

高溫超導濾波器微波特性之磁通釘扎效應研究

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ABSTRACT

Narrow-band microstrip cross-coupled band-pass filters based on the quadruplet geometry are fabricated for wireless-communication applications. We have fabricated the high- T_c superconducting filters by patterning $YBa_2Cu_3O_y$ (YBCO) films deposited on double-side 15-mm-square and 0.5-mm-thick $LaAlO_3$ substrates. The flux pinning in YBCO resonators is increased with an artificial magnetic lattice of $Nd_{0.2}Sr_{0.8}MnO_3$ (NSMO) pinning dots. The design of bandpass filter consists of four rectangular microstrip open-loop resonators. The inductive coupling between the non-adjacent resonators produces transmission zeros in the frequency response. Due to the presence of transmission zeros near the pass-band edge, a steep skirt characteristic is exhibited in the frequency response. Our 4-pole 15-mm-square filter has a 2.15-GHz center frequency with a 10-MHz bandwidth and a 0.14-dB maximum insertion loss at 77 K. The results are compared with that of an identical YBCO filter without NSMO pinning dots. The influences of the flux pinning on filter performance are discussed.

Keywords : YBCO ; flux pinning ; NSMO ; transmission zeros

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