

# easySLM-STED: Stimulated emission depletion microscopy with aberration correction, extended field of view and multiple beam scanning

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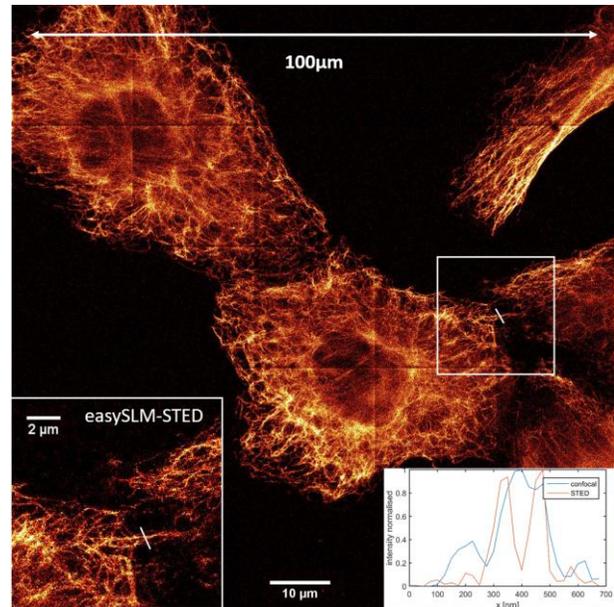
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**Abstract:** We report a STED system with reduced complexity in alignment using a spatial light modulator (SLM) to modulate the phase and correct aberrations for the collinear excitation and depletion beams. This configuration can be used to enhance the field of view, parallelize the acquisition and automate the alignment.

Stimulated emission of depletion (STED) microscopy is a powerful super-resolved microscopy (SRM) technique [1]. However, due to the complex optical design, it can be challenging to implement in the laboratory. Several approaches target the simplification of the optical set-up of STED, such as the *easySTED* method [2] or the use of an SLM for electronic control of beam shaping via adaptive optics, e.g. [3]. Here we present a new approach combining *easySTED* with programmable wave-front shaping [4].

Starting from collinear excitation and depletion beams, the *easySLM-STED* approach uses an SLM for programmable depletion beam modulation and aberration correction of both beams. This can eliminate the beam walk-off induced by lateral chromatic aberrations, thereby enabling STED over larger fields of view and extending the range over which galvo scanners can operate. The figure shows an *easySLM-STED* image of vimentin with a 100 x 100  $\mu\text{m}$  field of view. This approach also enables programmable multibeam scanning to reduce the image acquisition time via parallelization.



## References

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