Abstracts

High functionality mode transformers with bandwidth control and mode selectivity

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We propose high functionality field transformation in irregular rectangular waveguide structures. Multiresolution optimization allows good convergence and a stepped wall profile provides for a large number of degrees of freedom. The resulting structures are compact, with dimension of a few wavelengths, and can have functionality not achievable through periodic means. For illustration, we have designed frequency-dependent mode converters, mode-selective reflectors, and multiple mode converters, where more than one mode is converted simultaneously, all with virtually 100% efficiency. Non-uniqueness affords design selection based on the frequency response.

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