

**Jeudi 18 octobre 2018 à 11h30 (IAS, bâtiment 121, salle 1-2-3)**

**DESHIMA: Wideband on-chip spectrometer and its first-light results**

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DESHIMA (DEep Spectroscopic HIgh-z MApper) is an on-chip filter bank spectrometer for submillimeter wave astronomy that utilizes NbTiN superconducting resonant filters. The output signal of each filter is read out by Microwave Kinetic Inductance Detectors (MKIDs). The high multiplexing capability of MKIDs enables us to realize wide-band coverage with moderate frequency resolution. DESHIMA is based on the combination of nano-technology with superconducting detectors.

The target frequency band of DESHIMA is 240-720 GHz with a frequency resolution of  $F/dF = 500$ . We have successfully carried out the first-light campaign of the first generation of DESHIMA, covering a frequency range of 326-368 GHz, at the ASTE telescope at the Atacama Desert in 2017 autumn.

The DESHIMA instrument is composed of 4 K cold optics cooled down by a pulse tube cooler, MKIDs cooled down to 120 mK by an adiabatic demagnetization refrigerator (ADR), and FFT based multi-tone readout circuits. The design, fabrication, assembly, laboratory tests, and the first-light campaign have been carried out by a collaboration between Delft University of Technology (TU Delft), Netherlands Institute for Space Research (SRON), The University of Tokyo, Nagoya University, and National Observatory of Japan (NAOJ).

I would like to present the details of the DESHIMA instrument together with its performance, such as submm response, and optical efficiency measured in the laboratory. I will also present preliminary results from the first-light campaign, and possible future application of the filterbank technology to other astronomical instruments such as for cosmic microwave background observation.