

Supplementary Information

Directional Bloch surface wave coupling enabled by magnetic spin-momentum locking of light

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Fig. S1. The material and geometry of the 1D-PC.

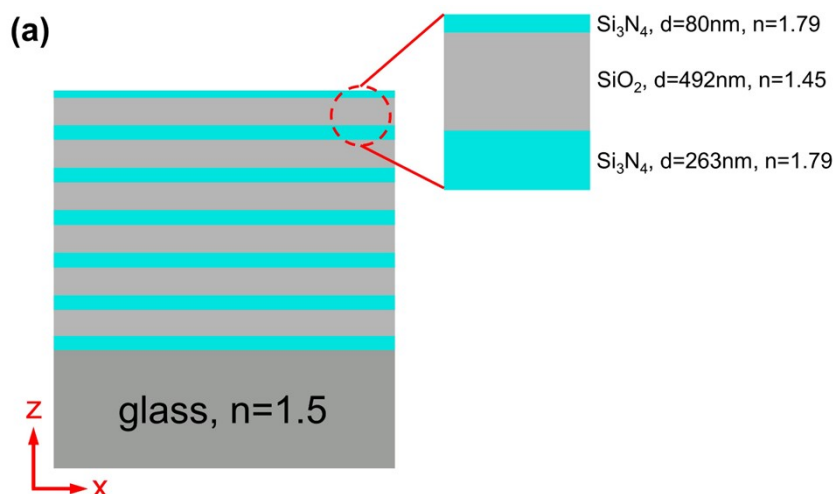


Fig. S2. Coupling of a spinning electric dipole (ED) polarized in the xz-plane to BSWs. (a) Electric field under the illumination of ED source. (b, c, d) Real part of the x-component, y-component and z-component of the electric field under the illumination of ED source.

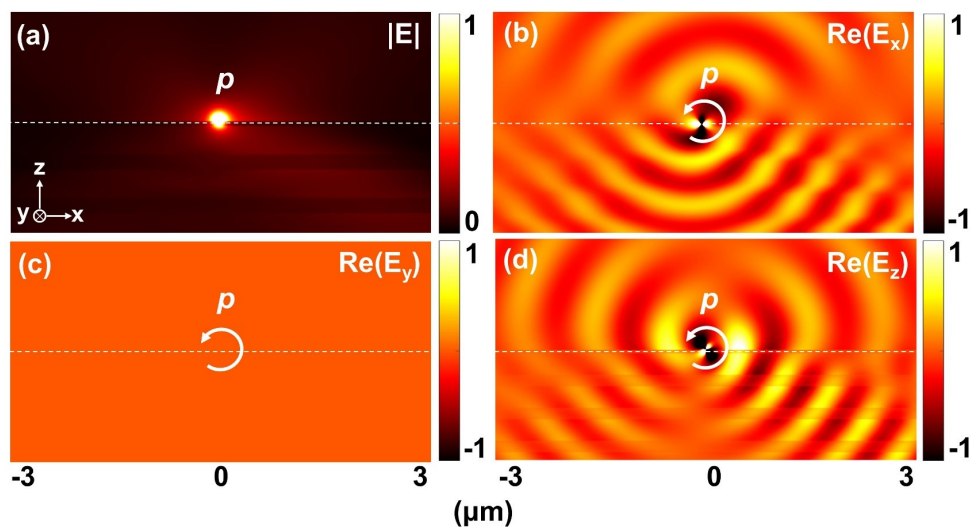


Fig. S3. The magnetic dipole (MD) ratio of different nanoparticles. (a) Ratio from 1000nm to 2000nm. (b) Ratio around the wavelength of 1550 nm.

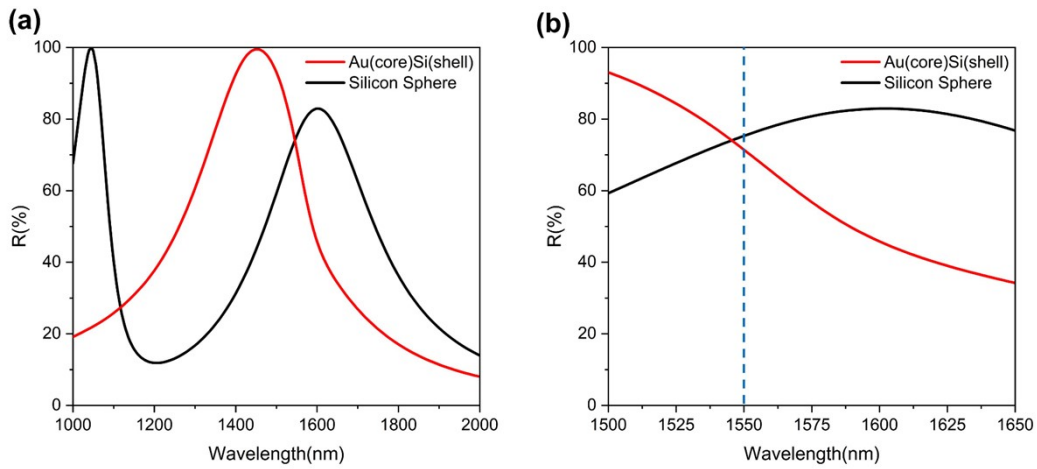


Fig. S4. The far-field scattering pattern of the silicon sphere in the air at the wavelength of 1600 nm.

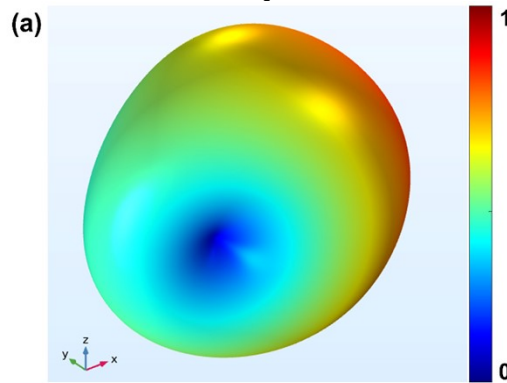


Fig. S5. The electric field excited by the nanoparticle and the electric field on the surface of the 1D-PC without nanoparticle under the illumination of circularly polarized Gaussian beam at normal incidence.

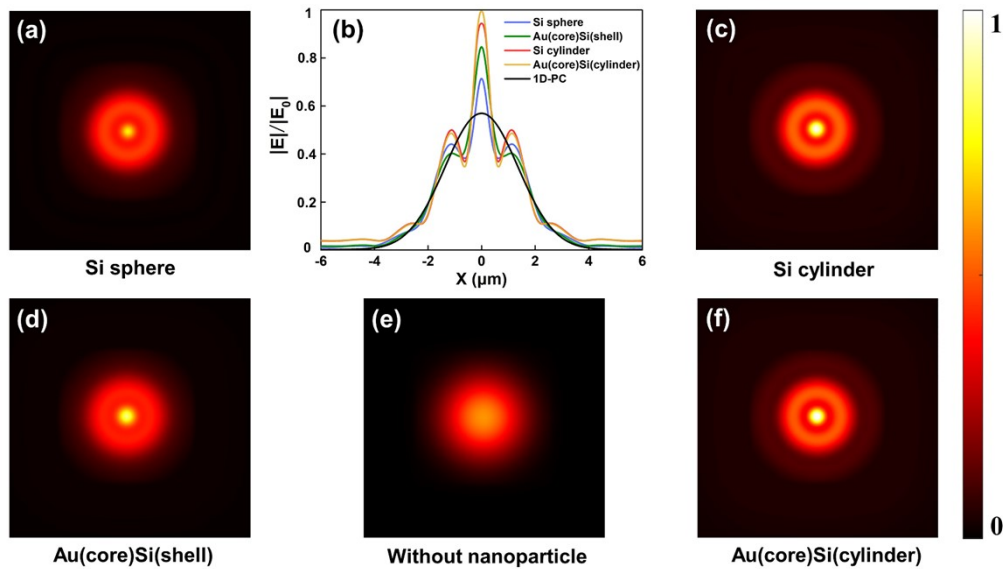


Fig. S6. (a) The area where the electric field is integrated. Symmetrically divide the simulation region into two parts. And then we collected the electric intensity both right side and left side. (b) Ratio (the second harmonic component/ the fourth harmonic component) of different nanoparticles.

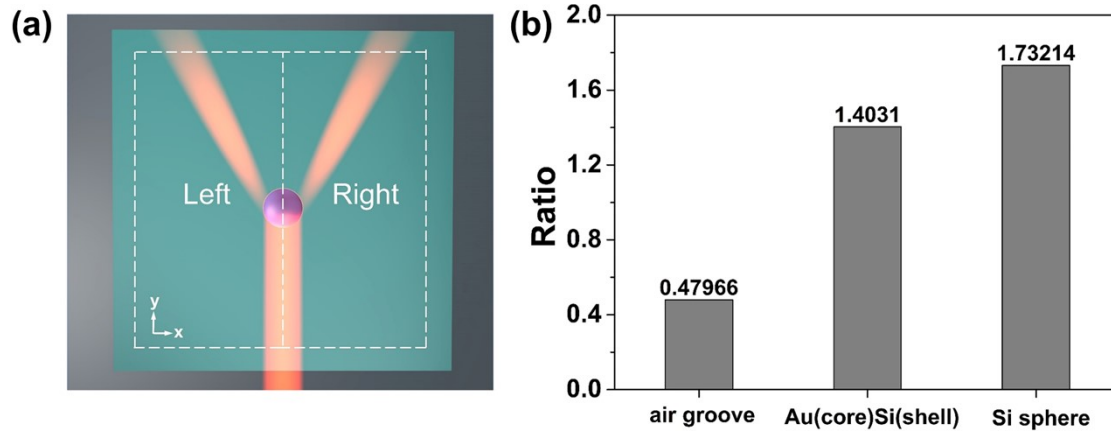


Table S1. Comparison between our work and literature [1].

	Light-to-BSW coupler	2nd harmonics	4th harmonics
Wang: lsa2018 [1]	Air groove (ED coupler)	Magnetic effect	Electric effect
This work	Mie particle (MD coupler)	Magnetic effect	Magnetic effect

References

(1) M. Wang et al., Light Sci. Appl., 2018, 7, 24.