Contribution ID: **93** Type: **Early Career Scientist**

Advancing Detector Technology for Mm/submm-wavelength Line Intensity Mapping

Mm/submm-wavelength line intensity mapping (LIM) uses the intensity and redshift of mm/submm molecular emission lines to trace the 3D large-scale structure (LSS) of the universe. Compared to observations at other wavelengths, LIM can probe higher redshift than optical surveys and access more independent information than the 2D cosmic microwave background (CMB). The opportunity is to advance the spectroscopy technologies and scale them up to the size of current and next-generation CMB surveys to cross critical thresholds in primordial non-Gaussianity, neutrino mass, light relics, and dark energy. Silicon chips provide an ideal platform for building high-density integrated spectrometer sensor arrays, which are vital in improving the sensitivity of the experiments. However, we need to address a few technological challenges, such as sensor packing density, spectral resolution, optical efficiency, and noise, to mature the current on-chip spectrometer technology toward kilo-spectrometer arrays with rivaling constraining power compared to the CMB experiments. I will summarize the current sensor technology status, our efforts in optimizing the sensors for small demonstration experiments, and some future directions that need more investment.

Primary author: PAN, Zhaodi (Argonne National Laboratory)

Session Classification: Open Session for Remarks and Discussions