

Quantum Emitter-Mediated Robust Chirality in the Vicinity of Nanophotonic Waveguide

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ABSTRACT:

We studied systematically the directionality of emitted photons from an emitter with orthogonal polarizations in the vicinity of nanowire waveguide. Our calculations of the electromagnetic modes are based on Green's function technique which gives the exact solutions to all modes, radiation, guided, and surface plasmon modes. In such a structure, TE mode and TM mode will excite simultaneously both the scattered TE mode and the scattered TM mode. As a result of the strong transverse confinement, light emitted near an optical waveguide is captured and equally split into two modes with opposite directions of propagation. Enabling the control of the dipole spin of the emitter, it is possible to break the symmetry of the scattering photons and select only one direction with very high efficiency.