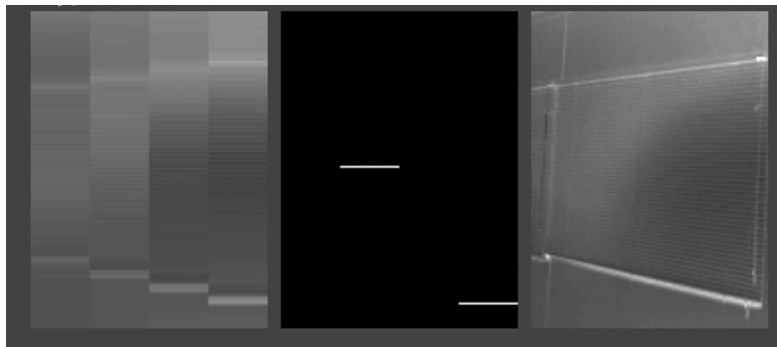
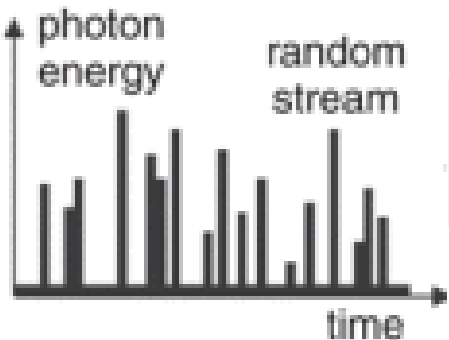
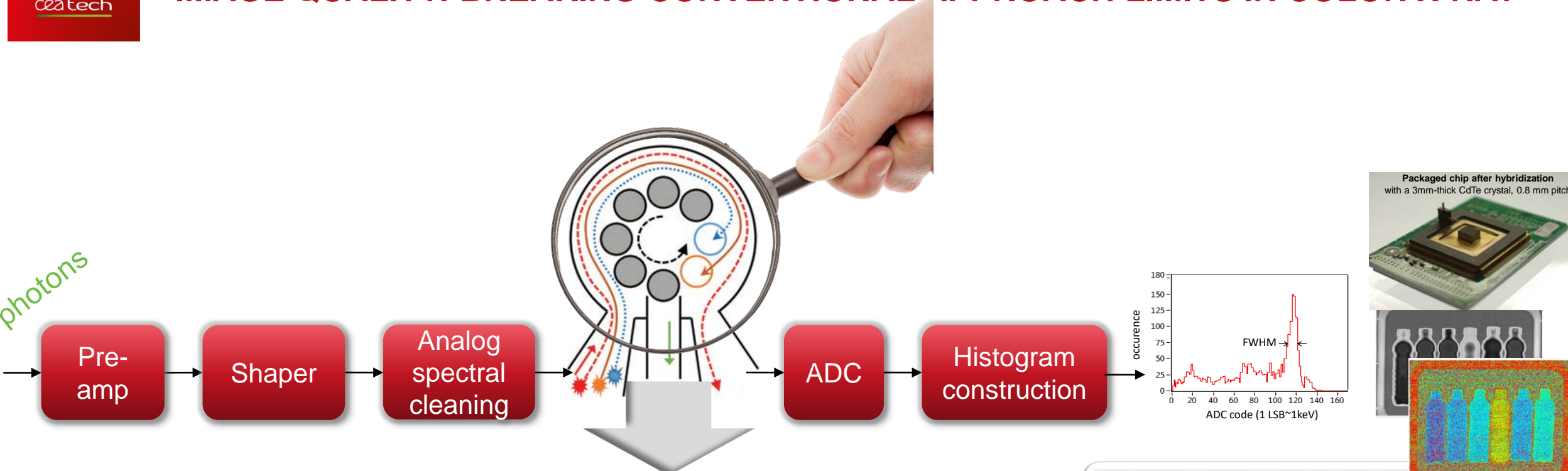
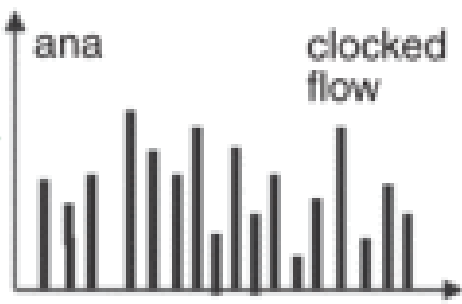
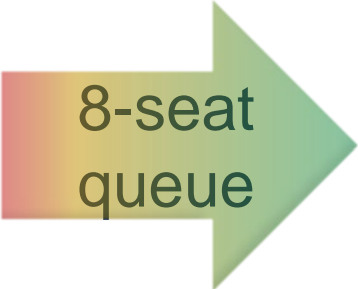


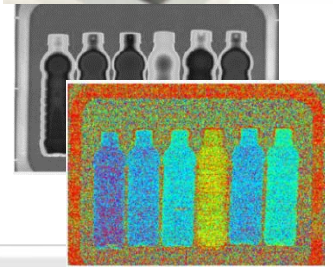
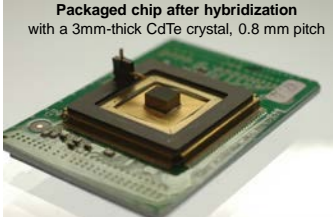
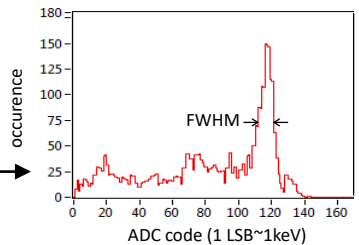
IMAGE QUALITY: BREAKING CONVENTIONAL APPROACH LIMITS IN COLOR X-RAY



Asynchronous
200MHz BW



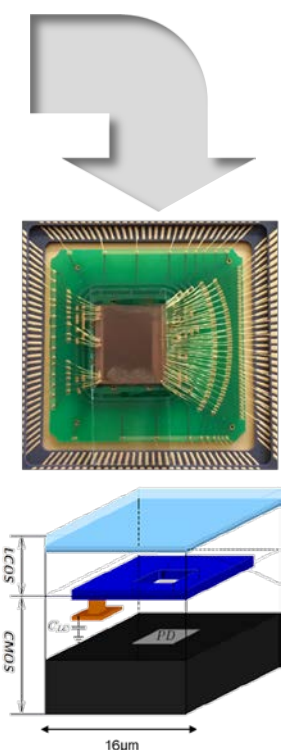
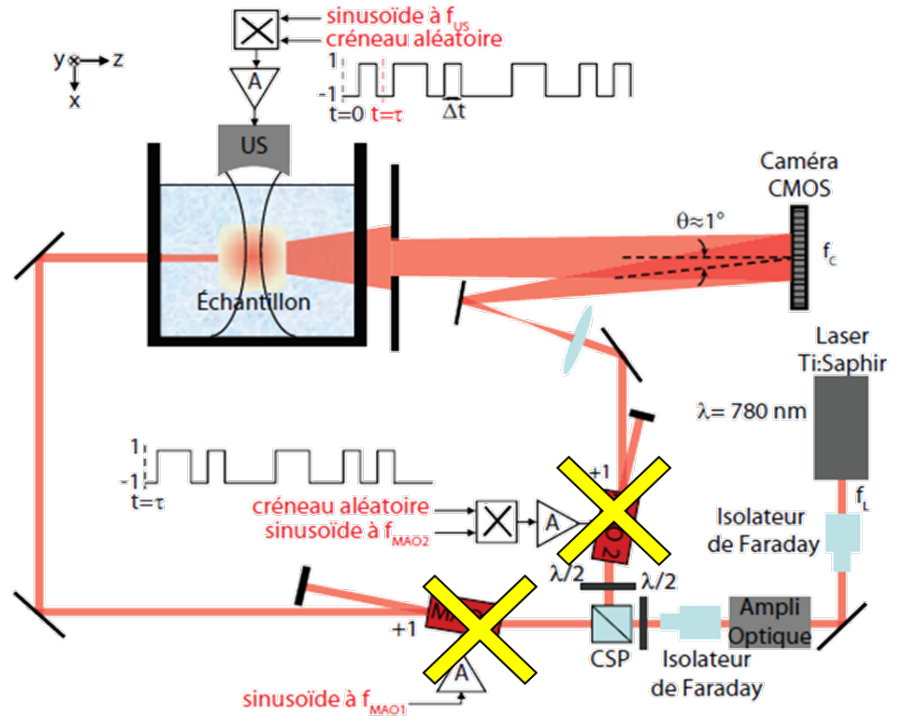
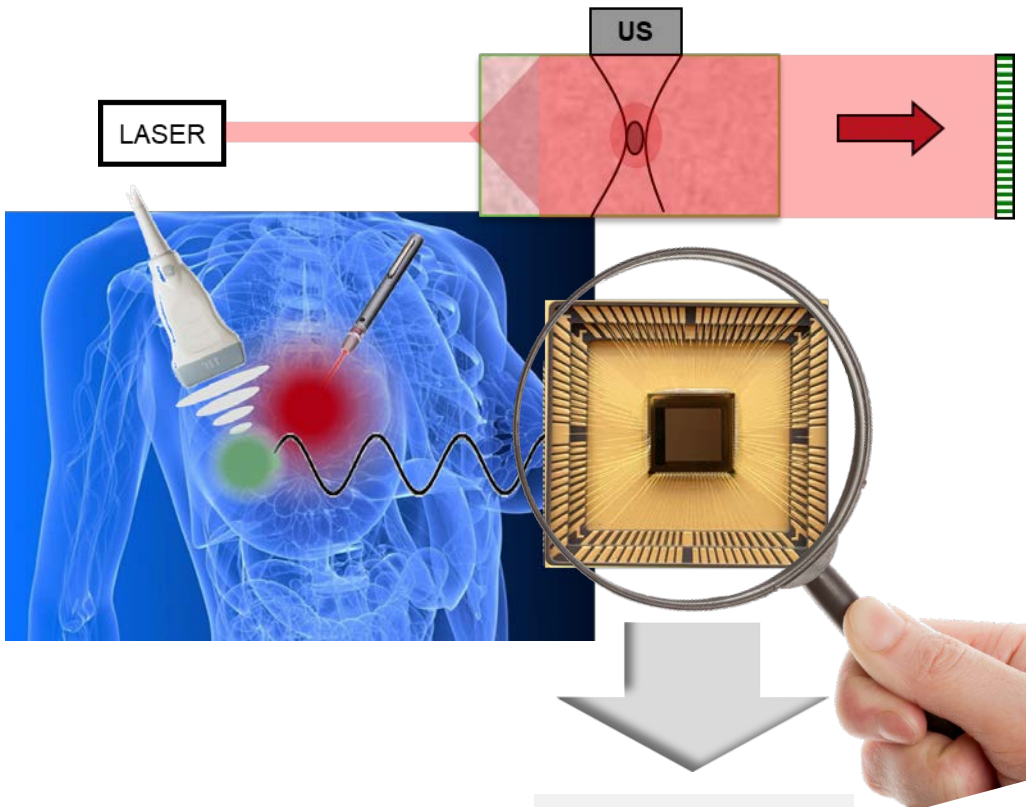
$f_s = 10\text{MS/s}$



Key features

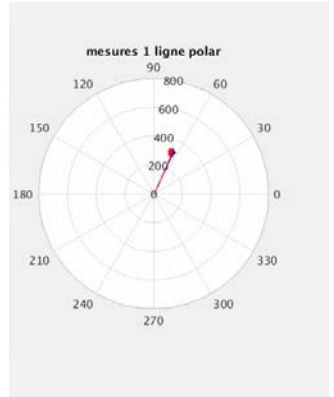
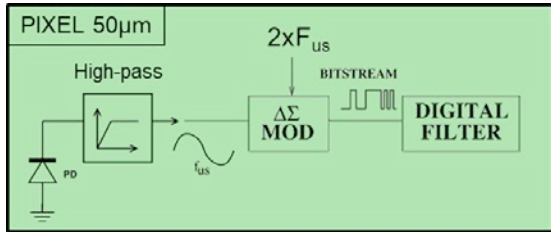
- 256 bin spectrum
- Sampling freq. / 7
- Missed photons /10

COST AND ADDED VALUE: IN PIXEL WAVE FRONT MEASUREMENT & CORRECTION

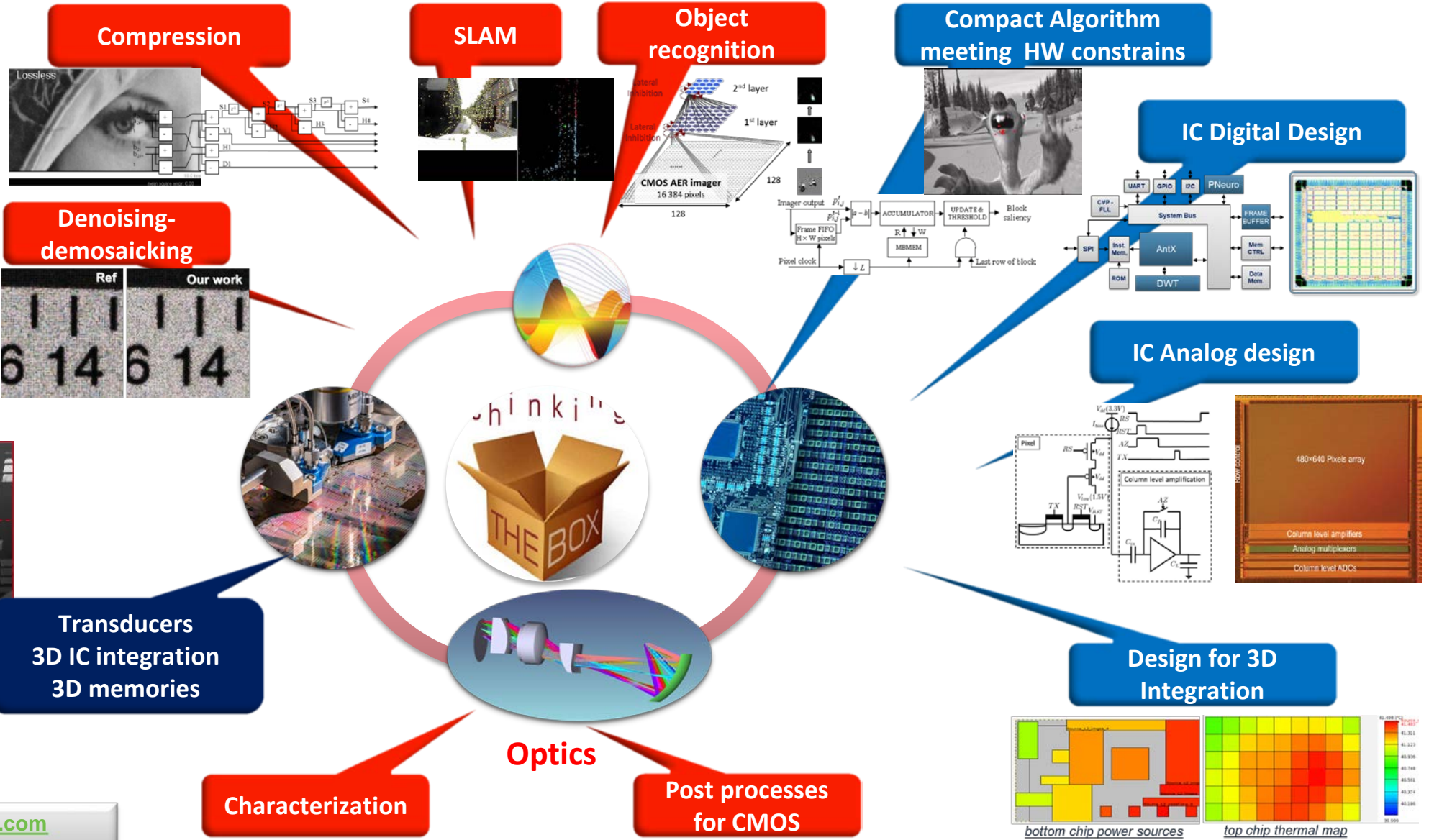


Key features

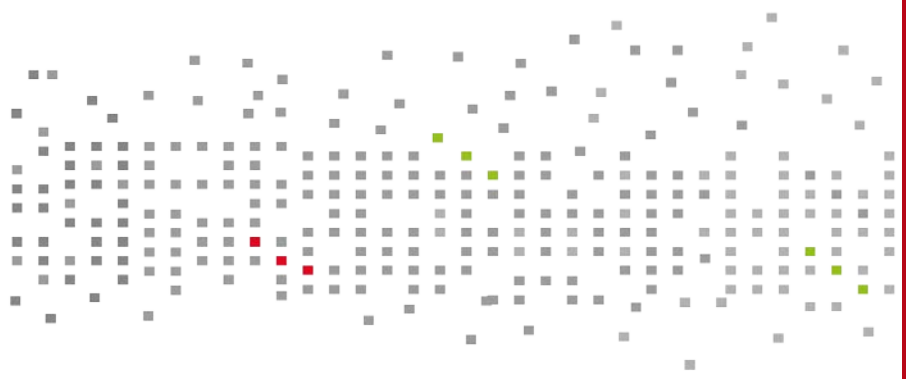
- DC removal >90%
- 10 bits ADC
- 10μW/pix
- Lock-in max : 16MHz



SOME CHALLENGE? LET TALK TO CEA-LÉTI!



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