

To be submitted to AS17 SPIE conference August 2002 Waikoloa, Hawaii

ID#: 00525905

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Abstract Title:

THz Frequency Receiver Instrumentation for Herschel's Heterodyne Instrument for Far Infrared (HIFI).

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Presentation: Oral

Brief Biography:

John C. Pearson received his AB in physics from Harvard University and his MA and PhD in physics from Duke University. He has been employed at the Jet Propulsion Laboratory since 1995 as a member of the technical staff. He is currently the high frequency subsystem manager for the HIFI consortium. At JPL he serves as the project element manager and system engineer for the NASA contribution to HIFI.

Summary:

The Heterodyne Instrument for Far Infrared (HIFI) on the ESA Herschel Space Observatory is comprised of five SIS receiver channels covering 480-1250 GHz and two

HEB receiver channels covering 1410-1910 GHz. Two fixed tuned local oscillator sub-bands are derived from a common synthesizer to provide the front-end frequency coverage for each channel. The local oscillator unit will be passively cooled while the focal plane unit is cooled by superfluid helium and cold helium vapors. HIFI employs W-band GaAs amplifiers, InP HEMT low noise IF amplifiers, fixed tuned broadband planar diode multipliers, and novel material systems in the SIS mixers. The National Aeronautics and Space Administration's Jet Propulsion Laboratory is managing the development of the highest frequency (1119-1250 GHz) SIS mixers, the highest frequency (1650-1910 GHz) HEB mixers, local oscillators for the three highest frequency receivers as well as W-band power amplifiers, varactor diode devices for multipliers and InP HEMT IF components for all the receiver channels. The NASA developed components represent a significant advancement in the available performance. The design criteria, system requirements and current status will be presented along with a programmatic view of the development effort.

Key Words

Heterodyne, Receiver, Submillimeter, Multiplier, Mixer, LNA, Local Oscillator