

BACKWARD GUIDING OF TERAHERTZ RADIATION IN PERIODIC DIELECTRIC WAVEGUIDES

X. F. Zhang, L. F. Shen, J. -J. Wu, 楊宗哲

Electrical Engineering

Engineering

yangtj@chu.edu.tw

Abstract

The guiding properties of periodic dielectric waveguides (PDWGs) are investigated theoretically at terahertz frequencies for both two- and three-dimensional model systems. It is shown that in a PDWG there may exist several bound modes, and among them often occur backward modes with antiparallel phase velocity and energy flow. The backward guiding behavior of the PDWG is demonstrated by its contra-directional coupling with a conventional dielectric waveguide (CDWG). For the coupler formed by a PDWG and a CDWG, the coupling direction of energy flow is selectable, since the PDWG supports either a forward or a backward mode at different frequencies.

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