

Universal manuscript template for Optica Publishing Group journals

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Abstract: This template contains important information on submissions to Optica Publishing Group journals.

1. Introduction

Here, we design and test a silicon waveguide with 500 nm width and 220 nm height strip waveguide. All

2. Main Waveguide

Here, we design and test a silicon waveguide with 500 nm width and 220 nm height strip waveguide. All designs are based on silicon on insulator. A wavelength operation of around 1550 nm is targeted with TE mode.

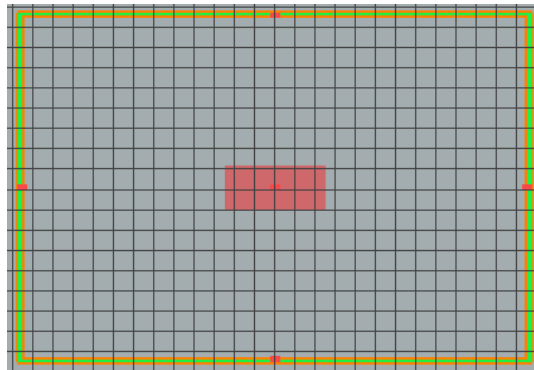


Fig. 1. Waveguide view

3. Simulation Design and Results

3.1 Modes

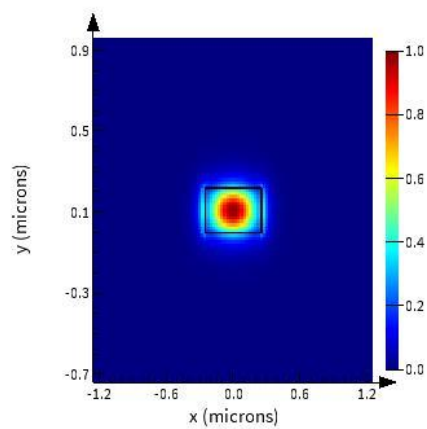


Fig. 2. TE mode

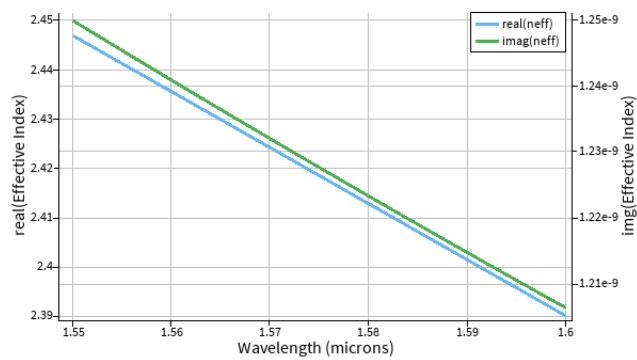


Fig. 3. Effective index

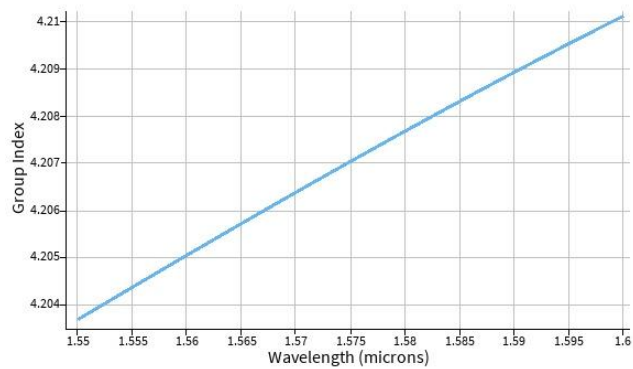


Fig. 4. Effective index

3.2 MZI

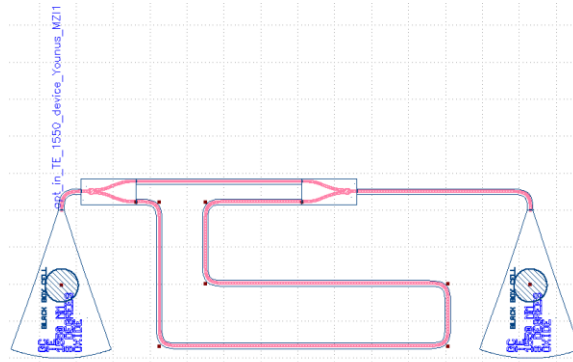


Fig. 5. MZI1 and MZI 2 with $\Delta L = 200 \mu m$. The aim is to show the manufacturing variation effect on FSR.

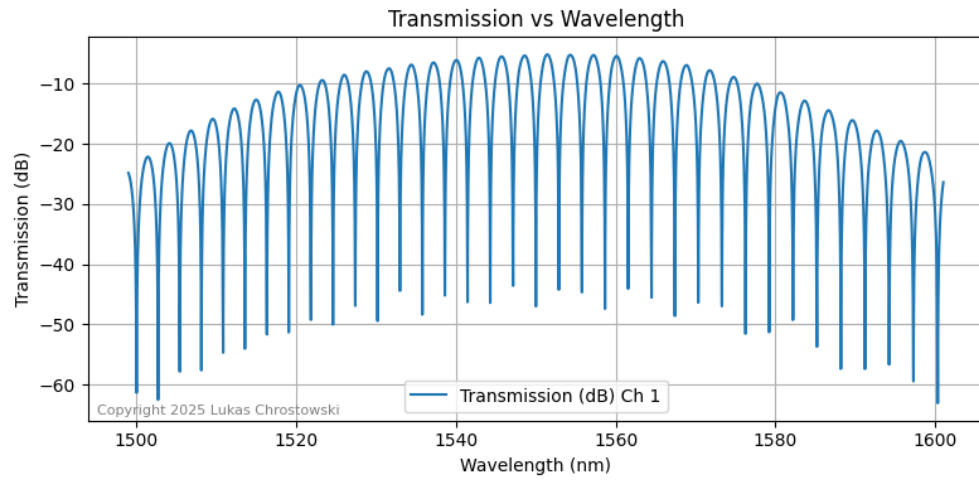


Fig. 6. MZI1 and MZI2 transmission verse wavelength with 5.7 nm FSR

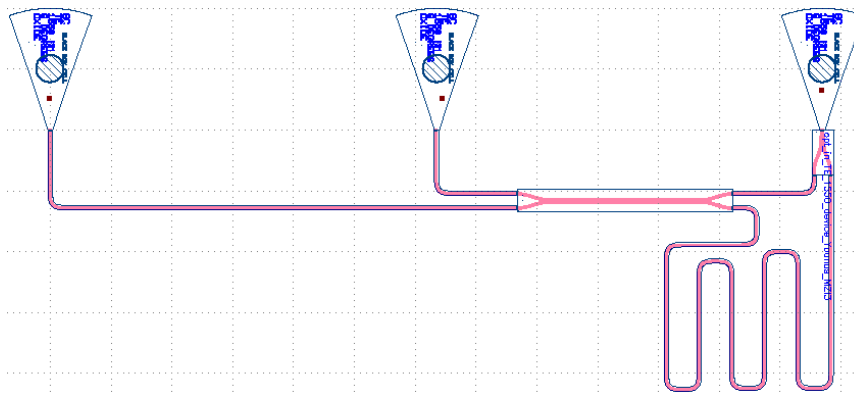


Fig. 6. MZI3 has two output ports to show constructive and distractive interferences. The $\Delta L = 344 \mu m$.

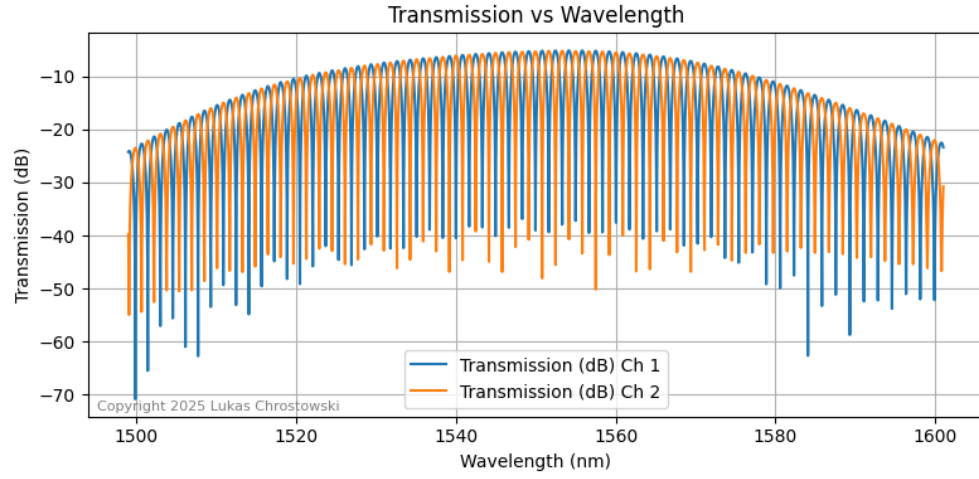


Fig. 6. Transmission verse wavelength for MZI3

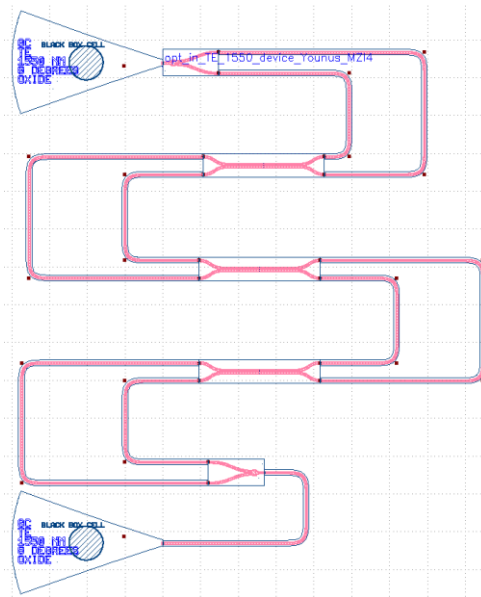


Fig. 7. MZI4 has four cascaded MZIs with $\Delta L1 = 50 \mu m$, $\Delta L2 = 60 \mu m$, $\Delta L3 = 55 \mu m$, $\Delta L4 = 65 \mu m$. The idea is to create a pattern. Similar structures are used to create a wideband optical bandpass filter, for example.

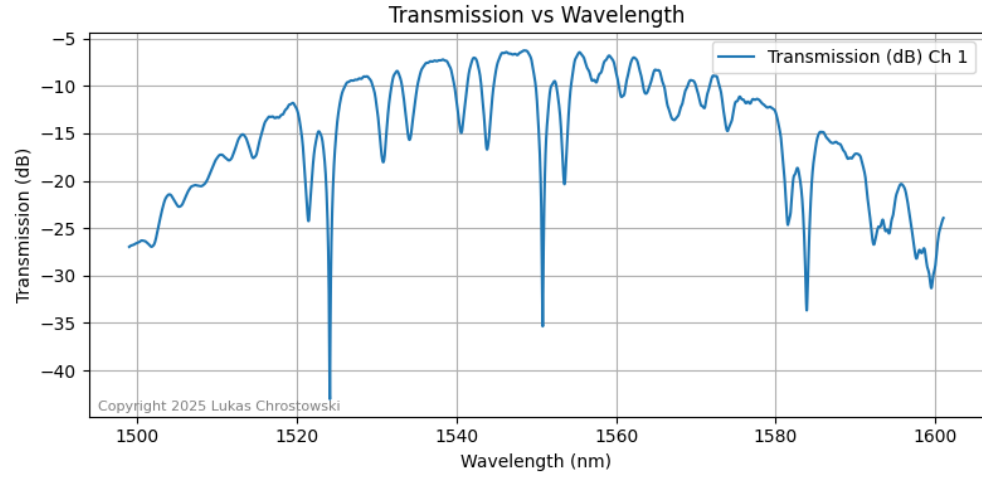


Fig. 8. Transmission verse wavelength for MZI4

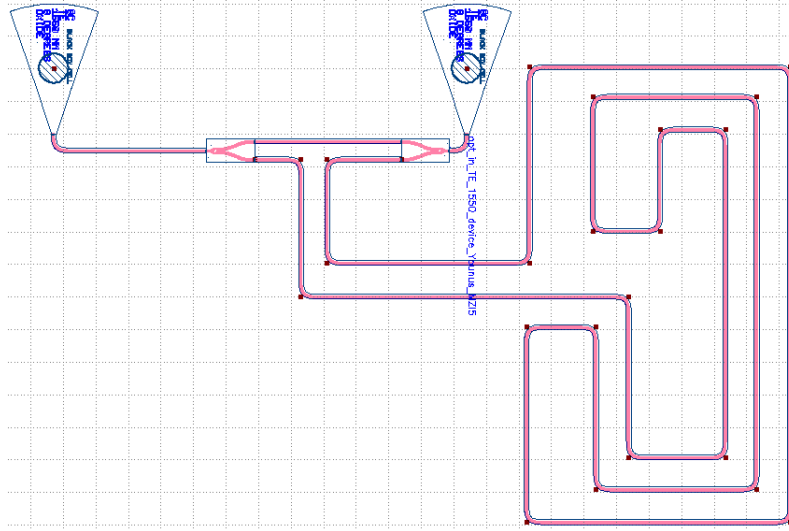


Fig. 9. MZI5 and MZI6 both have much longer $\Delta L = 1200 \mu m$ to show the shorter FSR and compare both for fabrication tolerance.

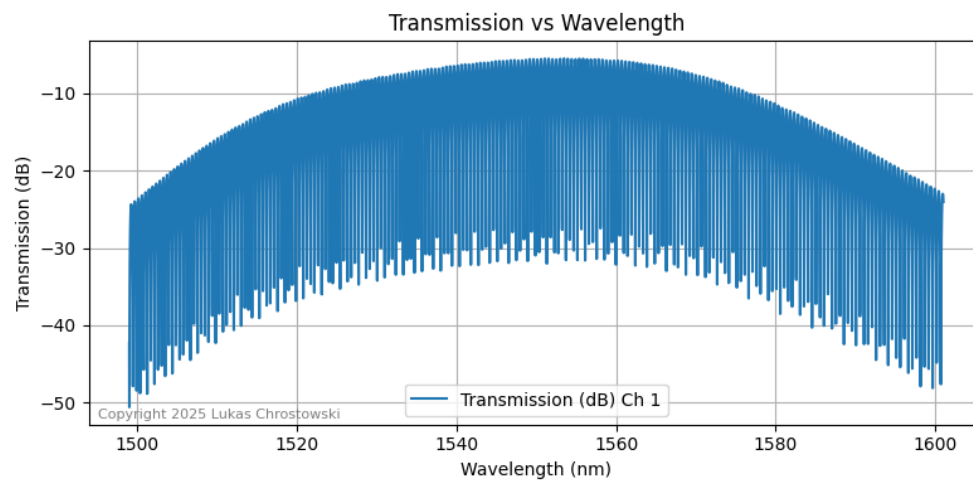


Fig. 10. Transmission verse wavelength for MZI5 and MZI6

3.3 Bragg Grating

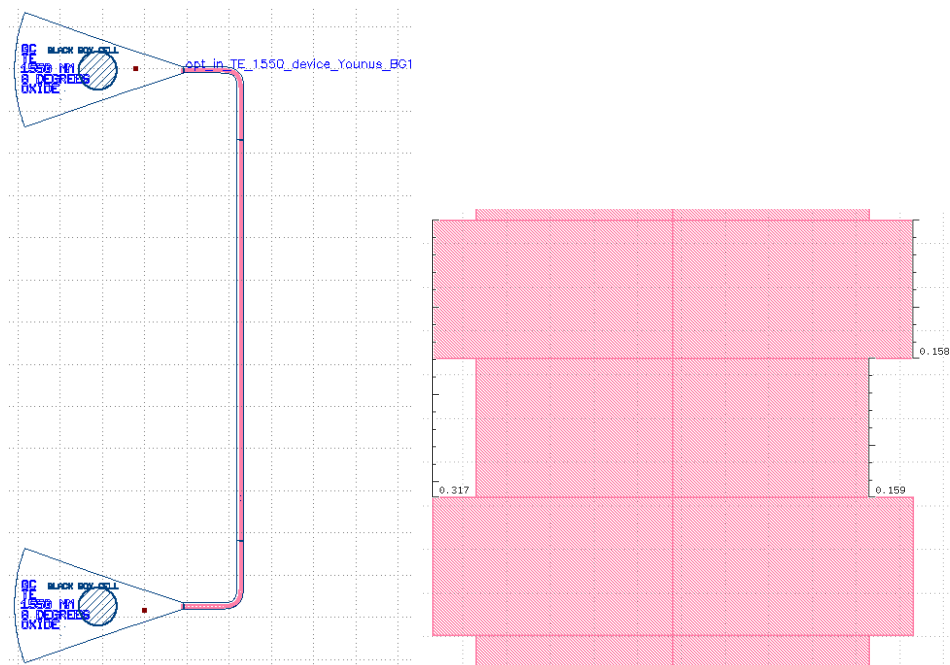


Fig. 11. BG1 and BG2 are bragg grating with 300 periods and each is $0.317 \mu\text{m}$. There are acting as a notch filter around 1550 nm.

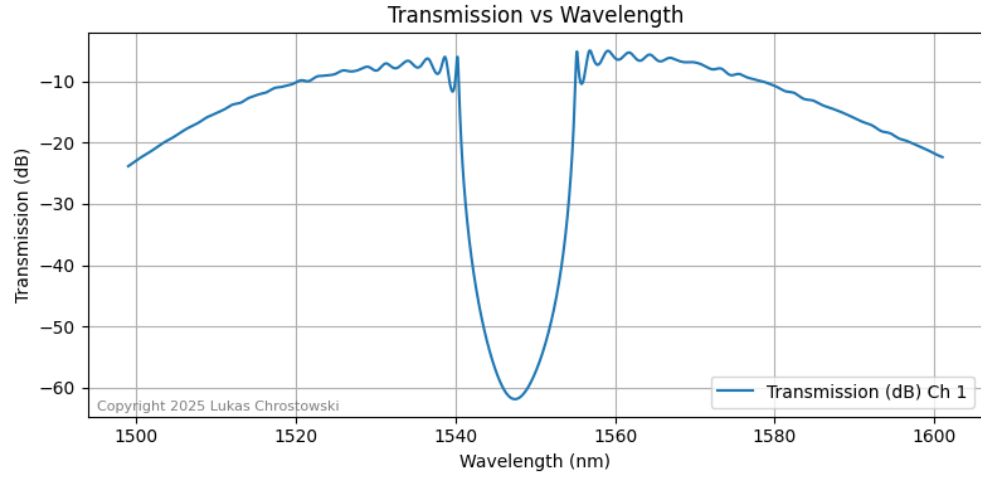


Fig. 12. BG1 and BG2 transmission verses wavelength.

3.4 Ring Resonator

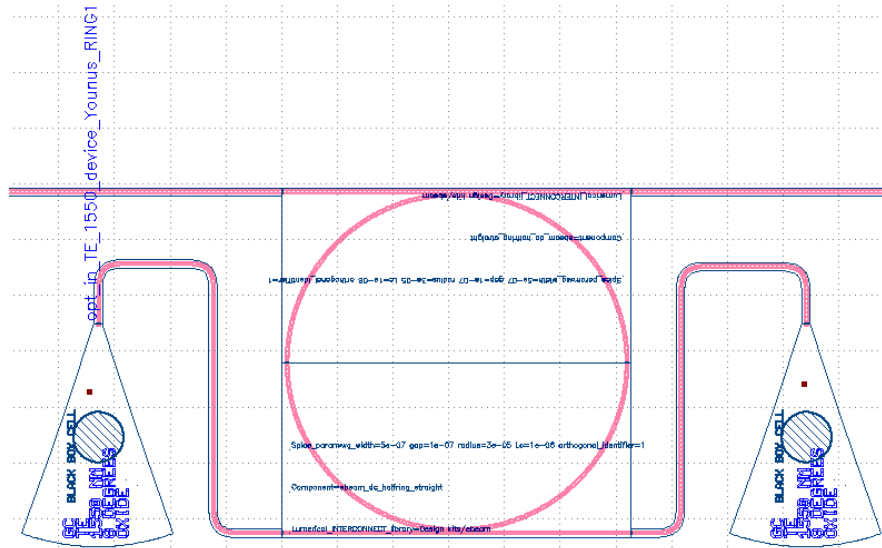


Fig. 13 Double-bus ring resonator (RING1) with 30 μm radius.

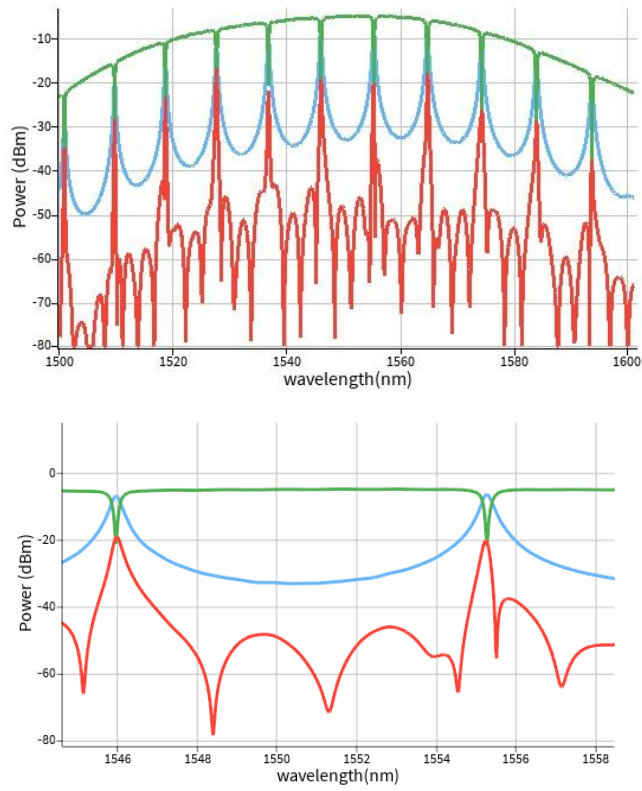


Fig. 14 RING1 transmission verses wavelength for drop-port (blue), through-port (green), and add-port (red).

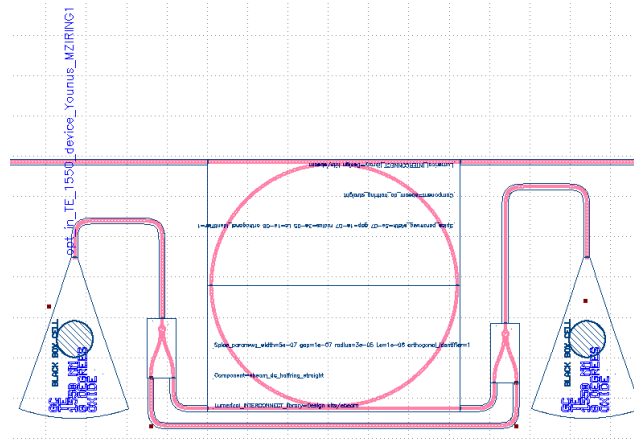


Fig. 15 MZIRING1 and MZIRING2 are double-bus ring resonator with MZI.

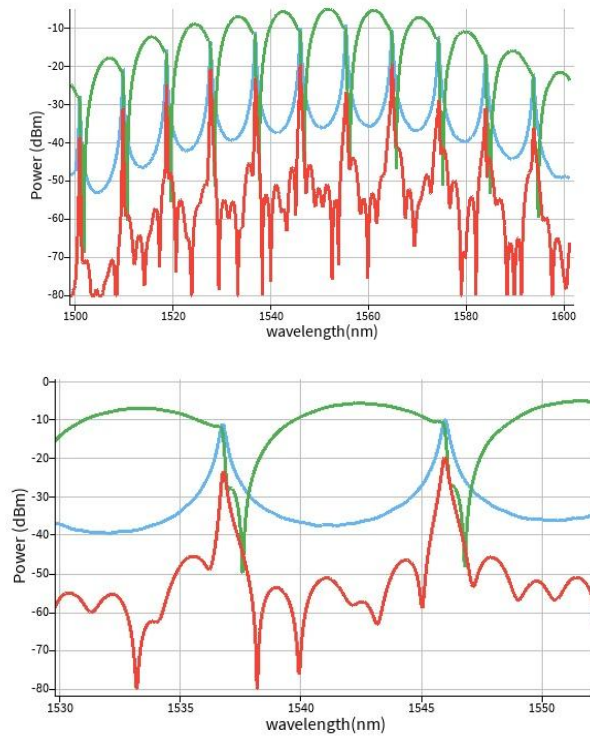


Fig. 16 MZIRING1 and MZIRING2 transmission verses wavelength for drop-port (blue), through-port (green), and add-port (red). It can be seen that the extinction ratio of the resonant is much higher compared to RING1.

4. Experimental Results

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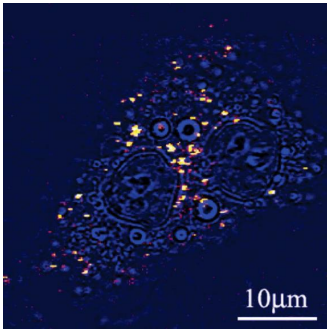


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References

1. P. J. Harshman, T. K. Gustafson, and P. Kelley, "Title of paper," J. Chem. Phys. **161**(10) (to be published).
2. L. M. Rachbauer, D. Bouchet, U. Leonhardt, *et al.*, J. Opt. Soc. Am. B **41**(9), 2122–2139 (2024).
3. X. Chen, B. Wen, H. Zhang, *et al.*, Opt. Express **32**(19), "Enhanced performance of all-PM Ho-doped fiber oscillator using NPE-SESAM hybrid mode-locking," 32643–32654 (2024).
4. D. Yelin, D. Oron, S. Thiberge, *et al.*, "Multiphoton plasmon-resonance microscopy," Opt. Express **11**(12), 1385–1391 (2003).
5. M. Partridge, "Spectra evolution during coating," figshare (2019), <https://doi.org/10.6084/m9.figshare.1004612>.
6. F. Author, "Title of preprint," Optica Open 000000 (2023), <https://doi.org/10.1364/opticaopen.00000000>.