

## Two-dimensional control of light with light on metasurfaces

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Excel file: Fig2b\_and\_3\_spectra\_and\_cross-sections.xlsx

Description: Fig.2b\_spectra sheet: Reflection, transmission and absorption spectra of the fabricated metasurface for illumination of its front and back.

Fig.3a-e\_cross-sections sheet: Intensity cross-sections taken from the .tif images for Fig. 3a-e after the background noise (darkscan) has been subtracted. In all cases, the horizontal axis corresponds to the CCD pixel number on the x-axis.

In the manuscript, the pixel count has been translated to the equivalent  $\mu\text{m}$ -scale on the sample plane (512 pixels of  $16\mu\text{m} \times 16\mu\text{m}$  demagnified 50x by the imaging optics) and is centered around and limited to the imposed profiles. Therefore, the x-axis shown in the manuscript spans from -20 to 20  $\mu\text{m}$ .

Image file: Fig2c\_sample\_SEM\_image.tif

Description: Scanning electron micrograph showing a part of the metasurface. Grey corresponds to gold and black corresponds to apertures.

Image files: Fig3\_darkscan.tif,  
Fig3a\_beamA.tif,  
Fig3b\_beamB.tif,  
Fig3c\_AandB.tif,  
Fig3d\_AxorB.tif,  
Fig3e\_AorB.tif

Description: Tif image files captured by the CCD camera for all cases corresponding to figure 3 of the manuscript. In all cases, the horizontal axis corresponds to the x-axis.

The images show the metasurface illuminated by (a) beam A only, (b) beam B only, and (c-e) both beams A and B. Different relative phases of beams A and B correspond to different logical operations: (c) A AND B, (d) A XOR B, (e) A OR B.

In the manuscript, the background noise (darkscan) has been subtracted from the plotted images and the pixel count has been translated to the equivalent  $\mu\text{m}$ -scale on the sample plane (512 pixels of  $16\mu\text{m} \times 16\mu\text{m}$  demagnified 50x by the imaging optics) and is centered around and limited to the imposed profiles. Therefore, the x-axis shown in the manuscript spans from -20 to 20  $\mu\text{m}$ .

Image files: Fig4\_darkscan.tif,  
Fig4a\_beamA.tif,  
Fig4b\_beamB.tif,  
Fig4c\_selection.tif,  
Fig4d\_deletion.tif

Description: Tif image files captured by the CCD camera for all cases corresponding to figure 4 of the manuscript. In all cases, the horizontal axis corresponds to the x-axis.

The images show the metasurface illuminated by (a) the International Year of Light logo (beam A) and (b) its central sun (beam B). Coherent (c) selection and (d) deletion of the sun within the logo for different relative phases of beams A and B.

In the manuscript, the background noise (darkscan) has been subtracted from the plotted images and the pixel count has been translated to the equivalent  $\mu\text{m}$ -scale on the sample plane (512 pixels of  $16\mu\text{m} \times 16\mu\text{m}$  demagnified 50x by the imaging optics) and is centered around and limited to the imposed profiles. Therefore, the x-axis shown in the manuscript spans from -30 to 30  $\mu\text{m}$ .