Spin controlled wavefront shaping metasurface with low dispersion in visible frequencies

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Supporting information

Let's assume the axis orientation in Fig. S1(a) is θ_{l_1}(Red Color) and θ_{l_3} (Green color), which can be given as,

$$\theta_{l_n} = l_n \times Arg(v) + 2\pi \frac{x}{\Lambda_{l_n}} - 2\pi\sqrt{x^2 + y^2} \ .$$

Here, subscript of *n* represents the topological charge of the OAM. The gradient of polarization diffraction grating is set in the *x* direction; the period is given by Λ_{l_1}= 0.4 mm, and Λ_{l_3}= 0.2 mm. For Fig. S1(b), Λ_{l_2}= 0.25 mm, Λ_{l_4}= 0.30 mm. Note that the different period can lead to unequal spin shift, which is also a manifestation of the spin controlled wavefront shaping of photonic spin-dependent splitting. Figure S1(c) demonstrates the combination of the Figure S1(a) and Figure S1(b).

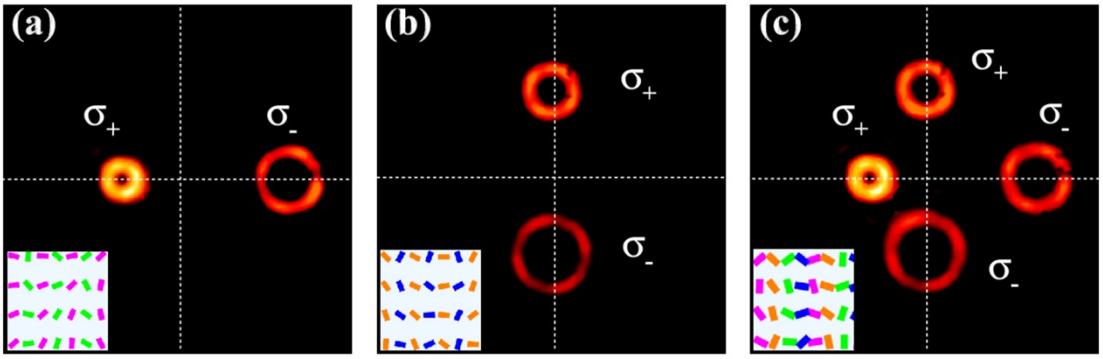

Figure S1. The concept of this work for the generation of topological charge of OAM with unequal spin-dependent shift. (a) The asymmetry spin-dependent splitting of the spin component l_1= 1, and l_3= 3. (b) The spin-dependent splitting of different topological charge l_2= 2 and l_4= 4. (c) The combination of the spin-dependent splitting of four different topological charges. The inset is the schematic illustrating of axis orientation. The pink, green, orange and blue one correspond to topological charge of l_1= 1, l_3= 3, l_2= 2, and l_4= 4.