LOW-POWER STED MICROSCOPY OF UPCONVERSION NANOPARTICLES DEPOSITED ONTO GRAPHENE-BASED MATERIALS

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1. BACKGROUND

Upconversion nanoparticles (UCNPs) can convert near-infrared excitation into visible and ultraviolet emissions, making them promising for optical microscopy imaging. UCNPs have recently been used to achieve nanometre-scale optical resolution through low-power STED microscopy \cite{1}. The combination of UCNPs with suitable materials enables innovative functionality for biology and photonic applications. Here, we report on low-power STED microscopy of UCNPs deposited on graphene-based materials.

2. RESULTS AND DISCUSSION

Using a 980-nm excitation beam with a Gaussian shape and an 808-nm depletion beam with a doughnut shape, we imaged UCNPs on graphene-based materials using STED microscopy. We have achieved a saturation intensity of ~0.4 MW cm\textsuperscript{-2} and a lateral feature size of <50 nm, offering new avenues for the nanoscale use of functionalized UCNPs.

![Figure 1](image)

Figure 1: A) Confocal and STED microscopy of UCNPs deposited on graphene-based materials. (B) Intensity profiles along the dashed lines in A.

3. REFERENCES