Cross-Coupled Narrow-Band Filter Using YBa2Cu3O7 Resonators with Artificial La0.7Sr0.3MnO3Magnetic Pinning Lattices

陳志菖、王立民

E-mail: 9419765@mail.dyu.edu.tw

ABSTRACT

Narrow-band microstrip cross-coupled band-pass filters based on the quadruplet geometry are designed for wireless-communication applications. We have fabricated the high-Tc superconducting filters by pattering YBa2Cu3Oy (YBCO) films deposited on LaAlO3 substrates. The flux pinning in YBCO resonators is increased with an artificial magnetic lattice of La0.7Sr0.3MnO3 (LSMO) pinning dots. The 4-pole 15-mm-square filter has a pair of transmission zeros near the pass-band edge, a ~2.173-GHz center frequency with a ~9.5-MHz bandwidth and a ~3.78-dB minimum insertion loss at 77 K. With a LSMO bulk and an applied field of 200 Oe, the center frequency (fc) shifts to 2.161 GHz and the insertion loss increases to 4.76 dB. This increase of insertion loss is attributes to variation of magnetic-coupling coefficient in filter. The results are discussed and compared with that of an identical YBCO filter without LSMO pinning dots. The influences of the flux pinning on filter performance are discussed .

Keywords : YBCO、flux pinning、LSMO

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