
The Terahertz Intensity Mapper

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Abstract

The process of star formation and galaxy assembly over cosmic time is largely obscured by cool interstellar dust in star forming galaxies. Fortunately, there are many un-extincted fine structure lines accessible at far-infrared (FIR) wavelengths that can be used to trace the star formation process in these galaxies. To map the evolution of cosmic star formation through these lines, we are developing the Terahertz Intensity Mapper (TIM), a NASA-funded long-duration balloon that will launch from Antarctica in 2023. TIM will make deep spectroscopic maps of the FIR sky from 240-420 microns, wavelengths that are unaccessible from the ground due to tropospheric water absorption. TIM incorporates background-limited grating spectrometers, coupled to a low-emissivity, 2-meter reflector through high-throughput optics. The planned observing flight should directly detect ~ 100 galaxies in FIR emission lines, trace the cosmic star formation history through deep intensity mapping of CII and other lines, and demonstrate technology for future stratospheric and/or space instruments. I will describe the observational and technical goals of the TIM balloon, and the path to its first Antarctic flight.

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