



W06

# ANALYSIS OF THE RADIOMETER - REFERENCE LOAD SYSTEM FOR THE PLANCK/LFI INSTRUMENT

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# ADVANCED REFERENCE LOADS FOR THE PLANCK LFI RADIOMETERS

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Kettle, D.<sup>(4)</sup>, Levin, S.<sup>(5)</sup>, Mandolesi, N.<sup>(1)</sup>, Mennella, A.<sup>(6)</sup>, Morgante, G.<sup>(1)</sup>,  
Morigi, G.<sup>(1)</sup>, Roddis, N.<sup>(4)</sup>, Simonetto, A.<sup>(3)</sup>, Terenzi, L.<sup>(1)</sup>, Tomasi, M.<sup>(6)</sup>, Villa, F.<sup>(1)</sup>

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Bank Observatory, (<sup>5</sup>) JPL/NASA,  
(<sup>6</sup>) IASF/CNR – Sezione di Milano



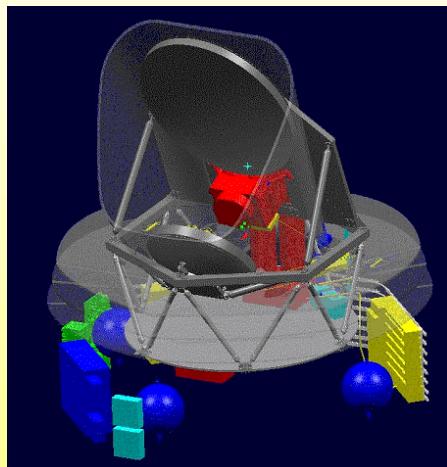
LTD-10 Genova, July 10th 2003



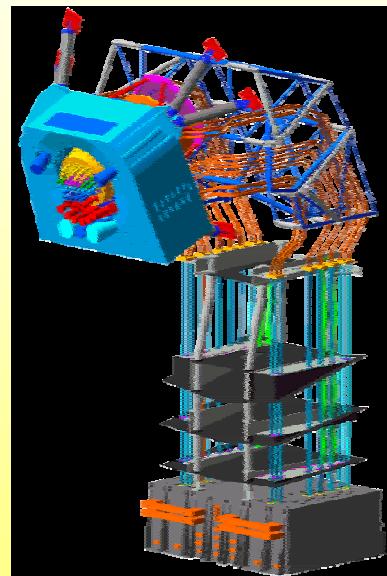


# ANALYSIS OF THE RADIOMETER - REFERENCE LOAD SYSTEM ON BOARD THE PLANCK/LFI INSTRUMENT

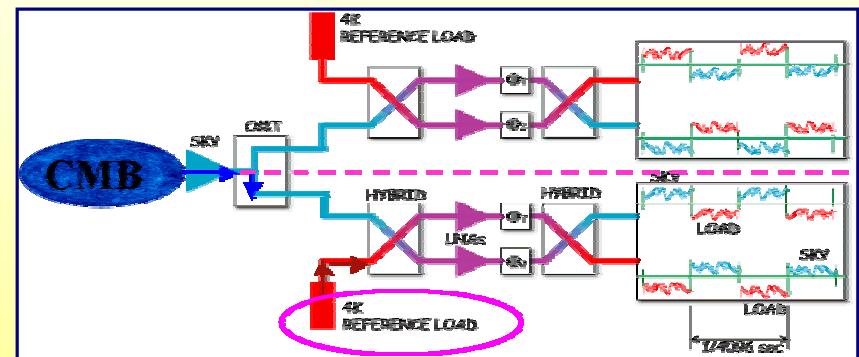
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PLANCK

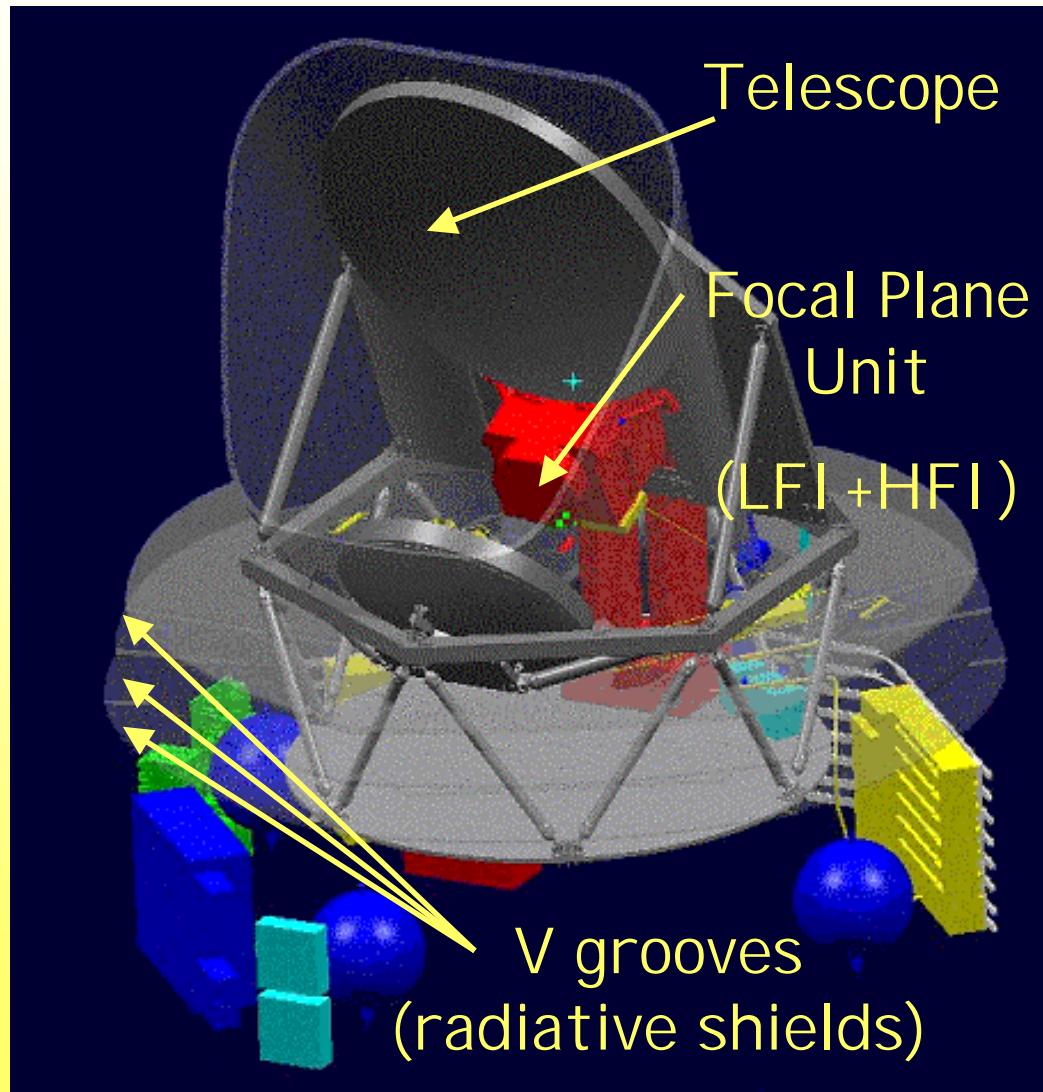


LFI



RADIOMETER  
SCHEME

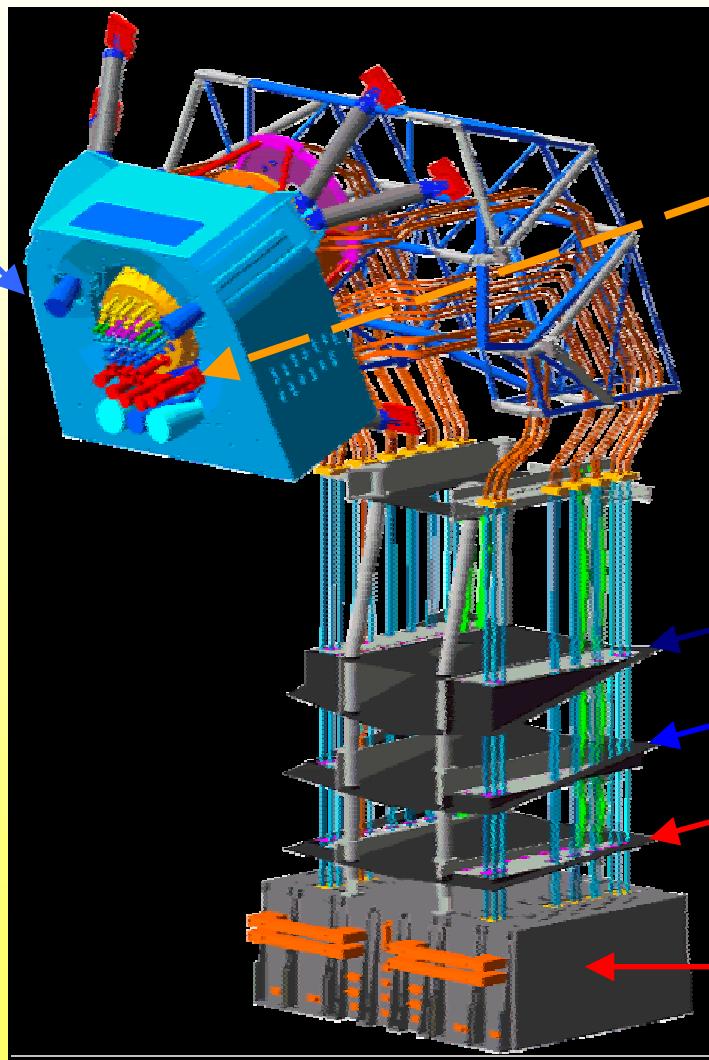
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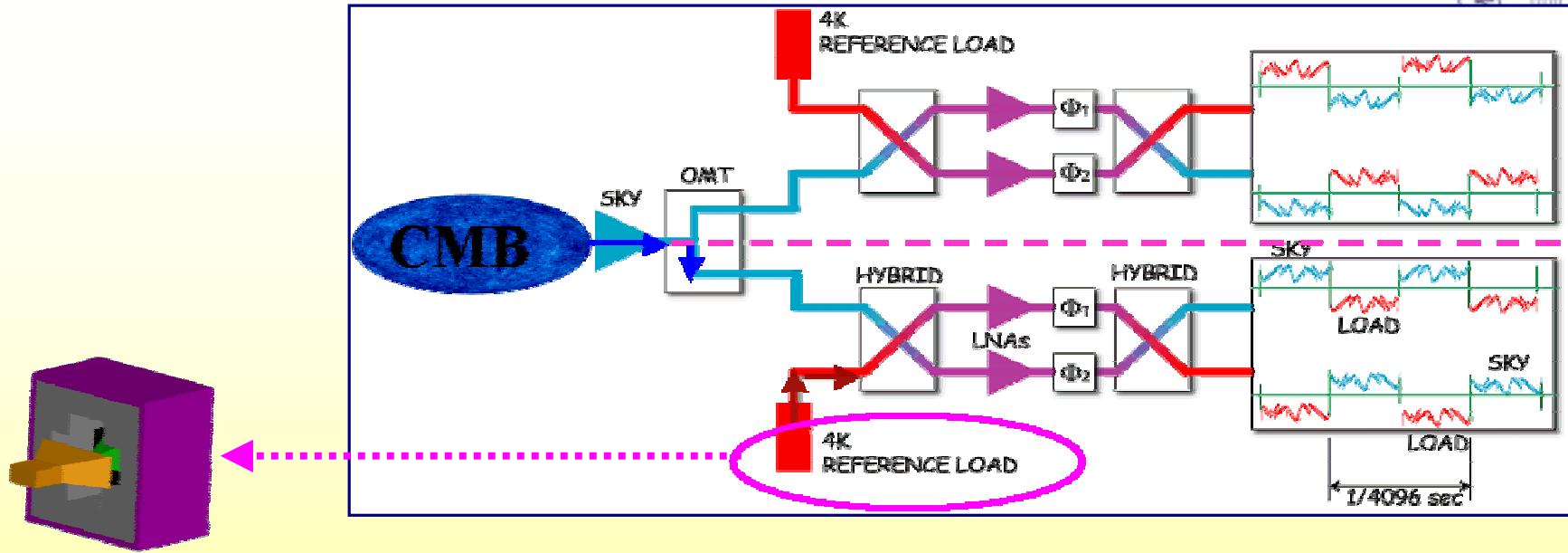


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20K FEM

11 Corrugated Horns  
@ 30,44,70 GHz





...evaluating the *RF TRANSFER FUNCTION*:

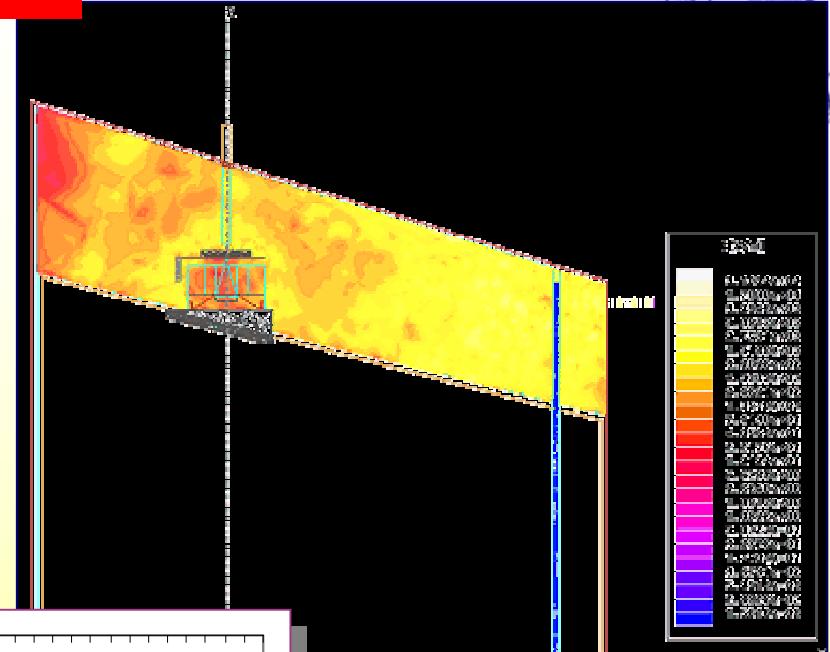
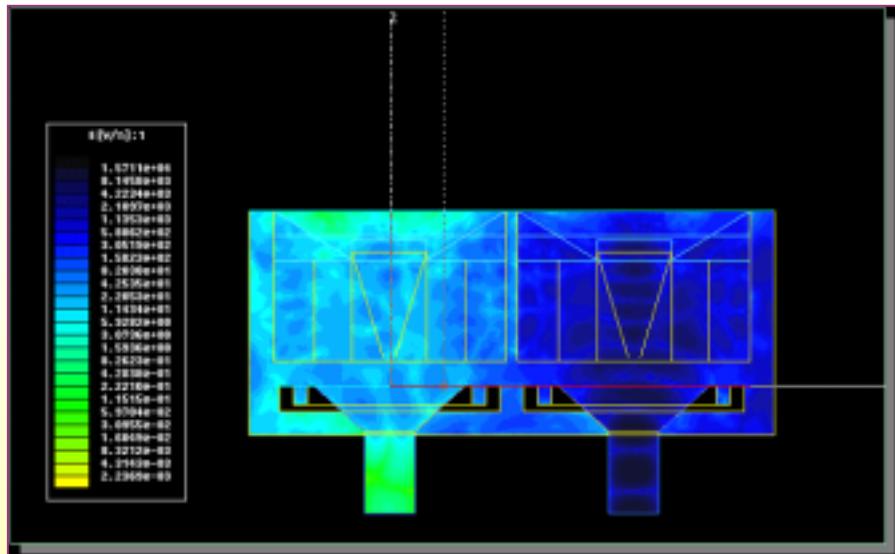
$$\bar{p} = ak\beta G \left[ T_x + T_n - r(T_y + T_n) \right]$$

...and the sensitivity to various systematic effects producing fluctuations able to mimic the true sky fluctuation

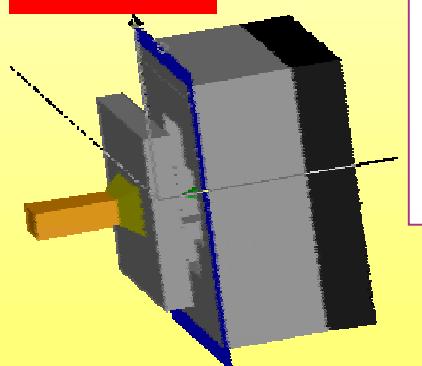
$$P_{wg} = [T_{ENV}^A * SPO + T_{LOAD}^A * (1 - \eta)] * (1 - R_H) + [T_n + kT_{Horn} \Delta \nu * \varepsilon_H] * S_{11}^2$$

# Finite Elements Method

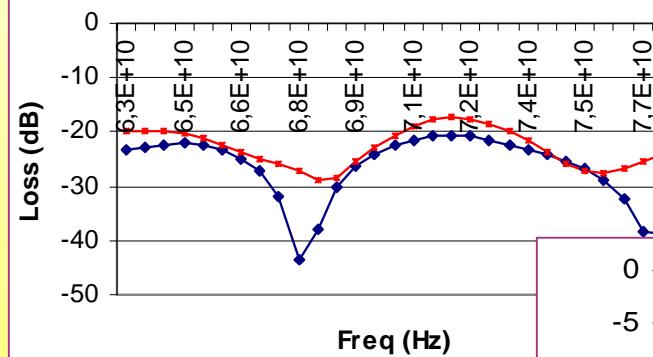
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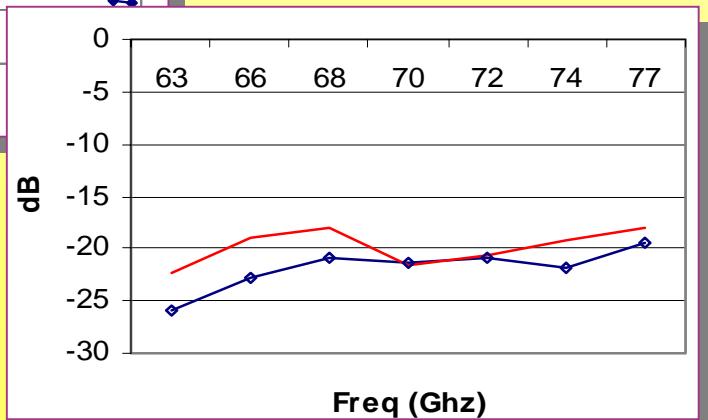
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Return Loss



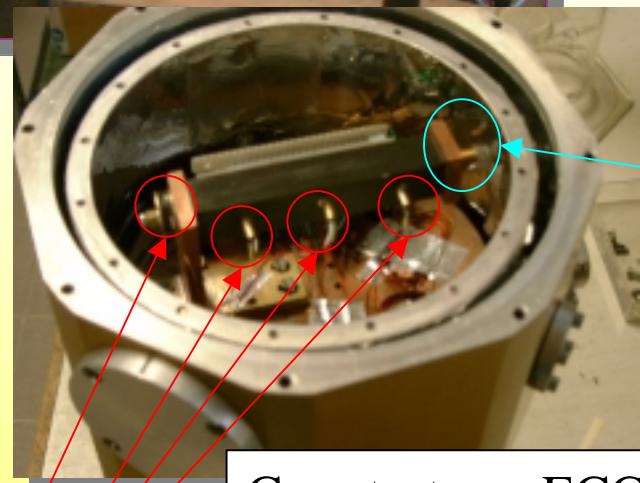
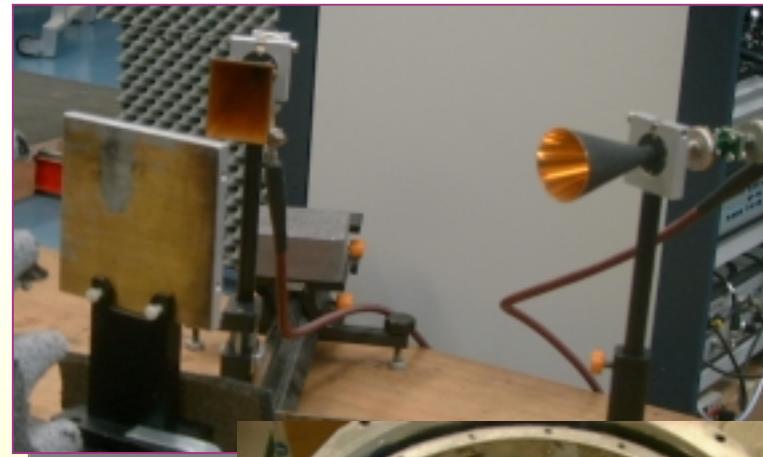
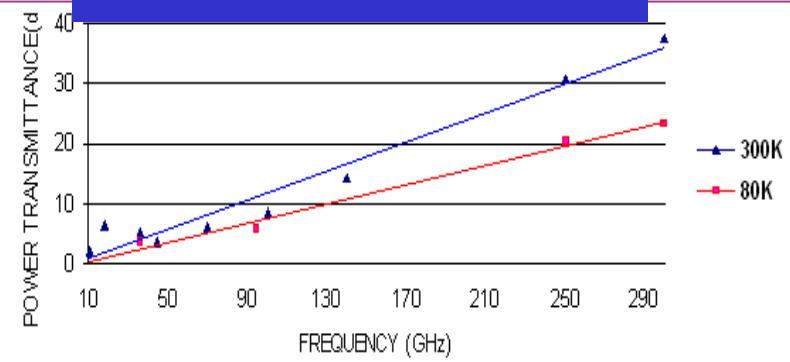
Spillover



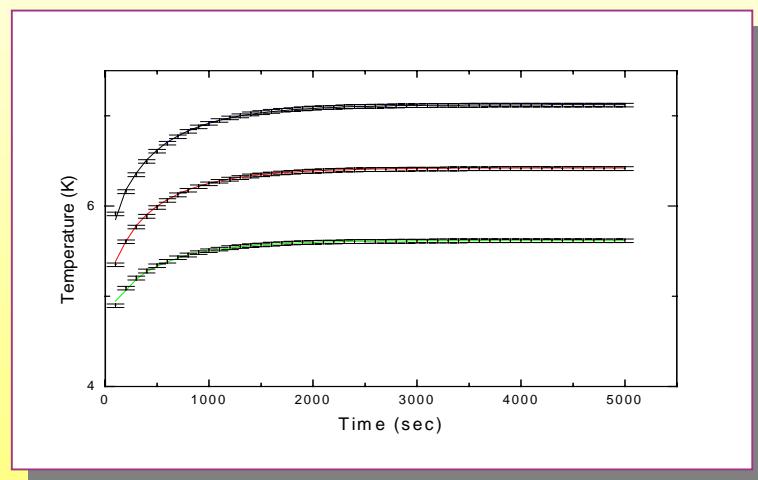
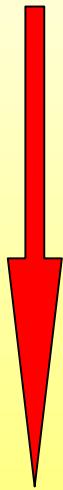
Design & Results

# ECCOSORB CR110&C117

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Heater



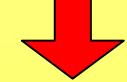
e.m parameters+thermal model



SINDA



RF characterisation



Improved design & performances

Cryo tests on ECCOSORI