

Cross-Coupled Narrow-Band Filter Using YBa₂Cu₃O₇ Resonators with Artificial La_{0.7}Sr_{0.3}MnO₃ Magnetic Pinning Lattices

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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-T_c superconducting filters by patterning YBa₂Cu₃O_y (YBCO) films deposited on LaAlO₃ substrates. The flux pinning in YBCO resonators is increased with an artificial magnetic lattice of La_{0.7}Sr_{0.3}MnO₃ (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 (f_c) 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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