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标题: GREAT: the SOFIA high-frequency heterodyne instrument
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摘要: We describe the design and construction of GREAT (German REceiver for Astronomy at Terahertz frequencies) operated on the Stratospheric Observatory For Infrared Astronomy (SOFIA). GREAT is a modular dual-color heterodyne instrument for high-resolution far-infrared (FIR) spectroscopy. Selected for SOFIA's Early Science demonstration, the instrument has successfully performed three Short and more than a dozen Basic Science flights since first light was recorded on its April 1, 2011 commissioning flight. We report on the in-flight performance and operation of the receiver that - in various flight configurations, with three different detector channels - observed in several science-defined frequency windows between 1.25 and 2.5 THz. The receiver optics was verified to be diffraction-limited as designed, with nominal efficiencies; receiver sensitivities are state-of-the-art, with excellent system stability. The modular design allows for the continuous integration of latest technologies; we briefly discuss additional channels under development and ongoing improvements for Cycle 1 observations. GREAT is a principal investigator instrument, developed by a consortium of four German research institutes, available to the SOFIA users on a collaborative basis.
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