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Exploring modified hermite-gaussian waves for phase-front engineering in a graded index photonic crystal operating out of metamaterial class

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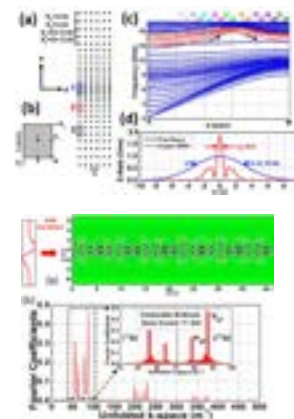
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Contribution of modified Hermite-Gaussian (HGW) waves to formation of phase fronts of the propagating electromagnetic waves in a graded index photonic crystal (GRIN PC) is studied. GRIN PC is used to focus light in photonic sensor applications. Short wavelength disables the effective medium approach of metamaterials. Dispersion diagram (Fig. 1) with nonisotropic dispersion features together with equifrequency contours are used to explore the existence of modified HGW in GRIN PC. Comparing analytical expressions of HGW with simulated even /odd mode profiles and interpreting Fourier analysis results of the field distributions (Fig. 2), it is seen that the multimode operation of HGW yields lensing with high spot size conversion ratio (Fig. 1(d)).



Biography

Evrin Colak earned his PhD from the Electrical and Electronics Engineering Department of Bilkent University, Ankara, Turkey in 2012. His research interests cover Metamaterials, Photonic Crystals, Microwave, RF Circuits, Photonics, Optics, computational electromagnetics and Biomedical applications. He is a faculty member in Electrical and Electronics Engineering Department, Ankara University, Ankara, Turkey. He has published more than 20 papers in SCI and SCIE journals.

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