MINFLUX and MINSTED provide molecule-scale resolution in fluorescence microscopy

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I will show how an in-depth description of the basic principles of diffraction-unlimited fluorescence microscopy (nanoscopy) [1] has spawned a new powerful superresolution concept, namely MINFLUX nanoscopy [2-5]. MINFLUX utilizes a local excitation intensity minimum (of a doughnut or a standing wave) that is targeted like a probe in order to localize the fluorescent molecule to be registered. In combination with single-molecule switching, MINFLUX and its more recent 'cousin' MINSTED [6] have obtained the ultimate (super)resolution: the size of a molecule. Providing 1–3 nanometer resolution these novel microscopy concepts are being established for routine fluorescence imaging at the highest, molecular-size resolution levels. Relying on fewer detected photons than popular camera-based localization, MINFLUX and MINSTED nanoscopy are poised to open a new chapter in the imaging of protein complexes and distributions in fixed and living cells.

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