

Superconducting filter for radio astronomy using interdigitated, capacitively loaded spirals

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Received: 6 September 2011 / Accepted: 27 January 2012 / Published online: 10 February 2012
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Abstract A matched pair of microstrip spiral superconducting filters with centre frequency 357.5 MHz and 29.4% bandwidth has been developed for radio astronomy. The high coupling coefficients required for the large bandwidth have been achieved through interdigitating the spirals to provide a large interaction length, and by adding loading capacitors on the inner ends of the resonators, together with previously reported features. A low-pass filter has been cascaded with each band-pass filter to mitigate spurious responses. Measurements show 0.09 dB loss, thought to arise mainly from sources outside the filter itself, plus 0.12 dB maximum ripple.

Keywords Astronomy receiver design · Computer-aided design · High-Tc superconducting thin-film filters · Microwave filters

1 Introduction

A matched pair of spiral filters with a pass band of 305–410 MHz were designed for one of the receivers in the Sardinia Radio Telescope (SRT, www.srt.inaf.it), a new general purpose, fully steerable 64 m diameter parabolic radio telescope

This work has been supported by the National Institute for Astrophysics (INAF) through TECNO-INAF 2009 and by Region of Sardinia through the research program LR 7/2007.

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