



Tuesday, April 9th 2019 – 14:00
CFEL Seminar room IV (Bldg. 99)

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Quantum enhanced super-resolution microscopy

Although the principles of quantum optics have yielded multiple ideas to surpass the classical limitations in optical microscopy, their application in life science imaging has remained extremely challenging. In this talk, I will present two works that apply measurements of photon correlations for the benefit of localization microscopy and image scanning microscopy (ISM).

The first uses photon antibunching measurement to estimate the number of emitters in a fluctuating scene and can potentially speed-up super-resolution techniques based on localization microscopy [1]. In the second work, we employ photon antibunching as the imaging contrast itself. Measuring the spatial distribution of ‘missing’ photon pairs in an ISM architecture may enhance lateral resolution four times beyond the diffraction limit [2]. The robustness of the antibunching signal enabled super-resolved imaging of fixed cells, relying solely on a quantum contrast.

[1] - Israel, Y.*, Tenne, R.*, Oron, D. & Silberberg, Y. Quantum correlation enhanced superresolution localization microscopy enabled by a fibre bundle camera. *Nat. Commun.* 8, 1 (2017).

[2] - Tenne, R. et al. Super-resolution enhancement by quantum image scanning microscopy, *Nature Photonics*, 13, 116-122 (2019)

Host: Daniele Nicoletti / Andrea Cavalleri

