ASTROPHYSICS SEMINAR SERIES

MEASURING THE EPOCH OF REIONIZATION WITH LINE INTENSITY MAPPING USING TIME

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TIME is an instrument being developed to use line intensity mapping (LIM) to study emission from the faint objects in our universe. We will use this instrument to study the epoch of reionization, advancing our understanding of the first astronomical objects that ionized the neutral hydrogen in the universe. TIME is a mm-wavelength spectrometer using Transition Edge Sensor (TES) bolometers. The instrument spans the frequency range of 200-300 GHz with 60 spectral pixels and 16 spatial pixels. TIME will measure redshifted ionized carbon ([CII]) emission over the redshift range 5 to 9 in order to probe the evolution of our universe during the epoch of reionization. TIME will also detect low-redshift CO fluctuations and determine the cosmic history of molecular gas in the epoch of peak cosmic star formation, redshift 0.5 to 2. This new instrument and emerging technique will allow us to make complementary measurements to galaxy surveys that are probing these epochs. TIME was installed for an engineering test on the 12m ALMA prototype antenna in Spring of 2019 at the Arizona Radio Observatory on Kitt Peak and will return to the telescope for 3 seasons of science observations in ~ winter 2020/2021.

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