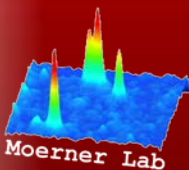


Corkscrew point spread function for far-field three-dimensional nanoscale localization of point-like objects



The corkscrew PSF rotates as a function of the axial position of a nanoscale object. It can be used with fluorescent or scattering objects, such as fluorescent molecules, fluorescent beads, or metal nanoparticles.

Objects can be localized in 3D with nanoscale precision over a $3.2 \mu\text{m}$ depth of field using a conventional fluorescence microscope, $4f$ imaging system, and spatial light modulator.

This approach has been used to localize bright beads on a sawtooth grating with 3 nm precision in x and y and 6 nm precision in z .

Images of the corkscrew PSF at various z positions

