

# A wideband multirate FFT spectrometer with highly uniform response

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**Abstract** An integrating spectrometer based on a two-stage polyphase digital filter bank (PDFB) algorithm is described. The first PDFB operates on a time multiplexed wideband signal, with a bandwidth up to 1 GHz. The second PDFB is performed in parallel over couples of overlapping channels from the first filterbank. The design automatically deletes the unused portions of the first filterbank channels, providing a seamless, uniform channelization of the input band. The design has been implemented and tested on the VLBI DBBC platform, using a single Xilinx XC5VLX220 FPGA.

**Keywords** Radioastronomy · Spectroscopy · Polyphase FFT

## 1 Introduction

Radioastronomic signals have usually a very large instantaneous bandwidth, in the range of several hundred MHz to a few tens GHz.

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