Abstracts

Unified Approach to Wave Diffraction by Space-Time Periodic Anisotropic Media

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The diffraction properties of electromagnetic waves propagating in a planar anisotropic medium with tensor permittivity which is modulated periodically with respect to space and time are analyzed by extending the previous theory for time-invariant anisotropic dielectric gratings. The method applies to any isotropic or anisotropic medium, any polarization of the incident plane wave, and any orientation of the grating vector. The analysis is formulated in a unified matrix form so that calculations can be performed systematically. As numerical examples of the general analysis, the optical diffractions by an acoustic wave in a birefringent crystal and by a cholesteric liquid crystal are treated, where the approximate two-wave analysis is also derived and the accuracy is discussed by comparison with the rigorous analysis.

❑ Return to main document.