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Full-Array Noise Performance of Deployment-Grade SuperSpec mm-wave On-Chip Spectrometers

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SuperSpec is an on-chip filter-bank spectrometer designed for wideband moderate-resolution spectroscopy at millimeter and submillimeter wavelengths, employing TiN kinetic inductance detectors. SuperSpec technology will enable integral-field-unit spectrometers suitable for high-redshift line intensity mapping or multi-object spectrographs. We plan to deploy a demonstration instrument to the Large Millimeter Telescope (LMT) in mid-2019, featuring six independent single-polarization SuperSpec chips and covering 190-310 GHz with 100 channels each.

In previous results, we have demonstrated noise performance for individual detectors suitable for photon noise limited observations at excellent mm-wave observing sites. In these proceedings, we present the complete system-level noise performance of deployment-grade devices that we will use at the LMT, measured through a ROACH-based readout system. Array statistics such as NEP, responsivity, and low-frequency noise performance will be shown for all channels and compared to the expected observing conditions and planned scan strategy at the LMT.

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

Y

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