

SAIP2014



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Propagation characteristics control by variation of PCF structural parameters

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Abstract :

A photonic crystal slab was designed in COMSOL using gallium arsenide (GaAs) pillars placed equidistant from each other in air. A defect was created by removing some GaAs pillars across the crystal slab geometry to form a 90 degree bend through the structure. Structural parameters; the pillar diameter and inter-pillar spacing were separately varied and waves were propagated through the created defect at different wavelengths within the photonic crystal's bandgap. It was observed for the air filling fraction that, when the factor given by the ratio of the air space size to the pitch is less than 0.43, a fewer number of lobes having greater physical dimensions can be confined within the waveguide with minimum losses. Higher order modes were also observed when the air filling fraction factor was greater than 0.43. These exhibited increased confinement and bend losses. The diameter and pitch also affected the core resonance resulting in selected wavelength bands being propagated through the created defect in the waveguide. Only those bands whose value coincides with the photonic bandgap were allowed to propagate.

Award :

Yes

Level :

MSc

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Paper :

No

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