

Abstract Submitted
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Quasi-planar optics: computing light propagation and scattering in planar waveguide arrays SUKOSIN THONGRATTANASIRI, Department of Physics, Oregon State University, JUSTIN ELSER, Department of Botany and Plant Pathology, Oregon State University, VIKTOR PODOLSKIY, Department of Physics, Oregon State University — We have developed a new mode matching approach capable of accurate numerical computation of wave coupling in arrays of planar structures. Building on previous mode matching algorithms, our technique identifies the full spectrum of modes needed to represent electromagnetic fields in and around the guiding system, and presents a set of analytical expressions to adequately calculate the propagation and scattering of light in coupled nonsymmetrical planar guides. The method is illustrated on examples of plasmonic and volumetric waveguides, surface waves scattering at step-coupling interfaces, and scattering at nonuniform semi-infinite dielectric-metal interfaces. The accuracies and convergences of the computed reflectance, transmittance, and scattering are in very good agreement with results of the finite-elements simulations. Compared to the latter, our mode matching technique provides significant memory-use improvement.

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