

SUPPLEMENTARY INFORMATION

SPECTRAL DEMULTIPLEXING IN HOLOGRAPHIC AND FLUORESCENT ON-CHIP MICROSCOPY

Ikbal Sencan,¹ Ahmet F. Coskun,¹ Uzair Sikora,¹ Aydogan Ozcan,^{1,2,3,*}

¹ Electrical Engineering Department, University of California Los Angeles, Los Angeles, California, United States of America

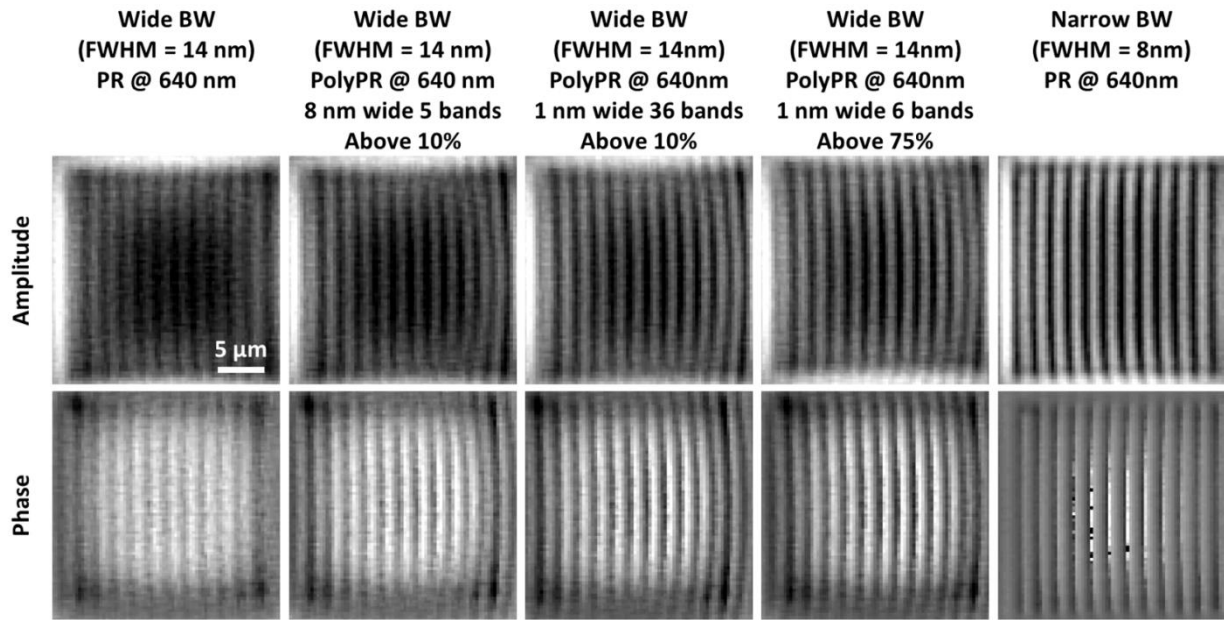
² Bioengineering Department, University of California Los Angeles, Los Angeles, California, United States of America

³ California NanoSystems Institute, University of California Los Angeles, Los Angeles, California, United States of America

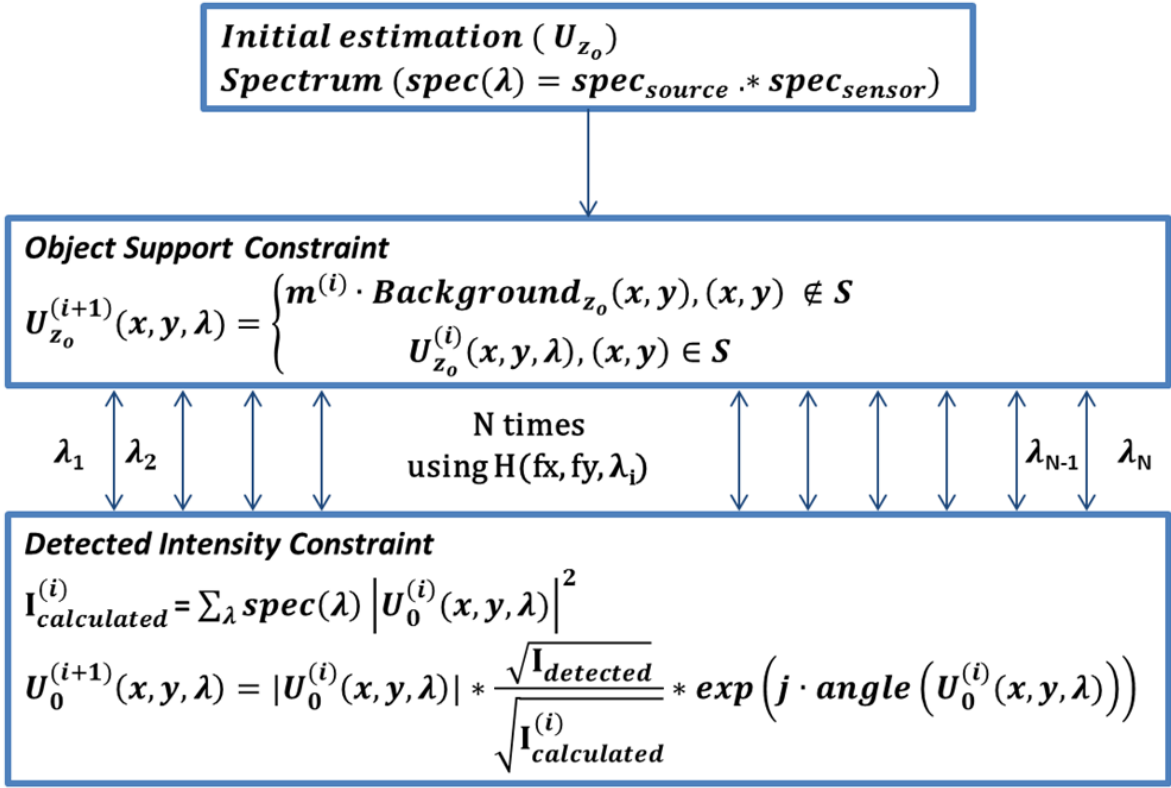
* ozcan@ucla.edu

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Supplementary Figures S1 and S2



Supplementary Figure S1. Reducing the computational load of PolyPR. (2nd and 3rd columns) PolyPR performed better with narrower bandwidths at the cost of increased number of bands. (3rd and 4th columns) Limiting the PolyPR to the narrow bands (~1 nm each) that are above 75% of the normalized spectral intensity did not degrade the recovery performance, and yet significantly reduced the computational load due to reduced number of bands used in the recovery process.



Object Support, S

The field at object level ($z = z_0$) i^{th} iteration, $U_{z_0}^{(i)}(x, y, \lambda)$

The field at detector level ($z = 0$) i^{th} iteration, $U_0^{(i)}(x, y, \lambda)$

$$m^{(i)} = \text{mean}(U_{z_0}^{(i)}(x, y, \lambda)) / \text{mean}(Background_{z_0}(x, y))$$

$$H(f_x, f_y, \lambda) = \begin{cases} exp\left(j2\pi z \left(\frac{n}{\lambda}\right) \sqrt{1 - \left(\frac{\lambda f_x}{n}\right)^2 - \left(\frac{\lambda f_y}{n}\right)^2}\right), & \sqrt{f_x^2 + f_y^2} < \frac{n}{\lambda} \\ 0, & \text{otherwise} \end{cases}$$

Supplementary Figure S2. Detailed schematic of the PolyPR method based on the object-support constraint. This PolyPR process does not assume wavelength-invariant objects.