

“Planck-LFI: instrument design and ground calibration strategy”, pp.189-195

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Abstract – The ESA Planck satellite is designed to achieve precision imaging of the Cosmic Microwave Background with an unprecedented combination of angular resolution, sensitivity, spectral range and sky coverage. The Low Frequency Instrument is one of two complementary instruments, and covers 30, 44, and 70 GHz with an array of wideband pseudo-correlation, cryogenic radiometers. Advanced qualification models of the radiometer chains and of the instrument electronics have been manufactured, tested and integrated into the LFI Qualification Model. The main radiometer calibration, RF tuning and performance characterization is carried out at a single radiometer chain level, and then verified at instrument integrated level in dedicated cryofacilities. Here we describe the main requirements and instrument design, and we summarize the radiometer calibration strategy optimised during the qualification activity in view of the LFI Flight Model campaign.