超寬頻高溫超導濾波器之製作與微波特性研究

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摘 要

我們提出一個微小的超寬頻帶通濾波器應用在短距離和高速無線通訊上，高溫超導YBa2Cu3Oy (YBCO)濾波器的設計原理運用了步階阻抗諧振器和平行耦合線結構，並且加入開路殘段來實現增加通帶內反射損失的極點，而且在上、下止帶區各創造一個傳輸零點，模擬結果顯示插入損失3 dB點的通帶從3.0 GHz至8.6 GHz，反射損失為18 dB。

在實作上，由RF (Radio-Frequency)濺鍍系統成長雙面高溫超導(HTS)YBCO薄膜於雙面拋光的0.5 mm MgO (100)基板，然後將濾波器圖形製作於雙面YBCO薄膜，封裝於鍍金的金屬封裝盒內，製作完成的高溫超導超寬頻帶通濾波器量測結果顯示頻寬從3.0-8.5 GHz，最大插入損失3.5 dB，然而變溫量測的頻率響應，可用二流體模型來解釋，頻率隨溫度轉移是依循著穿隧深度而變化。

關鍵詞 : 超寬頻 UWB 濾波器 高溫超導 釔鋇銅氧

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