



# Integrated Filterbank for DESHIMA: A Submillimeter Imaging Spectrograph Based on Superconducting Resonators

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An integrated filterbank (IFB) in combination with microwave kinetic inductance detectors (MKIDs), both based on superconducting resonators, could be used to make broadband submillimeter imaging spectrographs that are compact and flexible. In order to investigate the possibility of adopting an IFB configuration for DESHIMA (Delft SRON High-redshift Mapper), we study the basic properties of a coplanar-waveguide-based IFB using electromagnetic simulation. We show that a coupling efficiency greater than 1/2 can be achieved if transmission losses are negligible. We arrive at a practical design for a 9 pixel x 920 color 3 dimensional imaging device that fits on a 4 inch wafer, which instantaneously covers multiple submillimeter telluric windows with a dispersion of  $f/df = 1000$ .

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