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3. Abstract Title: The Local Oscillator System for the Heterodyne Instrument for First (HIFI)

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6. Abstract Text:

The Heterodyne Instrument for FIRST (HIFI) is comprised of five SIS receiver channels covering 480-1250 GHz and two HEB receiver channels covering parts of 1410-1910 GHz and 2400-2700 GHz. Two local oscillator sub-bands derived from a common synthesizer will provide the front-end frequency coverage for each channel. The frequency source, band selection and frequency distribution will be performed in the spacecraft service module at near ambient temperature. The service module will be connected to the local oscillator unit on the outside of the cryostat with a run of WR-28 waveguide for each of the 14 local oscillator sub-bands. The local oscillator unit will be comprised of an active and a passive region, both of which will be radiatively cooled and thermally isolated from each other and the cryostat wall. The active region will contain MMIC power amplifiers operating in five bands covering 71-113 GHz, and will be cooled to below 200K. The passive region will contain all the high frequency multipliers and will be cooled to below 100K. The local oscillator unit has the two-fold technical challenge of providing broad band frequency coverage at very high frequencies. This will be achieved through the system design and the use of high power GaAs MMIC amplifiers and planar diode multiplier technology. The design criteria and the resulting overall system design will be presented along with a programmatic view of the development program and development progress.

7. Key Words

Heterodyne, Sub-millimeter, Far-infrared, FIRST, Instruments

8. Brief Biography of principal author:

John C. Pearson received his AB 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 instrument scientist and the JPL project element manager for the HIFI instrument.