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The study of negative refraction in plasma photonic crystals

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Negative refractive material is a kind of material with negative refraction. It has great scientific significance and great application prospects and so it has a very important influence on future satellite communications, radar, ultrasonic imaging and medical imaging, etc. In this paper, a two-dimensional plasma photonic crystal has been investigated. The photonic crystal has a unit cell in the form of a six - angle lattice and the filling ratio of the medium is 0.3. The effect of plasma parameters on the band structure of the photonic crystals has been analyzed. The results show that the change of the plasma density can change the position of the forbidden band and compress the frequency range of the passband, and this allows the frequency range of negative refraction to be easily adjusted. According to the results of the simulation of band, the electric field distribution of the photonic crystal in the effective negative refractive frequency is given. The results show that the refraction angle and incident angle of the electromagnetic wave in the effective negative refractive frequency range are on the same side of the normal interface and the frequency range of negative refraction decreases slowly with the increase of plasma density. These results are consistent with the band analysis

References

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