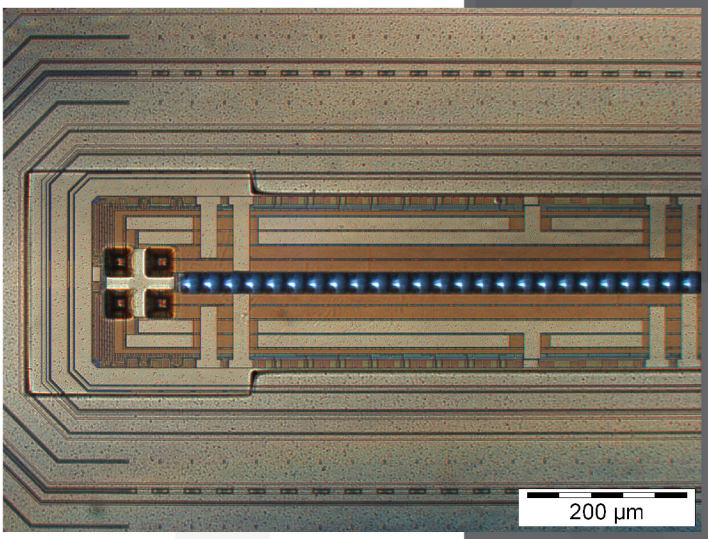
pi imaging

ENABLING INNOVATION

SPADλ

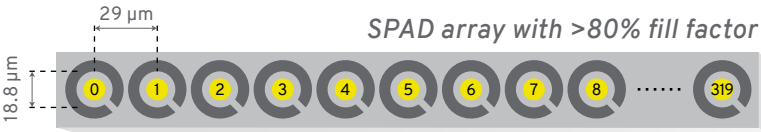


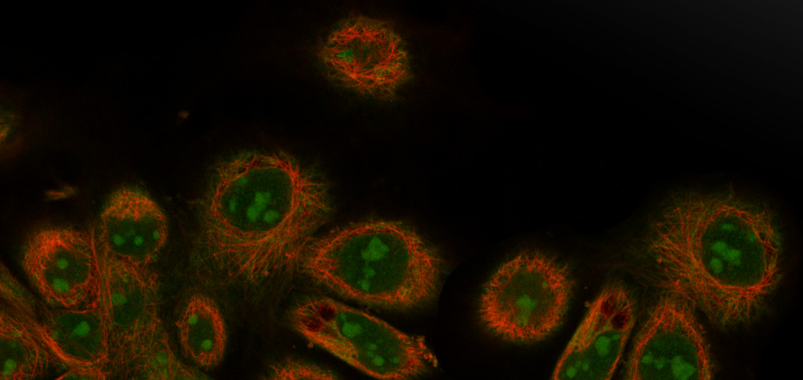
Description

SPADλ is a photon-counting linear array with time gating and time tagging. The core of the detector is a SPAD array with 320×1 pixels.

Photon counting with up to 555'000 frames per second and zero readout noise is achieved.

Nanosecond time gating is coupled with 17 ps gate phase shift. Time tagging with 20 ps resolution and 130 ps FWHM precision is available.





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Applications

Fluorescence lifetime imaging

SPADλ increases the overall photon throughput compared to point scanned detection systems from the typical 10 Mcounts per second to 3.2 Gcounts per second.

Why SPADλ?

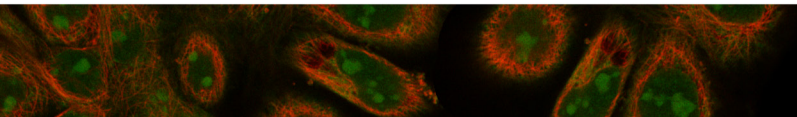
- Simplify FLIM setup
- Increase FLIM frame rate

Flow cytometry

SPADλ enables 320 spectral channels with shot noise limited SNR and integration times down to 1.8 µs.

Why SPADλ?

- Simplify multichannel detection
- Improve signal to noise ratio



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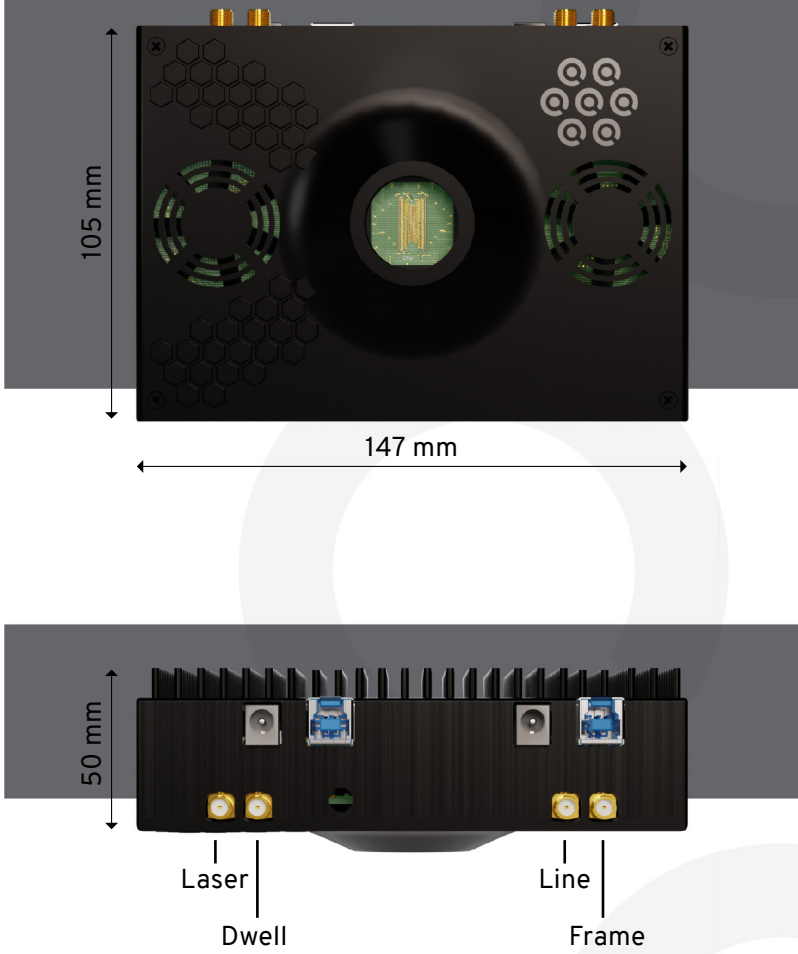
Technical specifications

Typical technical specifications

SENSOR	LINEAR SPAD ARRAY
Image array	320 × 1
Pixel pitch	29 µm
Sensor wavelength range	400 to 900 nm
Peak photon detection probability	50% @ 520 nm
Fill factor with microlenses	>80 % for collimated light
Median dark count rate at room temperature	<250 cps
Percentage of pixels with >10 kcps	5%
Frame rate (max.)	555'000 fps
Dead time	10 ns
Timing jitter	130 ps FWHM
Time-tagging resolution	20 ps
Minimum exposure/gate width	2 ns
Minimum exposure/gate shift	17 ps
Crosstalk	2%
Connection type	C-mount

SYSTEM DIMENSIONS AND PERIPHERALS



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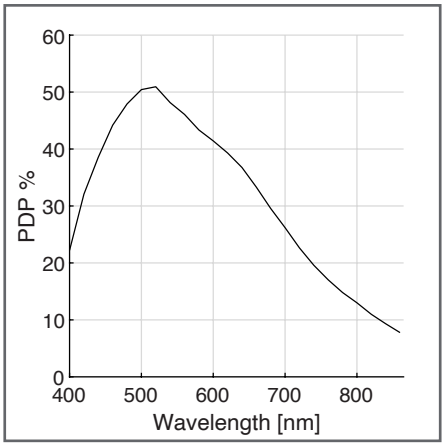
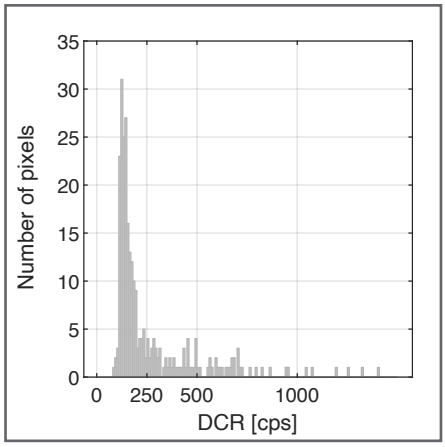
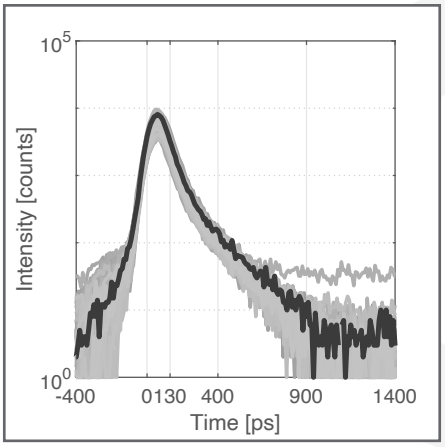
Typical performance characteristics



Photon detection probability.



Typical distribution of dark count rate over the SPAD array.

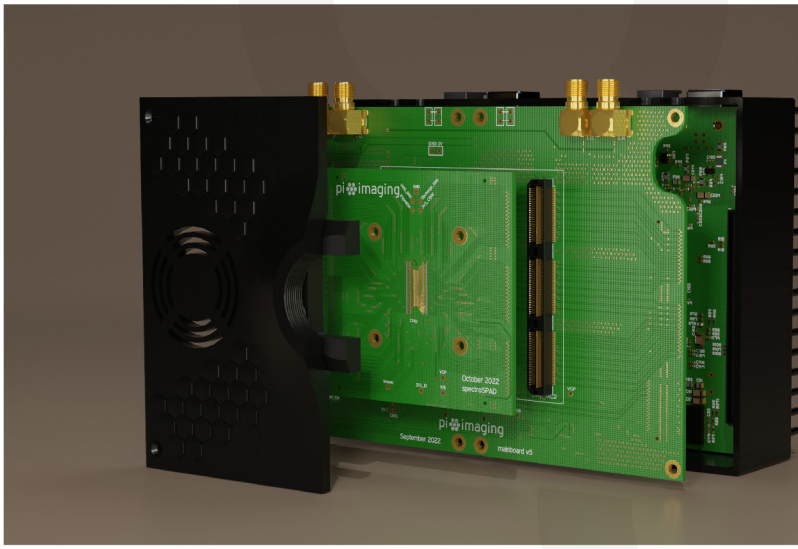


Timing jitter over all the pixels, with an average of 130 ps FWHM.

System integration

A system overview is shown on the right. For operation, only a 5 V power supply and two USB3 connections are required.

The software provides functionalities for photon-counting, time-gating and time-tagging modes. It can be accessed through TCP/IP for easy integration into LabVIEW, MATLAB, Python or C++.



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