

COSMOS

Cosmic Orbital and Suborbital Microwave Observations



Wrap up and experimental outlook

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PRESENT AND FORTHCOMING CMB PROBES

Ground



POLARBEAR



ACTPol

Atacama,
Chile

In addition,
ABS, CLASS, POLARBEAR-2,
Simons Array, Adv-ACTPol, ...



South
Pole

In addition, BICEP3, POLAR, QUBIC, ...

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Balloon

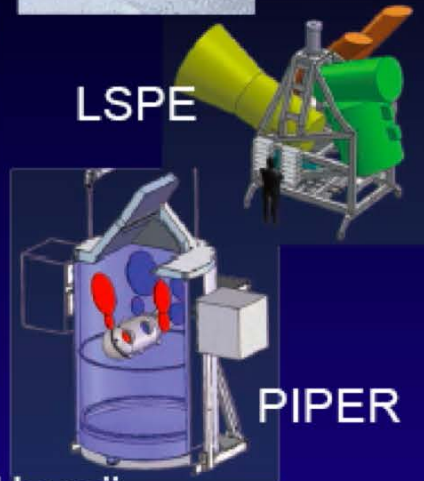


EBEX



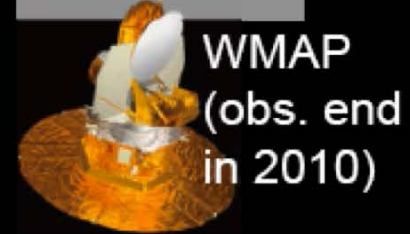
SPIDER

LSPE



PIPER

Satellite



WMAP
(obs. end
in 2010)



Planck



LiteBIRD



PIXIE



CORe+

In addition, QUIOTE in Canary island, AMiBA in Hawaii

PRESENT AND FORTHCOMING CMB PROBES

Ground



POLARBEAR



ACTPol

Atacama, Chile

In addition, ABS, CLASS, POLARBEAR-2, Simons Array, Adv-ACTPol, ...

and many more!



South Pole

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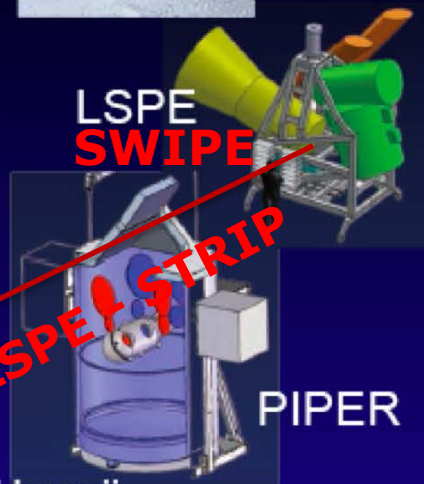
Balloon



EBEX



SPIDER



LSPE
SWIPE

PIPER

LSPE STRIP

Satellite



WMAP
(obs. end in 2010)



Planck

Retired
Almost-Retired



LiteBIRD



Not funded!
Not funded!
(India interested)

CORE+

In addition, QUIOTE in Canary island, AMiBA in Hawaii

Satellites

1. Planck is very close to its last release (spring 2018).
 - a. The legacy data will be exploited for several year, especially in the large angle and high frequency regime where data availability/quality will be limited.
2. PIXIE not selected. **No future for spectral distortions?**
 - a. Effort started in France to propose PRISTINE
 - b. Pathfinder to spectral distortions from the ground under deployment at DOME C (COSMO).

Satellites

1. Planck is very close to its last release (spring 2018).
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2. PIXIE not selected by NASA. No future for spectral distortions?
 - a. Effort started in France to propose PRISTINE (e.g. F-Class, 250 M€/M\$ cost cap)
3. CORE not selected by ESA for M5
 - a. Need to find international partner. Concrete possibility from India (ISRO). Indian CMB consortium created, first meeting held.
 - b. Aiming to ESA/M6? When?
4. LiteBIRD in track for JAXA phase A (completes fall 2018, selection will follow)
 - a. If selected, launch around 2027
 - b. US Participation funded by NASA, likely MoO after selection
 - c. ESA interested in MoO as well. European consortium created to steer EU participation.
 - d. ASI has financed Italian participation to phase A, through COSMOS
 - Five areas of activity: High Frequency Telescope, Calibration, Foreground, Systematics and Electronics.

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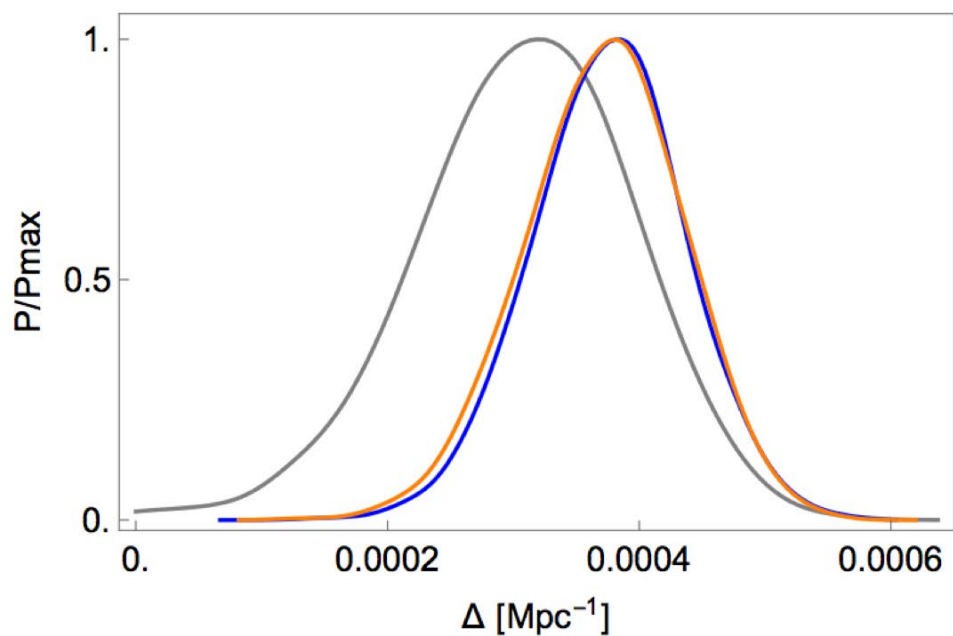


Remarks on balloon/ground

1. Most efforts are US based, small collaboration which may or not may have a public release policy for data (even after proprietary analysis)
2. They are essentially "B Machines", e.g. main science goal is tensor-to-scalar ratio (unsurprising)
3. More surprisingly, several of them aim at large angle/reionization peak, which is very hard for suborbital probes (as Planck knows well...)

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- ✓ **Black** curve is a forecast using Planck standard T mask and present-day polarization signal-to-noise. This would slightly raise the current detection level
- ✓ **Orange** is current ext30 masking but cosmic variance limited in polarization
- ✓ **Blue** is as orange but full sky. They push the detection power beyond 6σ

Talk by A. Gruppuso

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3. More surprisingly, several of them aim at large angle/reionization peak, which is very hard for suborbital probes (as Planck knows well...)
4. This means some of them will be able to do E mode polarization, even at large angle, although not likely at cosmic variance
 - a. Potentially interesting for tau and anomalies
5. CLASS and PIPER have hardware to measure V mode. PIPER may devote 30% of observing time to this, implying a limit perhaps only 10 times weaker than B mode.

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In a nutshell

1. At least ten years to the next satellites. LiteBIRD the most advanced option.
2. No current exciting prospects for spectral distortion
3. Boosting sub-orbital activity, mostly in the US
4. Planck legacy around for a while, to be exploited.
5. B mode is not the only thing CMB has to offer.

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