Contribution ID: **159** Type: **Poster**

Designing a Gas Cell Experiment for the Calibration of DESHIMA

Tuesday, 23 July 2019 18:45 (15 minutes)

The DESHIMA instrument is a wideband submillimeter spectrometer based on a single NbTiN superconducting chip, which is integrated with a dispersive filterbank and Microwave Kinetic Inductance Detectors (MKIDs) sensor array. For the next campaign at the ASTE telescope in Chile, DESHIMA is expected to have an instantaneous bandwidth from 220-440 GHz with 347 channels, achieving a resolution power of f/Δf =500. We present the design of a gas-cel calibration system, that is designed to calibrate the spectrometer in absolute frequency and which can also be used to perform long integration time tests, simulating the detection of faint extra-galactic lines.

The calibration system mainly consists of a gas cell between the spectrometer and a cold load that can be filled with room temperature gas at low pressure. In front of the gas cell is an optical chopper that eliminates 1/f noise and also modulates the spectrometer signal between the gas cell and a another cold load. The spectrometer detects the irradiance from the cold load through the gas cell with certain gas opacity. The absolute frequency can be calibrated by comparing the observed transmission spectrum of the gas and its model spectrum. The pressure in the gas cell can be tuned down to achieve higher gas opacity and smaller detected signal for the long integration time tests.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

Y

Primary authors: Ms ZHANG, Zhongyue (Leiden University/TU Delft); KARATSU, Kenichi (TU Delft); Mr DABIRONEZARE, Shahab (TU Delft); THOEN, David (Delft University of Technology); Mr BRANDL, Bernhard (Leiden University); Prof. BASELMANS, Jochem (SRON)

Presenter: Ms ZHANG, Zhongyue (Leiden University/TU Delft)

Session Classification: Poster session

Track Classification: Detector readout, signal processing, and related technologies