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Cosmology with Line-Intensity Mapping using On-Chip Spectrometers and SPT-SLIM

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Line-intensity mapping (LIM) at millimeter wavelengths is a powerful emerging probe of the large-scale structure of the Universe, but achieving meaningful constraints on cosmological parameters with LIM requires focal planes with orders of magnitudes more detectors than existing instruments. SPT-SLIM is an upcoming experiment to demonstrate LIM observations of CO at $0.5 < z < 2.0$ using on-chip spectrometers with kinetic inductance detectors (KIDs), a new technology that enables scaling to the much larger arrays of detectors needed to probe cosmology. I will present the overall experimental design and specific goals of SPT-SLIM, as well as several innovations in readout electronics and detectors that it will test in the field when it deploys to the South Pole Telescope in 2023. In addition, I will highlight the long-term science goals enabled by on-chip spectrometers and millimeter-wavelength LIM, including the potential to constrain dark energy, neutrino masses, and primordial non-gaussianity.

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