Why minimal intensity holds maximum (resolution) **power**

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A conclusive description of the basic principles of superresolution fluorescence microscopy (nanoscopy) spawns new nanoscopy concepts, as exemplified by the recent emergence of three powerful superresolution concepts: i) protected STED [1], ii) MINFIELD [2], and iii) MINFLUX[3]. Although they differ in several aspects, all these concepts harness a local intensity minimum (of a doughnut or a standing wave) for determining the coordinate of the fluorophore to be registered. MINFLUX nanoscopy uses an excitation intensity minimum to establish the fluorophore position, thus obtaining the ultimate (super)resolution: the size of a molecule [3].

[1] Danzl, J. G., Sidenstein, S. C., Gregor, C., Urban, N. T., Ilgen, P., Jakobs, S., Hell, S. W. Coordinate-targeted fluorescence nanoscopy with multiple off states, **Nat Photonics**, 10, 122-128 **(2016)**.

[2] Göttfert F., Pleiner T., Heine J., Westphal V., Görlich D., Sahl S.J., Hell S.W.
Strong signal increase in STED fluorescence microscopy by imaging regions of subdiffraction extent, **PNAS (2017)**.

[3]. Balzarotti F., Eilers Y., Gwosch, K. C., Gynnå, A. H., Westphal, V., Stefani, F. D., Elf, J., Hell, S.W., Nanometer resolution imaging and tracking of fluorescent molecules with minimal photon fluxes, **Science (2017)** 10.1126/science.aak9913