The double-helix microscope super-resolves extended biological structures by localizing single blinking molecules in three dimensions with nanoscale precision

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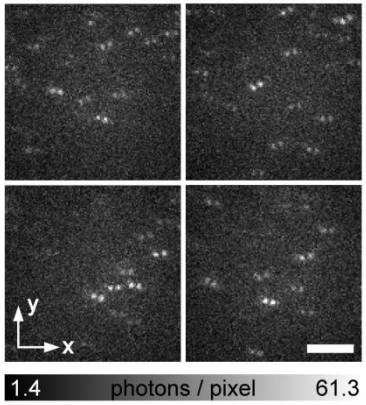
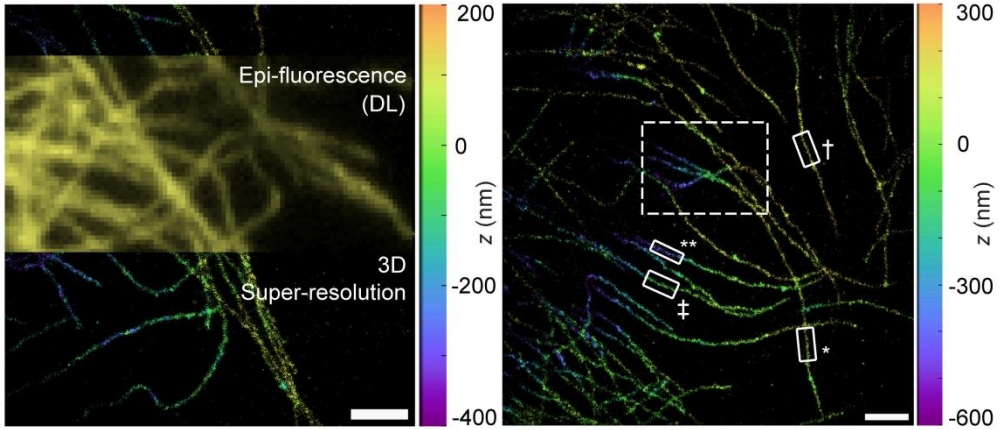
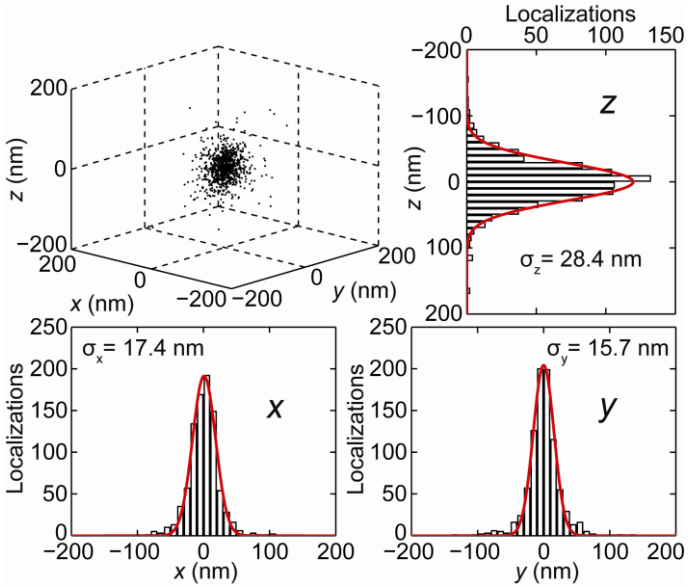
- Demonstrated 3D DH-PSF super-resolution (SR) imaging of extended biological *structures* (microtubules) with the blinking Alexa 647 dye system
- Fast (5 minute) image acquisition of well-sampled structures



Single-molecule DH images

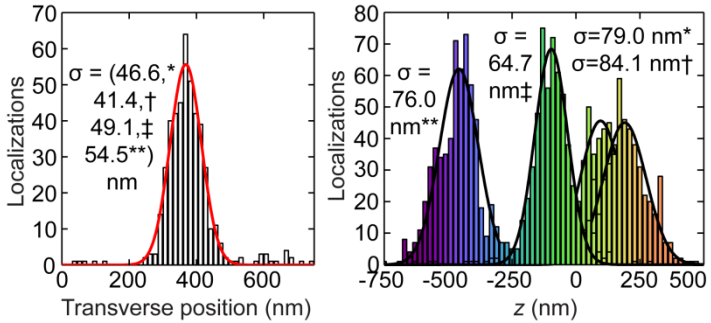


Super-resolution reconstructions over a large (1 μm) axial range (*z* position color-coded). Scale bars: 2 μm.



Provided an experimental calibration of localization precision and thus resolution potential for single-molecule labels under realistic biological background conditions of >10 photons/pixel/frame:

Localization precisions for on average 1200 photons (*x*,*y*,*z*)



Transverse and axial cross-sectional profiles

DH-PSF provided by R. Piestun, Univ, Colorado

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