TOWARDS A NEXT SPACE PROBE FOR CMB OBSERVATIONS AND COSMIC ORIGINS EXPLORATION

17-20th May 2016 | http://cern.ch/cmb2016

Objectives of the workshop

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on behalf of the organising committee

CERN

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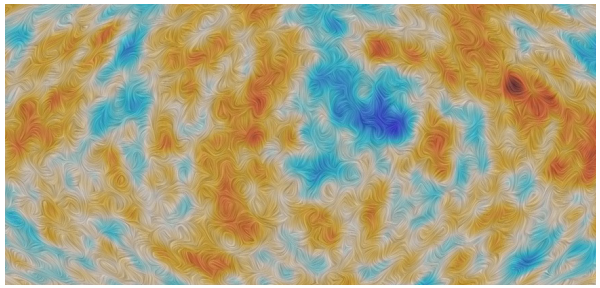


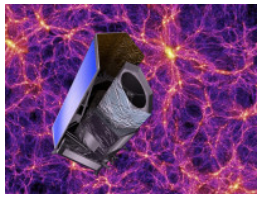
The context

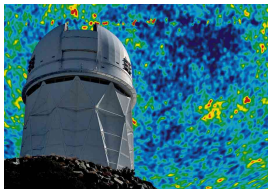
- ESA call for a Medium-size mission (M5)
  - Announcement of the call: July 2015
  - Interaction with the scientific community: July 2015 – April 2016
  - Call issued: 29 April 2016
  - ESA cost cap 550 M€
- CERN will participate to the CMB polarization mission proposal for M5

Activity	**Date**
Release of Call for M5 mission	April 29, 2016
Letter of Intent submission deadline	June 6, 2016, 12:00 (noon) CEST
Briefing meeting (ESTEC)	June 24, 2016 (TBC)
Proposal submission deadline	October 5, 2016, 12:00 (noon) CEST
Letters of Endorsement deadline	February 8, 2017, 12:00 (noon) CET
Selection of missions for study	June 2017
Phase 0 completed	November 2017
Phase A kick-off	January 2018
Mission selection	November 2019
Mission adoption	November 2021

The context

- Think of a future CMB polarization mission in synergy with other CMB experiments and other cosmological probes
  - ground/balloons vs. space – who does what?
    (sensitivity, angular resolution, systematics, frequency coverage)
  - synergy with other cosmological probes
    (cosmic complementarity: accurate testing of the model)

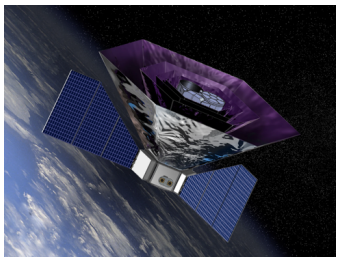




The suborbital roadmap

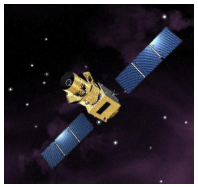
High resolution maps at ν < 200 GHz

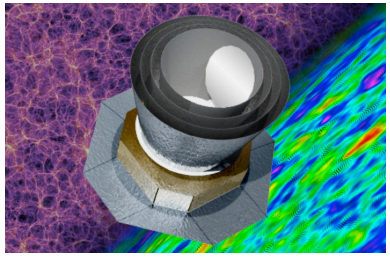
The CMB spectrum



Absolute spectrophotometry

Polarization from space





High sensitivity multi-channel differential polarimetry

The context

Missions
· Show All Missions

Future Missions Office
· Introduction to the Office

Astrophysics & Fundamental Physics Missions

Solar System & Robotic Exploration Missions

Payload Instruments

Payload Technology Validation

CMB POLARISATION: COSMIC MICROWAVE BACKGROUND POLARISATION MISSION

ESA's Concurrent Design Facility (CDF) has completed a short study of a Cosmic Microwave Background Polarisation mission (CMB Polarisation). The purpose of this study is to support the European and Japanese science community in defining a collaborative mission studying the Polarisation of the Cosmic Microwave Background for calls for Cosmic Vision Medium-sized mission. A brief outline of the mission is given here, while further details can be found in the CDF presentations: CMB Polarisation mission - summary and CMB Polarisation mission - full presentation.

MISSION JUSTIFICATION

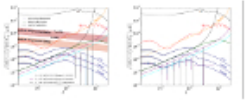
The highly successful ESA Planck space mission has demonstrated the capability of precision Cosmic Microwave Background (CMB) observations to constrain models of fundamental physics in the primordial Universe. Planck was primarily designed as the near-ultimate space mission for measuring the angular power spectrum of CMB temperature anisotropies, and has also made the most constraining measurements so far of E-mode polarisation. However, much remains to be learned from CMB polarisation, especially with regard to the much fainter B-modes, which are the signature of gravitational waves generated during inflation.

Search here

16-May-2016 22:33 UT

Shortcut URL
http://sci.esa.int/jump.cfm?oid=57795

Images And Videos



· CMB Polarisation mission - sensitivity to B-modes

· CMB Polarisation mission - orbit and scan strategy

http://sci.esa.int/trs/57795-cmb-polarisation-mission-study/

Day 1

What science program for M5?

- Key objectives:
  - review the current status of the field,
  - review the CMB roadmap, the competition, and complementarity
  - discuss the science objectives for a space mission launched in 2025-2030

- Program:
  - Scientific overview and Planck heritage
    - F. Bouchet, J.-L. Puget
  - Science
    - J. Martin, A. Challinor, R. Sunyaev, J. Lesgourgues,
    - J. Chluba, F. Boulanger, S. Ferrarro, T. Kitching
  - The roadmap and future projects outside Europe
    - C. Pryke, W. Jones, J. Carlstrom, M. Hazumi, A. Kogut

- Round table: what next? (conveners M. Bersanelli, F. Bouchet)
  - With the participation of
    - J. Carlstrom, P. de Bernardis, S. Hanany, M. Hazumi, R. Mandolesi, J.-L. Puget, R. Sunyaev

Day 2

Towards a mission design for M5?

- Key objectives:
  - review the foregrounds complexity
  - discuss the mission profile, constraints, feasibility
  - discuss potential collaboration with extra-european partners
  - discuss data analysis and simulation needs

- Program:
  - Foregrounds
    - J.-A. Rubiño-Martin, M. Jones, M. Remazeilles
  - M5 mission studies, design constraints, trade-offs, instrument options
    - J. Delabrouille, P. de Bernardis, M. Calvo
  - US contribution to M5
    - S. Hanany, Ullom, O'Brient, J. Carlstrom, J. Borrill
  - Japanese plans
    - M. Hazumi
  - Data processing, simulation, and calibration plans
    - J. Borrill, P. Natoli, G. Patanchon, M. Bersanelli

- Wrapping-up
  - Discussion (all)
  - Concluding remarks (Mandolesi)

Days 3 and 4

Work towards the M5 proposal

- Key objectives:
  - review and discuss the status of work on the "Exploring Cosmic Origins" papers;
  - discuss next steps to get these papers ready ASAP;
  - decide on our baseline mission, discuss the work towards the M5 proposal.

- Program of Day 3: Parallel discussions and work
  - Parallel meeting 1: Instrument, payload, calibration, and tests
    - Conveners: M. Bersanelli, P. de Bernardis, S. Hanany, B. Maffei.
  - Parallel meeting 2: Science, simulations, forecasting, and foregrounds
    - Conveners: A. Banday, A. Challinor, E. Komatsu, P. Natoli, M. Remazeilles
  - Informal discussions on the ECO papers

- Program of Day 4: Putting it all together
  - Report from parallel sessions
  - Parallel discussions
  - Plenary discussion of the baseline and of the work plan (all)

Thanks!

- All participants !
- SOC
  - James G. Bartlett
  - Marco Bersanelli
  - François Bouchet
  - Martin Bucher
  - Anthony Challinor
  - Enrico Chesta
  - Paolo de Bernardis
  - Jacques Delabrouille
  - John Ellis
  - Gian Giudice
  - Eiichiro Komatsu
  - Martin Kunz
  - J.-Alberto Rubiño Martin
- LOC (CERN)
  - Diego Blas Temino
  - Enrico Chesta
  - Bettina Hamoudi
  - Christos Papasimos
  - Anais Rassat
  - Sergey Sibiriakov
- LOC (University of Geneva)
  - Ruth Durrer
  - Martin Kunz
- Parallel session conveners
  - Anthony Banday
  - Marco Bersanelli
  - Anthony Challinor
  - Paolo de Bernardis
  - Shaul Hanany
  - Eiichiro Komatsu
  - Bruno Maffei
  - Paolo Natoli
  - Mathieu Remazeilles

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