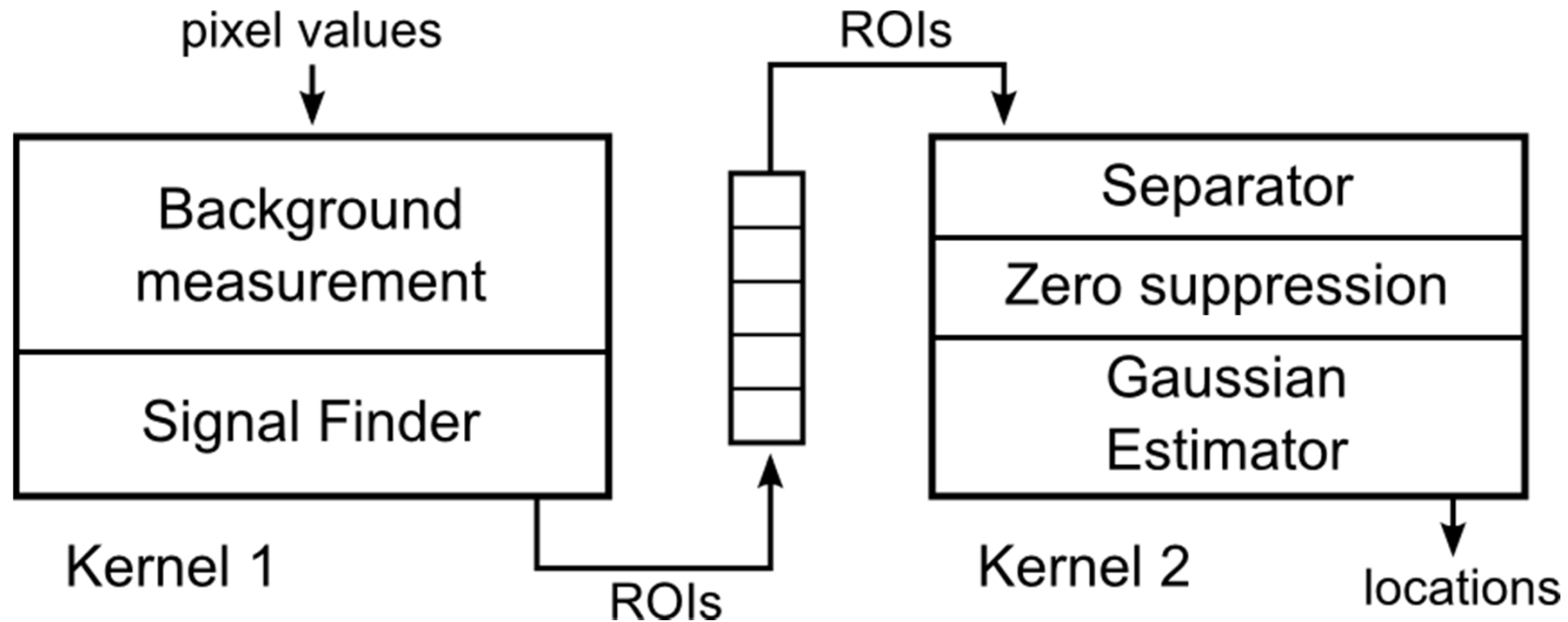


# Stochastic Localization Microscopy (STORM)

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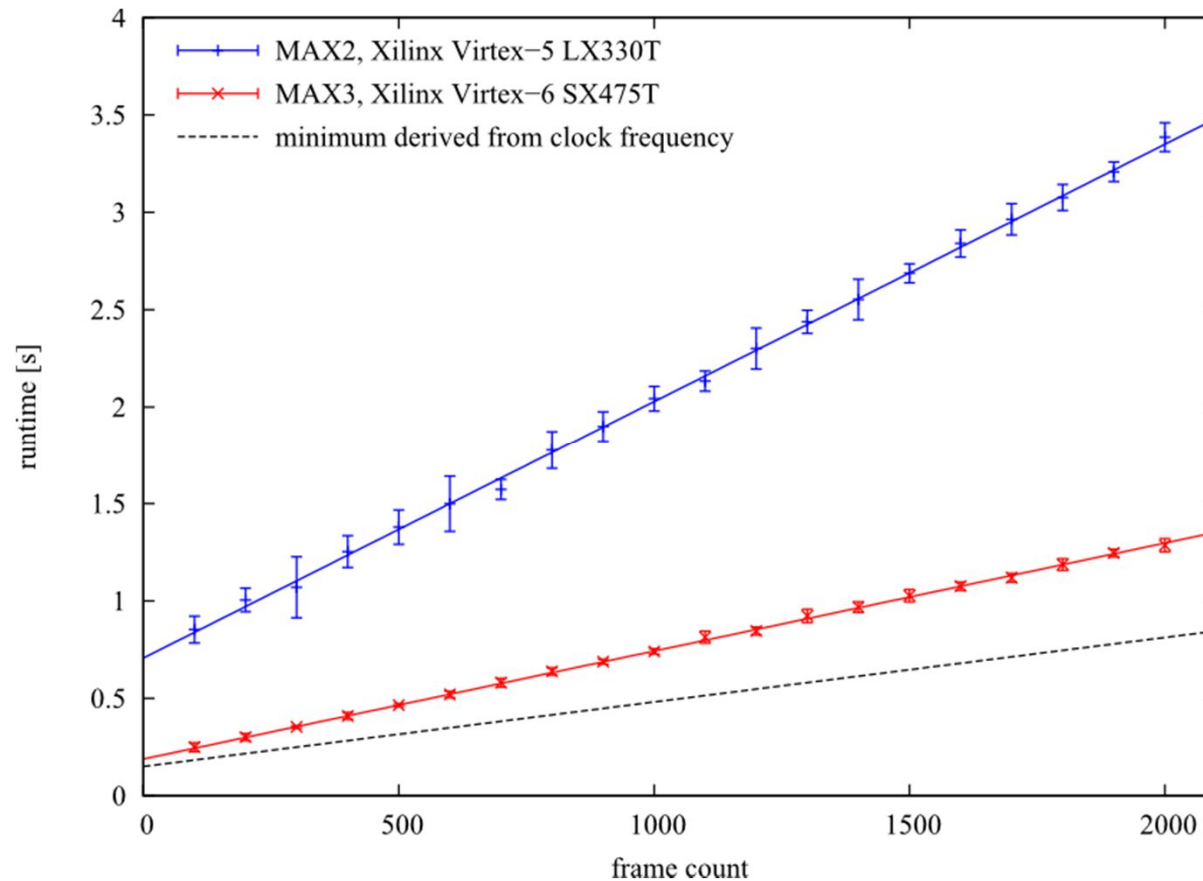
# Implementation on Max3 DFE



Two kernels with 200MHz each.  
Kernel 1 processes one input pixel per cycle.



# Throughput



- MAX2: 70 Mpx/s (Xilinx Virtex-5 LX330T), 200 MHz
- MAX3: 167 Mpx/s (Xilinx Virtex-6 SX475T), 200 MHz

# Acceleration

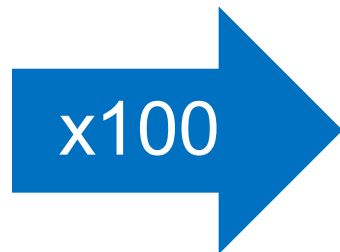
Typical image with 329,444 signals

Intel i5 450:  
Iterative signal fitting



[Intel]

4h



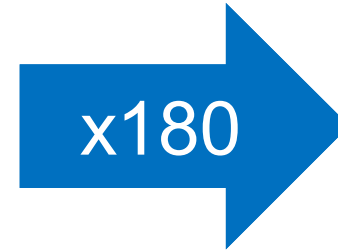
x100

Intel i5: New algorithm with  
center-of-mass calculation



[Intel]

1min 20s



x180

Max3  
Dataflow design



0.8s

See also:

Grüll, Kirchgessner, Kaufmann, Hausmann, Kebschull:

*Accelerating Image Analysis For Localization Microscopy With FPGAs,*

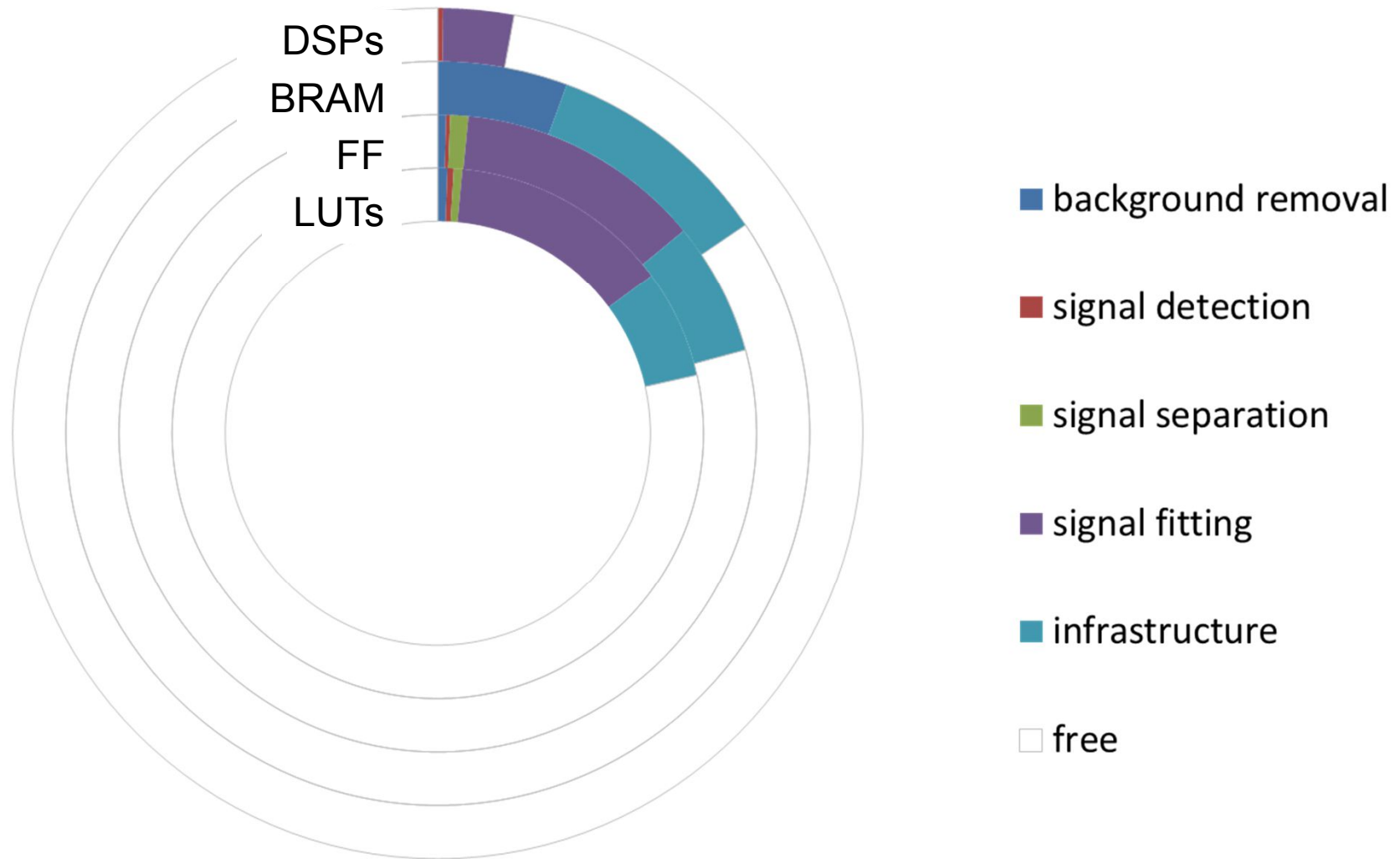
International Conference on Field Programmable Logic and Applications 2011, Chania, Greece

Kaufmann, Piontek, Grüll, Kirchgessner, Rossa, Wolburg, Blasig, Cremer:

*Visualization and Quantitative Analysis of Reconstituted Tight Junctions Using Localization Microscopy,*

PLoS ONE, vol. 7, Public Library of Science, 2012

# Ressource usage



MAX3 (Xilinx Virtex-5 LX330T), 200MHz

# Resource usage

## MAX3 (Xilinx Virtex-5 LX330T)

component	LUTs	FFs	BRAMs	DSPs
background	1151	1242	120	0
spot finding	741	609	0	4
spot separation	1038	2721	0	0
feature extraction	26470	37127	0	54
total usage	42464	61884	330	58
available	297600	297600	2128	2016
total %	14%	21%	16%	3%

occupies < 1/5 of a Xilinx Virtex-6 SX475T FPGA