Figure 1:

Schematic image to show the design principle of the metamaterial superlens, definition of super-oscillatory spot size (DN) and field of view (ΔN). No associated data.

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Figure 2:

(a) Figure 2a: FDTD simulated 8-level phase using eight different types of plasmonic V-slit antennae. Matlab \*.mat files containing the data from FDTD calculation, and \*.m files to produce the figure 2a. Insets are schematic graphs to explain the parameters and geometry phase.

Also included are Matlab figure files.

(b) Figure 2b: JPG files are the full and zoom-in SEM images of sampled metamaterial superlens (DN = 0.39λ, ΔN = 1.6λ).

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Figure 3:

(a) Figure 3a: Calculated transverse intensity patterns with different field of view (ΔN) and superoscillatory spot size (full-width at half-maximum, DN) at the focal plane, constructed by the combination of two circular prolate spheroidal wavefunctions. Matlab \*.mat files containing the data from analytical simulation, and \*.m files to produce the figures in figure 3a.

Also included are Matlab figure files.

(b) Figure 3b: Calculated intensity patterns in the propagation plane. Matlab \*.mat files containing the data from scalar Hankel transform, and \*.m files to produce the figures in figure 3b. The line scan intensity profiles at the focal plane are also included.

Also included are Matlab figure files.

(c) Figure 3c: Experimental transverse intensity patterns for the same range of field of view (ΔN) and spot size (DN) at the focal plane as Fig. 3a. Matlab \*.mat files containing the data from experimentally recorded images, and \*.m files to produce the figures in figure 3c.

Also included are Matlab figure files.

(d) Figure 3d: Experimental intensity patterns in the propagation plane. Matlab \*.mat files containing the experimental data from z-scanning with a step size of 100 nm, and \*.m files to produce the figures in figure 3d. The line scan intensity profiles at the focal plane are also included.

Also included are Matlab figure files.

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Figure 4:

(a) Figure 4a: Calculated transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 2.0λ. Matlab \*.mat files containing the data from scalar Hankel transform simulation based on the generated mask, and \*.m files to produce the figures in figure 4a. Also included are Matlab figure files.

(b) Figure 4b: Calculated transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 4.0λ. Matlab \*.mat files containing the data from scalar Hankel transform simulation based on the generated mask, and \*.m files to produce the figures in figure 4b. Also included are Matlab figure files.

(c) Figure 4c: Calculated transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 6.0λ. Matlab \*.mat files containing the data from scalar Hankel transform simulation based on the generated mask, and \*.m files to produce the figures in figure 4c. Also included are Matlab figure files.

(d) Figure 4d: Experimental transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 2.0λ. Matlab \*.mat files containing the experimental data, and \*.m files to produce the figures in figure 4d. Also included are Matlab figure files.

(e) Figure 4e: Experimental transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 4.0λ. Matlab \*.mat files containing the experimental data, and \*.m files to produce the figures in figure 4e. Also included are Matlab figure files.

(f) Figure 4f: Experimental transverse and longitudinal intensity patterns with DN = 0.39λ and ΔN = 6.0λ. Matlab \*.mat files containing the experimental data, and \*.m files to produce the figures in figure 4f. Also included are Matlab figure files.

(g) Figure 4g: Calculated intensity patterns at the focal plane for fixed DN = 0.39λ and varying ΔN of 2.0λ, 4.0λ, 6.0λ. Matlab \*.mat files containing the data from simulation, and \*.m files to produce the figures in figure 4g. Also included are Matlab figure files.

(h) Figure 4h: Experimental intensity patterns at the focal plane for fixed DN = 0.39λ and varying ΔN of 2.0λ, 4.0λ, 6.0λ. Matlab \*.mat files containing the experimental data, and \*.m files to produce the figures in figure 4h. Also included are Matlab figure files.

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Figure 5:

Figure 5(a) column 1: SEM image. No associated data.

Figure 5(a) column 2-4: Superoscillatory confocal image of hole pair with center-to-center distance of 320 nm with SOL2, SOL3 and SOL5. Matlab Figure5a2\_a4\_data.mat files containing the experimental data, and Figure5a2\_a4.m file to produce the figures in figure 5a2 to a4. Also included are Matlab figure files.

Figure 5(a) column 5: Bright-field image illuminated with laser. Matlab Figure5a5\_data.mat file containing the experimental data, and Figure5a5.m file to produce the figures in figure 5a5. Also included are Matlab figure files.

Figure 5(b) column 1: SEM image. No associated data.

Figure 5(b) column 2-4: Superoscillatory confocal image of a star-shaped constellation of holes (160 nm diameter) with SOL2, SOL3 and SOL5. Matlab Figure5b2\_b4\_data.mat files containing the experimental data, and Figure5b2\_b4.m file to produce the figures in figure 5b2 to b4. Also included are Matlab figure files.

Figure 5(b) column 5: Bright-field image illuminated with laser. Matlab Figure5b5\_data.mat file containing the experimental data, and Figure5b5.m file to produce the figures in figure 5b5. Also included are Matlab figure files.

Figure 5(c) column 1: SEM image. No associated data.

Figure 5(c) column 2-4: Superoscillatory confocal image of hole pair arrays with varying center-to-center distance (280 nm, 320 nm, 360 nm, 400nm) with SOL11, SOL12 and SOL13. Matlab Figure5c2\_c4\_data.mat files containing the experimental data, and Figure5c2\_c4.m file to produce the figures in figure 5c2 to c4. Also included are Matlab figure files.

Figure 5(c) column 5: Bright-field image illuminated with laser. Matlab Figure5c5\_data.mat file containing the experimental data, and Figure5c5.m file to produce the figures in figure 5c5. Also included are Matlab figure files.