

Numerical Analysis and Design of Dielectric to Plasmonic Waveguides Couplers

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Abstract : In this work, efficient directional coupler composed of dielectric waveguides and metallic film has been analyzed in details by simulations using finite element method (FEM). The structure consists of a step-index fiber with dielectric core, silica cladding, and a metal nanowire parallel to the core. The results show that an efficient conversion of optical dielectric modes to long range plasmonic is possible. Low insertion losses in conjunction with short coupling length and a broadband operation can be achieved under certain conditions. This kind of couplers has potential applications for the design of photonic integrated circuits for signal routing between dielectric/plasmonic waveguides, sensing, lithography, and optical storage systems. A high efficient focusing of light in a very small region can be obtained.

Keywords : directional coupler, finite element method, metallic nanowire, plasmonic, surface plasmon polariton, superfocusing

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