Performance analysis of interleaved SNSPDs

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SNSPDs are the preferred technology for quantum communications and computing due to their efficiency and timing precision [1]. By utilizing near-infrared wavelengths, they also integrate seamlessly with existing fiber-optic networks [2]. Recent emphasis toward multipixel designs enhance these applications by enabling Photon Number Resolution (PNR) and faster detection speeds [3]. These advancements allow for higher data rates and more complex photon manipulation, which are essential for scalable quantum information processing and long-distance quantum communication transmissions [4].
In this work (see Fig. 1), the key performance differences between interleaved SNSPDs with different number of pixels are highlighted and compared under different illumination regimes, presenting limits and trade-offs. Moreover, photon distributions and fidelities are retrieved for characterizing the devices' PNR.

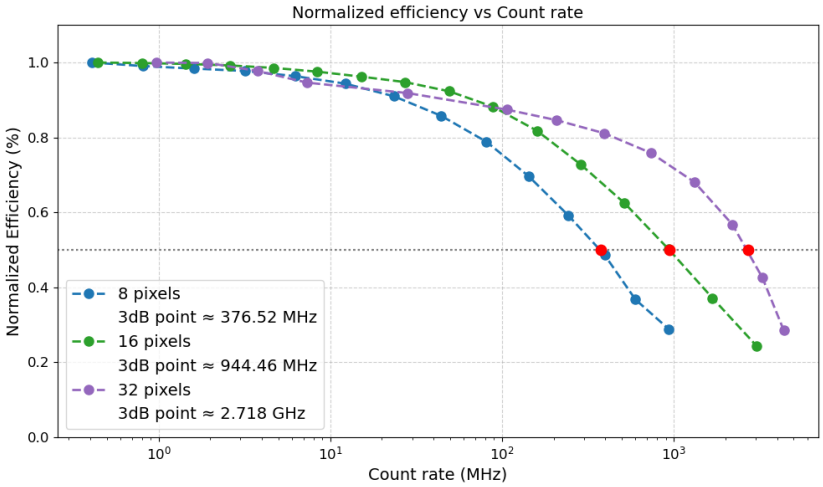

Fig. 1: *High count-rate plot showing the normalized efficiency as a function of the count rate for different multipixel devices: red dots are indicating the efficiency 3dB points.*

The study aims at showing more extensively the capabilities of each type of device and at bringing a clear benchmark analysis to potential end users.

Funding acknowledgement

The authors acknowledge the support of the European Union's Horizon Europe research and innovation program under EPIQUE Project (Grant Agreement No. 101135288).

References

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