NANOSCALE STED-MICROSCOPY WITH FLUORESCENT PROTEINS

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Stimulated emission depletion (STED)[1] is a concept to overcome the diffraction resolution barrier fundamentally: The excitation beam is overlapped with a second, red-shifted beam featuring a zero in the center that is capable of quenching excited molecules and thus reducing the focal spot to sub-diffraction sizes.

We report subdiffraction resolution using stimulated emission depletion (STED) microscopy with fluorescent protein labeled samples[2]. The ~70 nm lateral resolution attained in this study is demonstrated with images of GFP-labeled viruses and the endoplasmic reticulum of a mammalian cell. Our results enable nanoscale biological microscopy with genetically encoded markers.

[1] S. W. Hell, and J. Wichmann, "Breaking the diffraction resolution limit by stimulated emission." *Opt. Lett.* , **19**, 780-782 (1994)
[2] K. I. Willig, R. R. Kellner, R. Medda, B. Hein, S. Jakobs, and S. W. Hell, "Nanoscale resolution in GFP-based microscopy" *Nature Methods* **3,** 721-723 (2006).