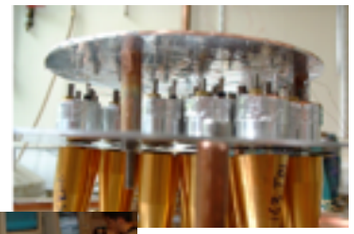
CMB Activities @LAL ?

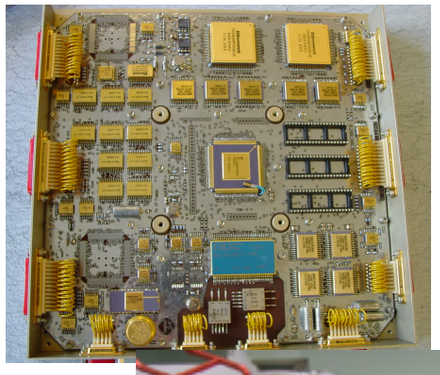
LAL is involved in CMB since ~20 years: we have been/are involved in Archeops, Planck, QUBIC, Thibaut is also in AdvACT.

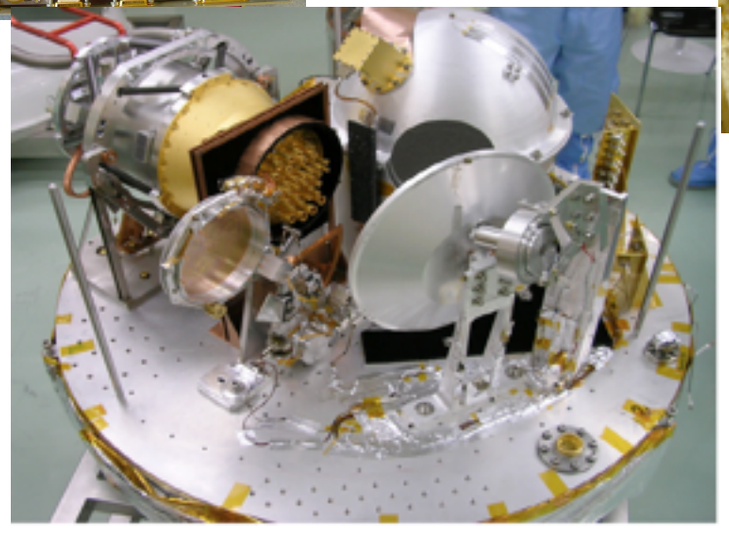
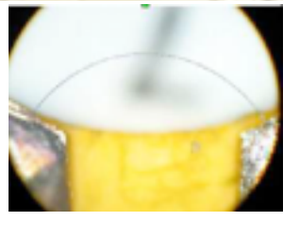




Archeops

* Responsible of the pointing reconstruction using the Stellar Sensor
* Participation to the launch @Kiruna, calibration on-site and in Grenoble (on-ground calib: beam reco, detector response - I(V), optical Xtalk,...)
* Dev of Carbon fiber sources for optical Xtalk and time response measurements
* Data analysis of flight data, Cl spectra, map reconstruction

Instrument&Calibration of Planck-HFI



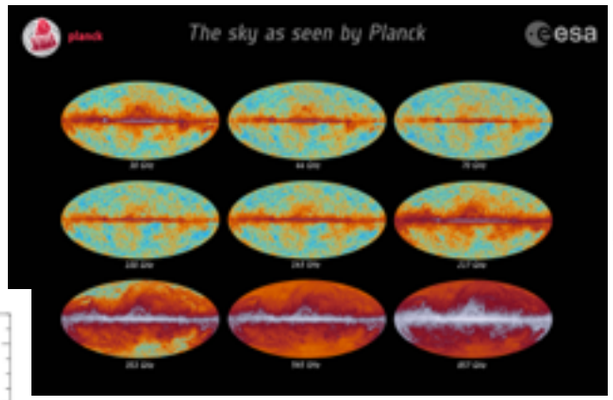
* Responsible of the building/delivery (...)
  Data Processing Unit of HFI
  including compression algorithm
  [CQM/PFM and Flight spare]

* Resp. for the instrumental setup of the Carbon fibers for Xtalk/time response measurements
* Simulations for the integrating sphere
* Participation in the calibration of the CQM, CSL tests, and PFM

* Contribution to the upgrade of the Saturne cryostat
* Responsible of the HFI Instrument Model, and the Instrumental Intrinsic Systematics effect WG for HFI up to 2006

CMB Activities @LAL ?

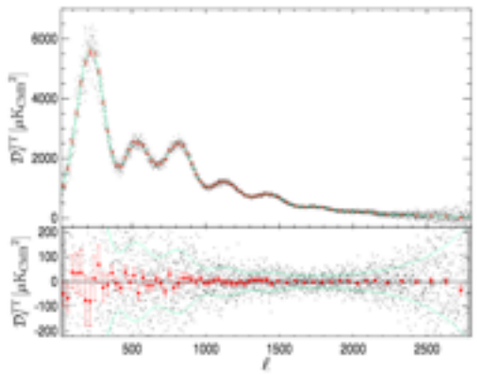
Planck Data Analysis:



Map Making et in-flight calibration

Study of the ADC non-linearities, time constant…

Responsables for the 2 releases 2013/2015



Reconstruction of spectra and likelihoods

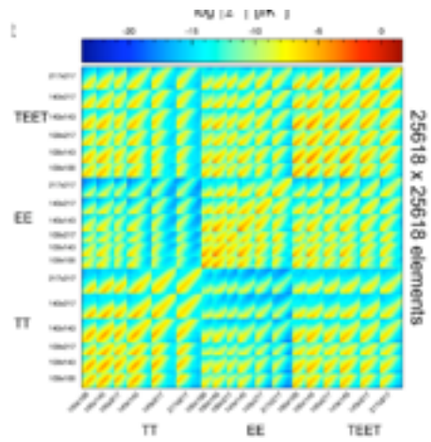
CMB Lensing

Hillipop: likelihood for the small angular scales

Lollipop: likelihood for the high angular scales

Matthieu is one of the precursors of Xspectra techniques

Thibaut is the leader of the ACTPol spectra and parameters paper

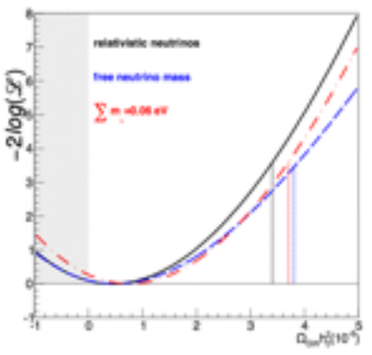


Extraction of cosmological parameter

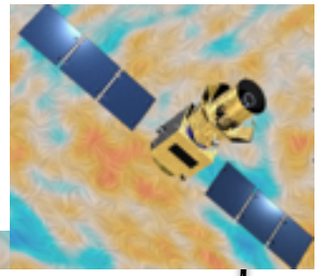
Development of CAMEL, a software for frequentist and Bayesian cosmological analysis

Physics [group publications]: Λ(CDM), Neutrinos, Gravitational waves bkg constraints (with Virgo/LAL),

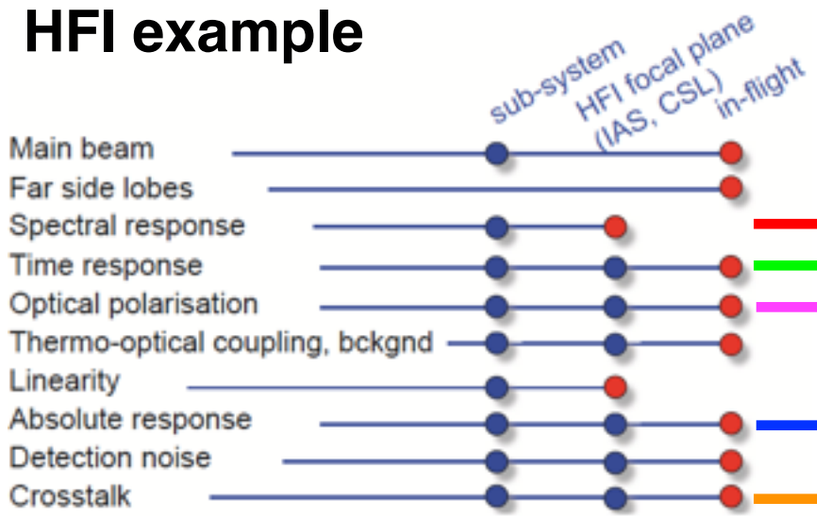
within Planck: Lead of the map making papers, + Reionisation paper, participation in the BICEP/Planck paper, likelihoods, cosmo (…)
(and older…pre-launch papers…)

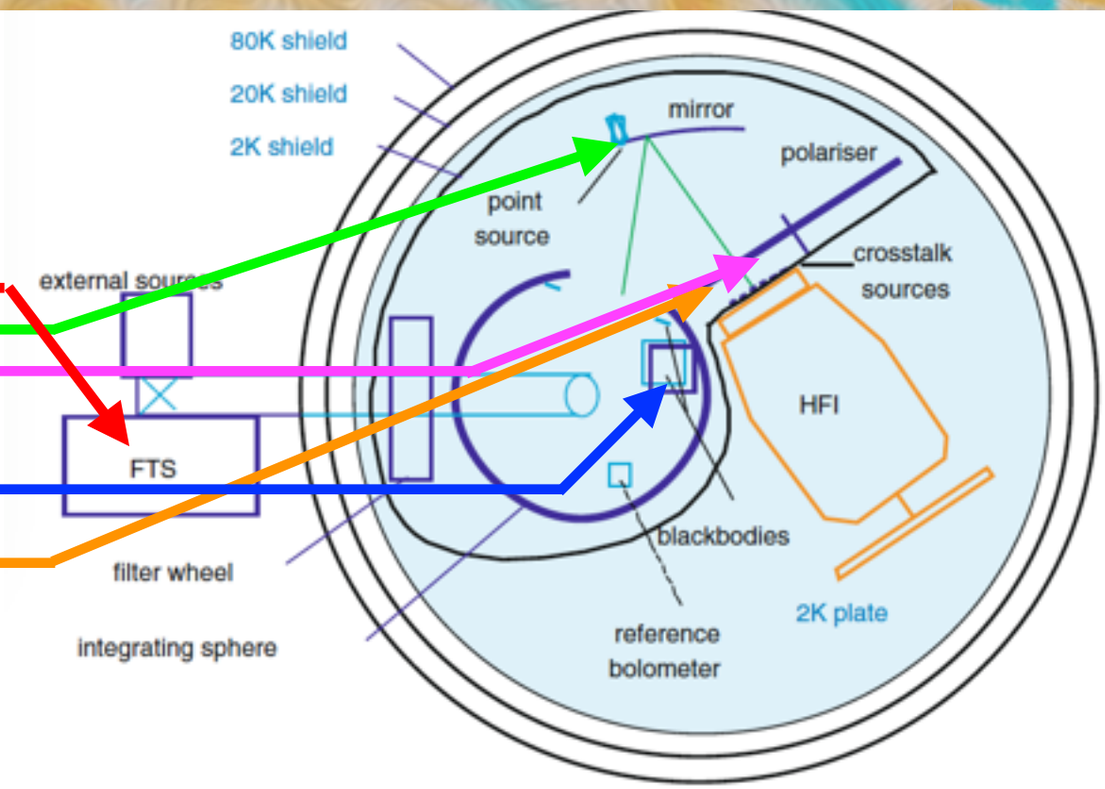


Material for discussion



HFI example



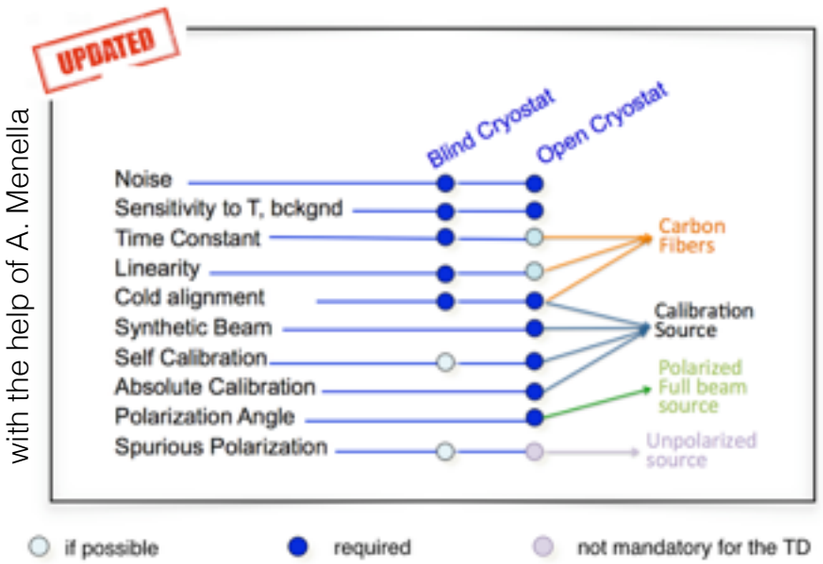


Credit: F. Pajot et al. Astronomy and Astrophysics, Volume 520, id.A10, 15 pp.

Tests in the Saturne cryostat @IAS

QUBIC example

Credit: S. Henrot-Versille with the help of A. Menella



Name	"Active source" CAL1 (*i.e.* monochromatic near field source)
	Controlled frequency emitters (130-170 GHz & 190-245 GHz) with output feed 10° FWHM + folding flat mirror Distance from the cryostat window around 11 m (TBD)
Goals	a) Map of the PSF on the "good quarter" of ONAFP to be compared with sims (fixed pointing, HWP modulation?) b) Map of the SB pattern (scans towards the source in elev and/or in az; TBD alt/az angle steps) c) Cut of the SB pattern (scans towards the source in elev and/or in az; TBD alt/az angle steps) d) check that we are able to measure the instrumental polarization measurements within XXX%
Pros	1. Frequency sweep allows to sample the PSF and the Synthesized beam pattern at discrete wavelengths 2. Even in the near field it is possible to map an interference pattern, see sims.
Limitations	1. Low output power changes along the sweep in frequency (TBD if must be monitored to compare absolute value of PSF at different colours) 2. All the measurements are done at one fixed polarization axis; difficult to handle a polarization axis rotation. 3. No measurements to check misalignment of the cold optics vs elevation

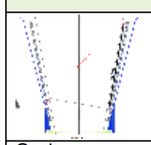
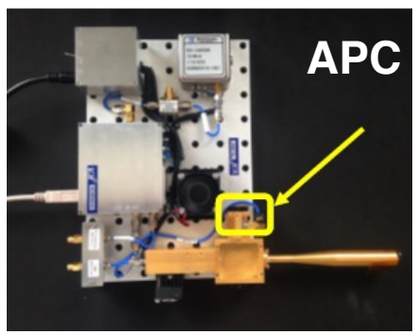
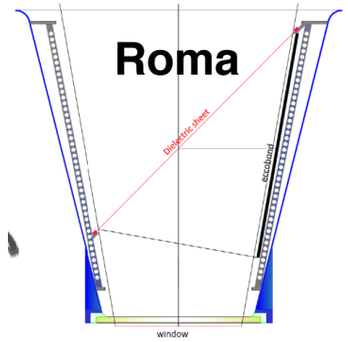
Name	"Full beam calibrator" (*i.e. very* near field thermal source)
	A 45° tilted beamsplitter in front of the feedarray to generate two sources: sky (or warm BB) & ambient BB with linear polarised emission Possible azimuth rotation of the whole forebaffle step-by-step by hand
Goals	a) check that we are able to reconstruct the polarization angle of the full beam calibrator within XXX% (see Limitation 1)
Pros	1. Compact calibrator 2. Broadband emission 3.
Limitations	1. Useful for single beam instrument (see BICEP2). Possible different behaviour for each feedhorn (see horns at the edges) What about the polarization performances of the SB? 2. A large dielectric beamsplitter (around 1 meter) 3. Azimuthal rotation

table: credit M. De Petris



LAL



Tests will be performed @APC