

Implementing a Modular 650 GHz Sideband-Separating Mixer

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Abstract

The ALMA band 9 receiver cartridge (600-720 GHz), which currently is in full production, features two single-ended (dual sideband) SIS mixers in orthogonal polarizations. In the case of spectral line observations, the integration time to reach a certain desired signal-to-noise level can be reduced by about a factor of two by rejecting the unused sideband.

A design study for a modular sideband-separating (2SB) mixer, suitable for retrofitting with minimal impact into the existing band 9 cartridges, has been presented on this conference last year. The design builds on the monolithic proof-of-concept 2SB mixer that was developed at SRON over several years.

Here, we present the first implementation of the modular 2SB mixer concept. A mechanical prototype (omitting the RF structure) was manufactured, and several improvements were fed back into the design. After that, a full prototype was produced, using micro-milling for the RF structures. We hope to present the first noise temperature and sideband separation results of the new mixer.