

# 利用平面鏡形成高傳輸且寬頻之光子晶體雙 60 度和 120 度轉折波導

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摘要

在本篇論文中，我們使用二維有限時域差分法去模擬光子晶體雙 60 度和 120 度轉折波導，並且利用平面鏡的方式形成全反射性的傳輸和寬頻的改善，還有調變平面鏡的寬度和光子晶體波導的相對位置來求得一個最好的高傳輸跟寬頻的結果。

在製程方面，詳細介紹如何製作光子晶體波導跟實驗所遇到的問題，從一開始的 CAD 設計，E-beam 顯影，ICP 蝕刻跟到最後的掏空基底來形成薄膜式的光子晶體波導並且切割出來跟初步量測結果，而在其中掏空跟切割的部分都有詳細的探討跟改善。

# **Broadband transmission for double-60° -bend and double-120°-bend photonic crystal single-line waveguides using planer mirrors**

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## **Abstract**

In this thesis, we use 2D FDTD method to calculate the double-60°-bend and double-120°-bend photonic crystal single-line waveguides. We put planer mirrors at bend regions and utilize total internal reflection to achieve the broad-bend and high transmission. Then we tune the width of mirrors and the positions of mirrors to optimize results in double-60°-bend and double-120°-bend photonic crystal single-line waveguides.

In fabrication, we describe the fabrication process for photonic crystal waveguides in detail and the problems we encountered. The first cad design, e-beam lithography, ICP etching, and undercut are introduced for the membrane-type photonic crystal waveguides and finally we cut the sample and measure.

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