



Contribution ID: 284

Type: Poster

C2Po1B-04: An HTS Multiplexer Based on Common-coupled Resonator

Tuesday 11 July 2023 09:15 (1h 45m)

The microwave signals used to control the qubit states need to be virtually free of noise and any electrical disturbance, so they must be carefully filtered before the microwave signals reach the sensitive quantum processor. In consideration of the requirement of miniaturization, we present a development of miniaturized multiplexers for a quantum computer. A high temperature superconducting (HTS) multiplexer is designed based on common-coupled resonator structure according to coupling matrix synthesis method. The theoretical result, coupling matrix, and the simulated result have also been demonstrated. The simulated 3 dB passbands of the multiplexer are 6.64-6.7 GHz, 6.82-6.9 GHz, 7.03-7.085 GHz and 7.22-7.26 GHz respectively, the simulated return losses is better than 15dB in all the pass bands. Besides, the coupled property of resonators is also analyzed and presented in this paper. There is good agreement between the simulated results and theoretical analysis.

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Session Classification: C2Po1B: Superconducting IV: Cryogenic System Applications