Abstracts

Low- and High-Temperature Superconducting Microwave Filters

S.H. Talisa, M.A. Janocko, C. Moskowitz, J. Talvacchio, J.F. Billing, R. Brown, D.C. Buck, C.K. Jones, B.R. McAvoy, G.R. Wagner and D.H. Watt. "Low- and High-Temperature Superconducting Microwave Filters." 1991 Transactions on Microwave Theory and Techniques 39.9 (Sep. 1991 [T-MTT] (Special Issue on Microwave Applications of Superconductivity)): 1448-1454.

Stripline and microstrip filters at X-band were designed and fabricated using low- and high-temperature super-conductors in quarter-wave, parallel-coupled section configurations. Low-temperature superconducting niobium thin films, deposited on single-crystal sapphire, were used to build two six-pole stripline filters with adjacent passbands and approximately 3 dB crossovers and 1.2% bandwidth. Four- and six-pole microstrip filters were made with in situ epitaxial YBa/sub 2/Cu/sub 3/O/sub 7/ (YBCO) films on LaAlO/sub 3/ substrates. All the YBCO filters showed 77 K passbands with clean skirts and high out-of-band rejection. The YBCO six-pole filters were made after some initial technology developments, together with a reasonably high degree of repeatability, were established with the fabrication of eight working four-pole filters. The six-pole filters had adjacent passbands with -28 dB crossovers and 1.5% bandwidth. The results obtained show the potential of high-temperature superconductors for filters with narrow bandwidths and low insertion losses. Furthermore, they show a very rapid rate of development of superconducting filter technology, leading to system demonstrations and subsequent production in the near future.

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