

Plasmonic Waveguides: Fundamentals and Applications

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Abstract: Recent years have seen an explosion of research into plasmonics instigated by a great promise of enabling energy-effective and highly-integrated optical interconnects that would exploit a special type of electromagnetic waves called surface plasmon-polaritons (SPP) propagating along and being controlled by metal circuitry, while also being strongly confined (beyond the diffraction limit) in the lateral cross section [1,2]. These remarkable characteristics open unique prospects for the design of highly integrated SPP-based photonic signal-processing systems, nano-resolution optical imaging techniques and sensors. This tutorial introduces the main SPP-based waveguide configurations and reviews a number of fundamental issues within the area of sub-wavelength SPP waveguides and circuitry [1-3]. Finally, the possibilities for immediate practical applications of SPP waveguide components for real data traffic management will be discussed along with the most recent achievements in this direction [4].

References

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