

Welcome, logistics, and the aim of this workshop

Eiichiro Komatsu (MPA)

“CMB in Germany” meeting, January 31, 2018

What is this workshop about?

- **To share the latest information** on great opportunities in the area of the cosmic microwave background research (broadly defined)
- Both ground-based (CCAT-p; CMB-S4) and space-borne (LiteBIRD)
- **Community-building exercise** in the CMB research
 - UK, France, Italy, and Spain have “roadmaps” of the CMB research but we do not have one
 - It’s not clear if we should have one, but at least having conversations may not be a bad thing, especially given the opportunities available now



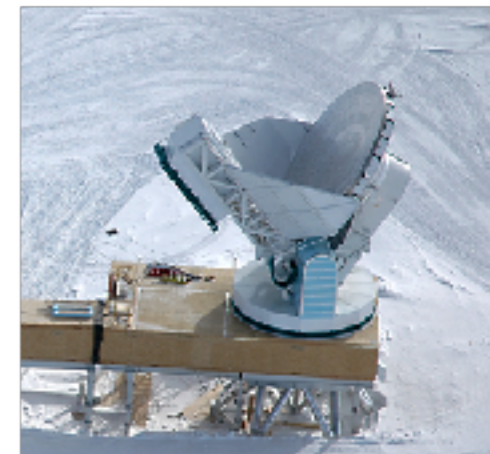
CMB in Germany

- **Ground-based**

- APEX (MPIfR; U. Bonn)

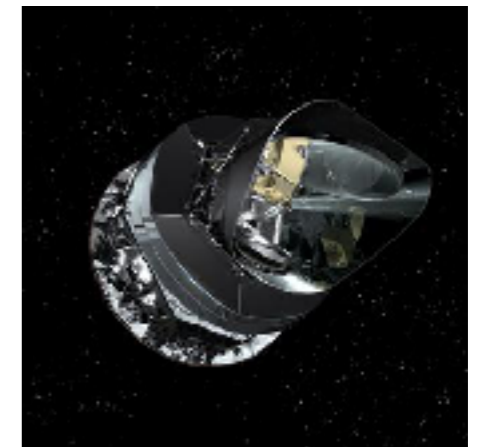


- Participation to the South Pole Telescope (LMU)



- **Space-borne**

- Participation to ESA's Planck satellite (MPA)



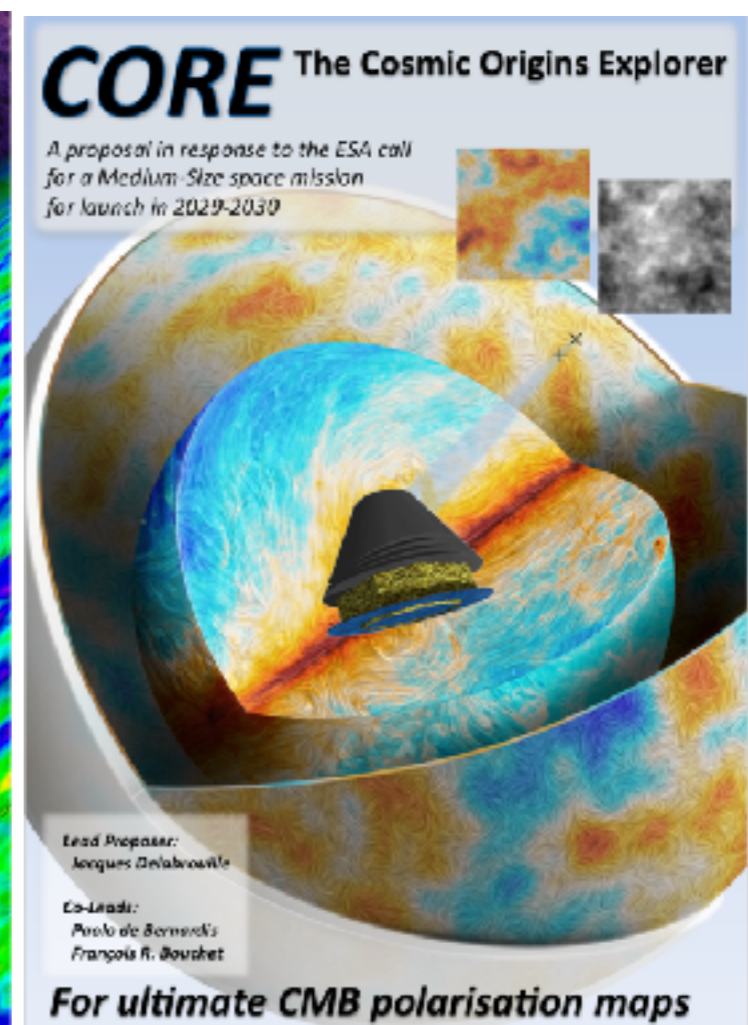
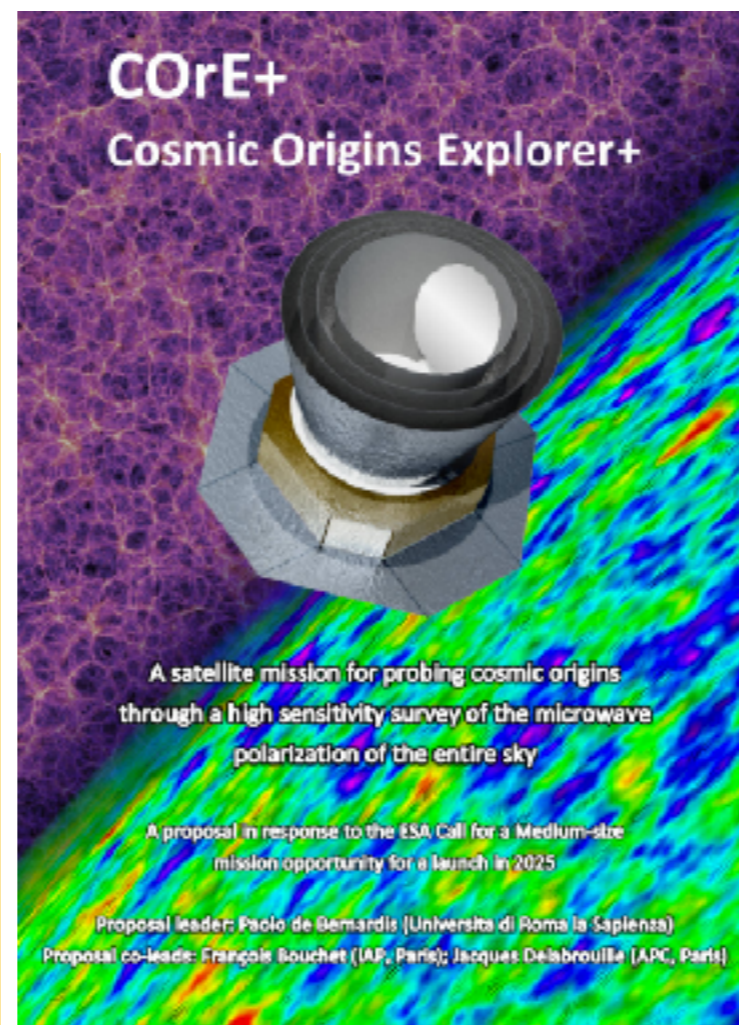
What's next?

Space-borne Opportunities

ESA's M4 and M5 Calls

- Formation of a substantial number of groups happened during ESA's M4 and M5 calls - "CORe+" and "CORE" proposals.
- We have a list of **17 scientists** who contributed to either or both proposals

The proposals were not successful. But it contributed to forming a group of people who are interested in the CMB science. Many of the contributors are here in this workshop!



CORE German Consortium

- Torsten Enßlin, E. Komatsu, Rashid Sunyaev (MPA)
- Sebastian Grandis, Steffen Hagstotz, Joe Mohr, Alex Saro, Jochen Weller (LMU/USM)
- Karl Menten, Bernd Klein (MPIfR) [readout electronics for KIDs](#)
- Jörn Beyer (PTB) [readout electronics for TES](#)
- Hans Böhringer, Gayoung Chon (MPE)
- Thejs Brinckmann, Sebastien Clesse, Julian Lesgourgues (Aachen)
- Kaustuv Basu (Univ. Bonn)

Current Opportunity: LiteBIRD



- JAXA-led mission with participations from USA, Canada, and Europe (ESA's mission of opportunity)
 - Target launch date ~ 2026 (i.e., “tomorrow”)
- European consortium is being formed; ESA seems enthusiastic (DLR is interested too!)
- See Nicola Vittorio's talk



Ground-based Opportunities

A Game Changer

- **CCAT-p**: 6-m, **Cross-dragone** design, on Cerro Chajnantor (5600 m) [See Frank Bertoldi's talk]

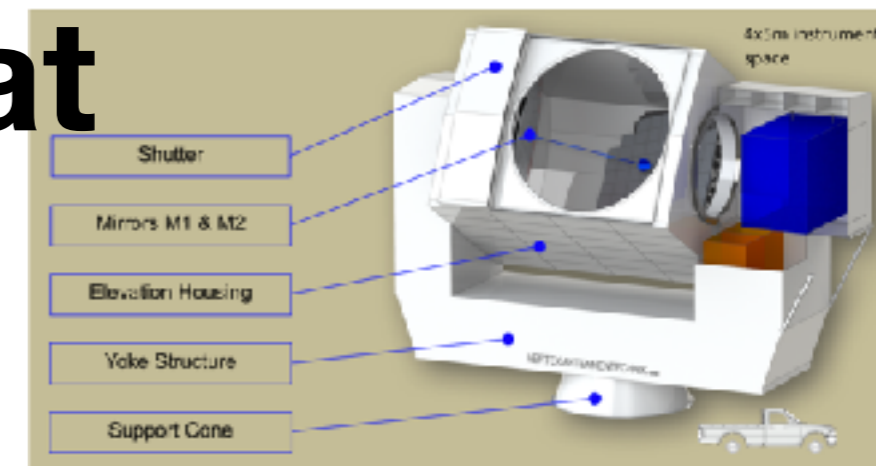
- **Germany makes great telescopes!**

- Initial design study completed, and the contract has been signed by “VERTEX Antennentechnik”

- CCAT-p is a great opportunity for Germany to make significant contributions towards the CMB S-4 landscape (both US and Europe) by providing telescope designs and the “lessons learned” with prototypes.

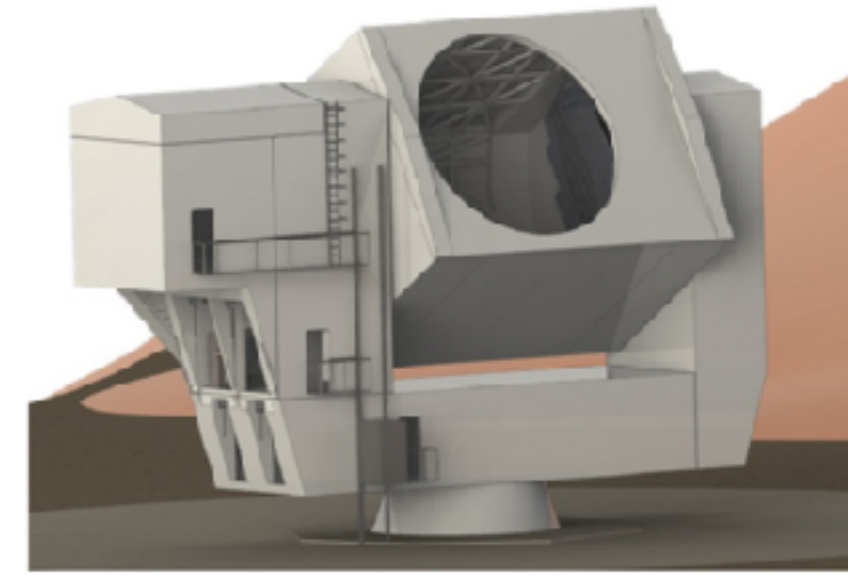
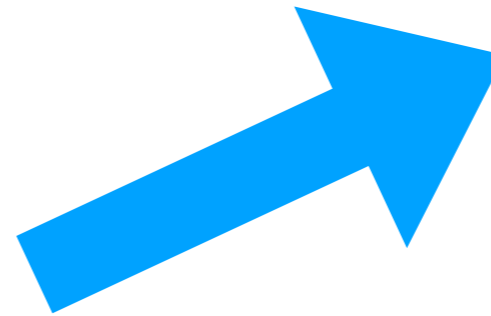
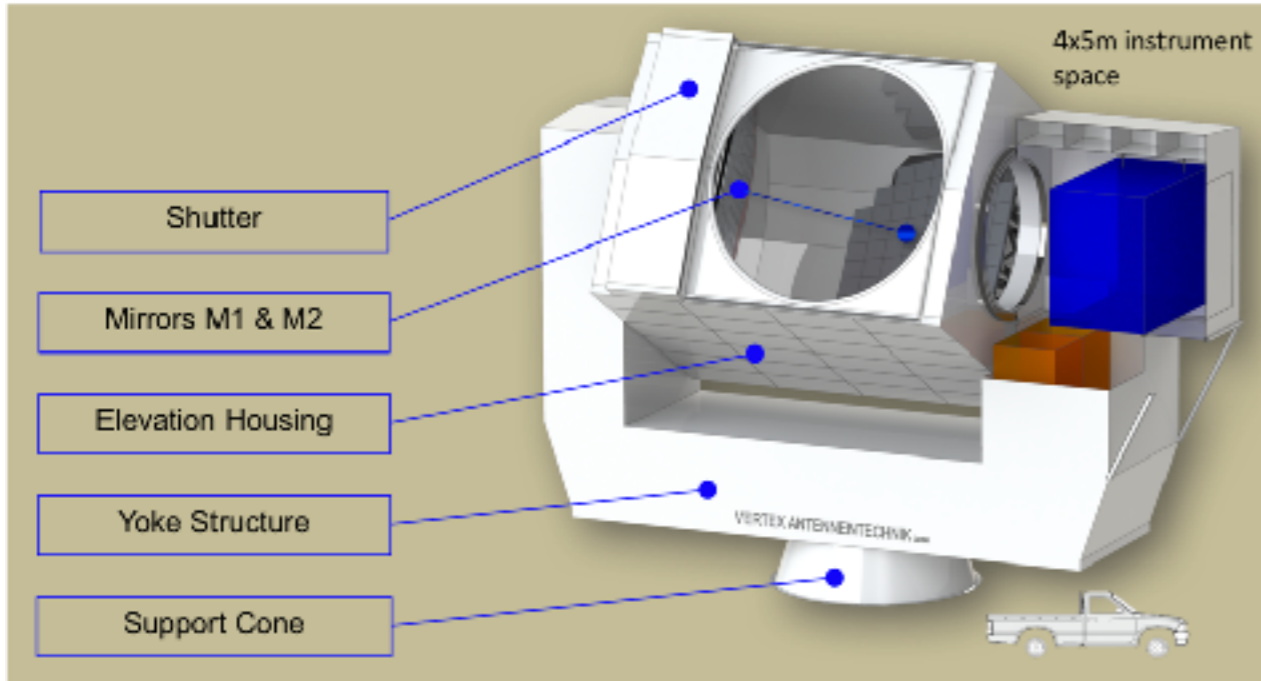
CCAT-prime

designed and built by Vertex Antennentechnik GmbH, Duisburg



CCAT-prime

designed and built by Vertex Antennentechnik GmbH, Duisburg



A rendering of the unique and powerful radio telescope. Image courtesy of VERTEX ANTENNENTECHNIK.

Simons Observatory (USA)

in collaboration

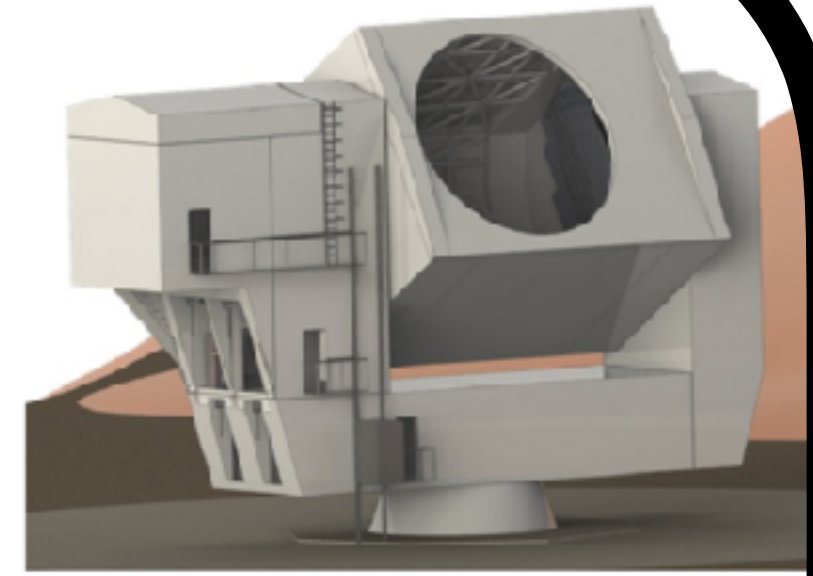
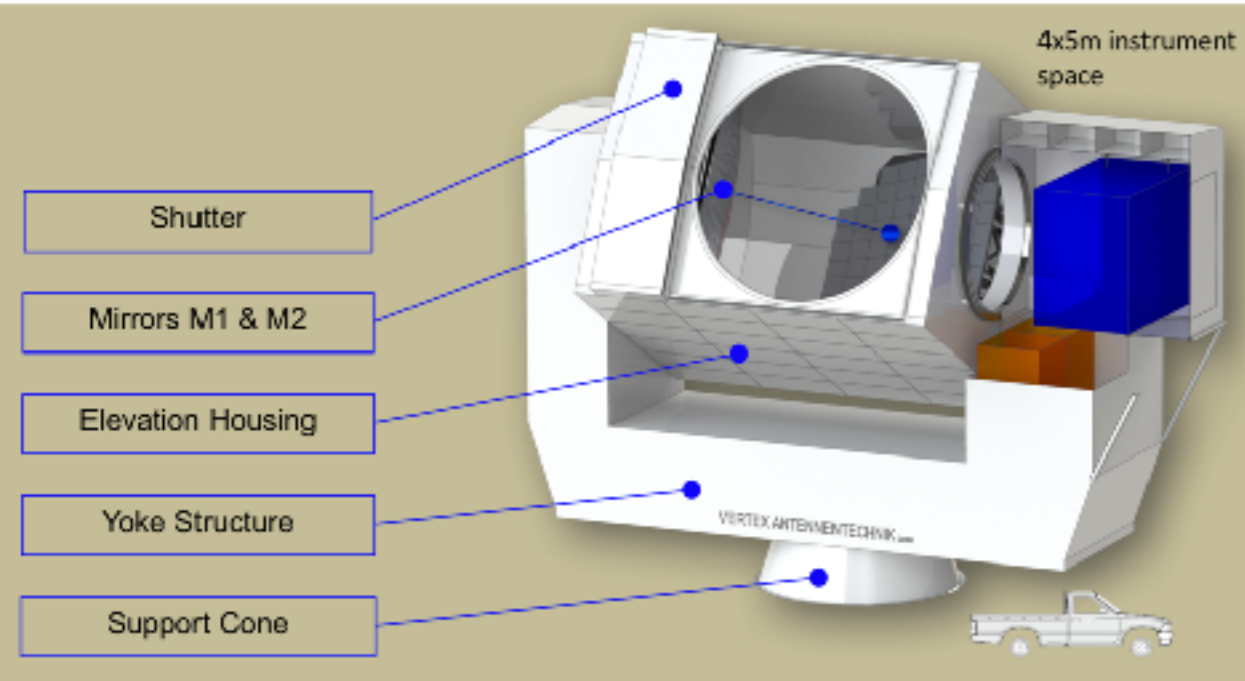


South Pole?

This could be “CMB-S4”

CCAT-prime

designed and built by Vertex Antennentechnik GmbH, Duisburg



A rendering of the unique and powerful radio telescope. Image courtesy of VERTEX ANTENNENTECHNIK.

**Simons Observatory
(USA)**

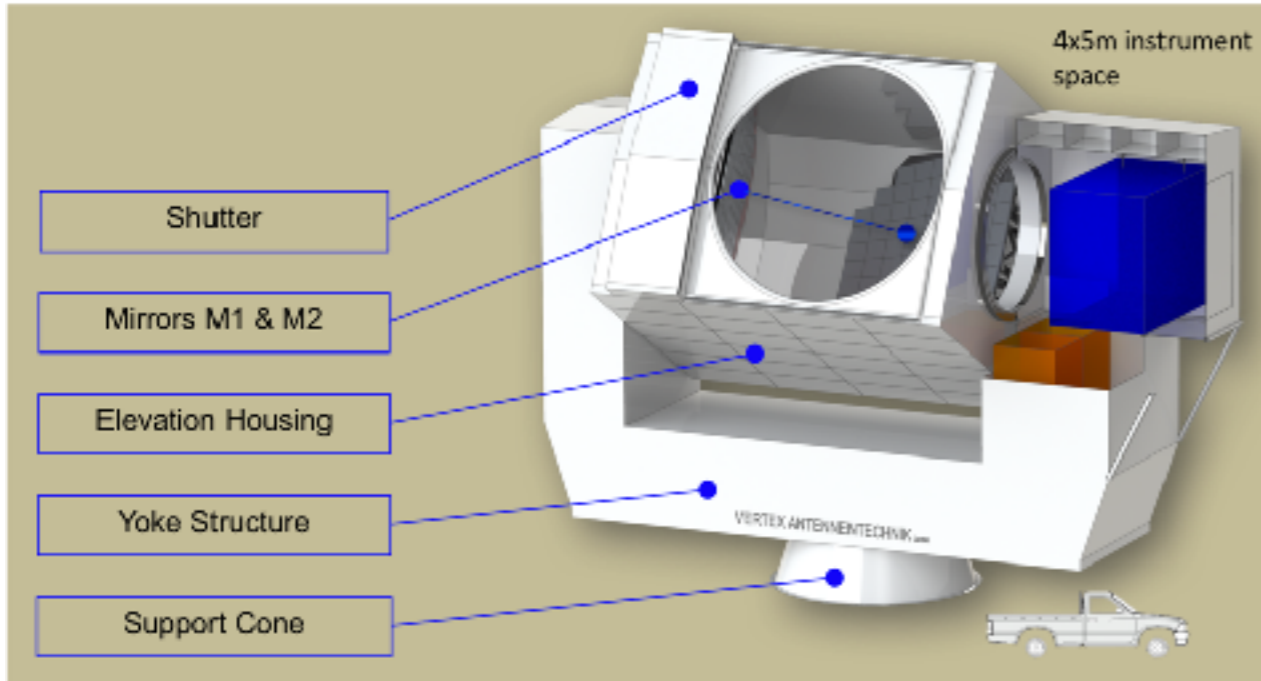
in collaboration



South Pole?

CCAT-prime

designed and built by Vertex Antennentechnik GmbH, Duisburg




- John Carlstrom's talk



- Frank Bertoldi's talk

South Pole?

“E-CMB”: European Coordination (Sub-orbital)



The image shows a screenshot of the E-CMB wiki homepage. The header features the E-CMB logo and a colorful Cosmic Microwave Background (CMB) map. A search bar and 'Recent Changes' link are visible in the top right. The main content area includes a welcome message, instructions on how to use the wiki, and a list of useful links. A sidebar on the left contains navigation links for Home, LogBook, Meetings, CMBnet?, WG1, and PmWiki. A large text overlay on the right side of the page reads 'See Nicola's talk'.

E-CMB A European coordination for Cosmic Microwave Background Science

Recent Changes - Search: Go

View Edit History Print

Welcome to E-CMB!

This is the wiki of the E-CMB collaboration. It is **world readable**.

Note that you **need a userid/password to edit/write** (ask your national coordinator).

Please log in your posts (with date and name, please) in the LogBook section

Later on, we may add some dedicated area by working group activity

Statement of purpose

Once available/agreed, we'll put some version of it here

Some useful links

[Site of the 2016-09 meeting at the Villa Finaly, Florence](#) (which prompted the E-CMB initiative)

[The core proposals wiki](#)

[The 2016 french prospective wiki](#) (with link to the french roadmap document of June 2016)

See Nicola's talk

Home
LogBook
Meetings
CMBnet?
WG1
PmWiki
Basic Editing
Documentation Index
PmWiki FAQ
Board/Steering Log In



A portrait of Nicola, a man with a white beard and glasses, wearing a suit and tie, looking directly at the camera.

Summary

- This is a community-building exercise, but we have some concrete projects at work
 - Both ground-based and space-borne
- Interested? Get involved! Germany can play leading roles
 - Science ideas very welcome
- Let's leave Garching with some exciting ideas/paths forward

Place: MPA New Seminar Room

11:00–11:20: **“Welcome, Logistics, and the Aim of This Workshop”**, Eiichiro Komatsu [20]

11:20–12:00: **“Why CMB now?”**, Rashid Sunyaev [40]

12:00–12:30: **“Towards a European Coordination for Orbital and Sub-orbital CMB Experiments”**, Nicola Vittorio [30]

12:30–13:30: Lunch at Canteen [60]

13:30–14:00: **“CMB-S4”**, John Carlstrom [30]

14:00–14:30: **“CCAT-prime”**, Frank Bertoldi [30]

14:30–15:00: **“Submillimeter Science and Technology at the MPIfR”**, Karl Menten [30]

15:00–15:30: **“Probe CMB Anisotropies at High-Resolution”**, Tony Mroczkowski [30]

15:30–16:00: Break [30]

16:00–16:30: **“Probing Dark Matter with CMB-S4”**, David Marsh [30]

16:30–17:00: **“Tensor Non-Gaussianity from Axion-Gauge-Fields Dynamics”**, Aniket Agrawal [30]

17:00–17:30: **“CMB Anomalies – Can we learn more?”**, Dominik Schwarz [30]

17:30–18:00: **“CMB and Foreground Analysis via Information Field Theory”**, Torsten Enßlin [30]

18:30 Reception at MPA

February 1

Place: MPA New Seminar Room

9:30–10:00: **“CMB at South Pole”**, John Carlstrom [30]

10:00–10:30: **“Cluster Cosmology with the South Pole Telescope”**, Sebastian Bocquet [30]

10:30–11:00: **“Observations of the Relativistic SZ Effect: From Planck to CCAT–prime”**, Jens Erler [30]

11:00–11:30: Break [30]

11:30–12:00: **“Efficient Computation of the SZ signal using Temperature and Velocity Moments”**, Jens Chluba [30]

12:00–12:30: **“Galaxy Cluster SZ Science from CMB S3 and S4 experiments”**, Kaustuv Basu [30]

12:30–13:30: Lunch at Canteen [60]

13:30–14:00: **“Cosmology with the Next Generation of SZ Cluster Surveys”**, Steffen Hagstotz [30]

14:00–14:30: **“Cross–correlation of 2MASS Galaxies with the SZ Effect”**, Ryu Makiya [30]

14:30–15:30: Discussion and Q&A [60]

15:30 Adjourn

Logistics

- Lunches (12:30–13:30)
 - Canteen: Follow the crowd. **Tables are reserved**
- Reception today (18:30)
 - Beers, wines, light food (free!)
- Tomorrow: if you plan to take taxis, please coordinate