DESHIMA: Redshift Machine Based on an On-chip Filterbank

A. Endo[1*], J.J.A. Baselmans[2], P.P. van der Werf[3], D.J. Thoen[1], R.M.J. Janssen[1], P.J. de Visser[1,2], T.M. Klapwijk[1], L.Ferrari[4], S.J.C. Yates[4], A.M. Baryshev[4,5], and Y.J.Y. Lankwarden[2],

1 Kavli Institute of NanoScience, Faculty of Applied Sciences, Delft University of Technology, Lorentzweg 1, 2628 CJ Delft, The Netherlands

2 SRON, Sorbonnelaan 2, 3584 CA Utrecht, The Netherlands

3 Leiden Observatory, Leiden University, PO Box 9513, NL-2300 RA Leiden, The Netherlands

4 SRON, Landleven 12, 9747 AD Groningen, The Netherlands

5 Kapteyn Astronomical Institute, University of Groningen, P.O. Box 800, 9700 AV Groningen, The Netherlands

* Contact: A.Endo@tudelft.nl, phone +31-15-27-86113

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***Abstract*—DESHIMA (Delft SRON High-z Mapper) is a project to build an imaging spectrograph to instantaneously cover the entire bands of multiple submillimeter telluric windows in the range of 320-950 GHz, with a resolving power sufficient for resolving redshifted atomic and molecular lines from submillimeter galaxies (f/df ~ 1000). We are currently following a design which utilizes the rapidly advancing technology of superconducting microresonators twofold. The signal received by the antenna is separated into different frequency channels by using submillimeter wave resonators, made of superconducting NbTiN, as band pass filters. At the exit of each channel is a microwave resonator with a strip of Al, making the resonator act as a Microwave Kinetic Inductance Detector (MKID). The first prototype of such an integrated filterbank (IFB) device, which uses a circuit consisting of coplanar waveguides on a Si substrate, showed strong coupling to stray light radiation. In the conference we will report the current status of the development of DESHIMA, with special focus on the first optical experiment of an IFB, as well as possible solutions for reducing stray light coupling.**