SO/CMB-S4 Workshop

**on**

**Alignment of Respective Science and Infrastructure Capabilities**

**March 1, 2022**

This collaborative activity is undertaken under the auspices of the Memorandum of Understanding between The Regents of the University of California in its capacity as the manager and operator of the Lawrence Berkeley National Laboratory as the lead DOE laboratory for the Cosmic Microwave Background Stage 4 (CMB-S4), the Regents of the University of California San Diego on behalf of the Simons Observatory (SO), and the University of Chicago as lead institution for the National Science Foundation (NSF) portion of the CMB-S4 Project.

**Objective**: This short workshop brings together representatives from the two projects (SO and CMB-S4) to reach a common understanding of the minimum set of interfaces and specifications needed to evaluate and define scenarios for the use of SO infrastructure and/or data as part of a program to attain the science goals of CMB-S4.

Scenarios targeted for this workshop include use by CMB-S4 of

* the SO LAT(SO) with a LATR provided by the CMB-S4 Project
* the SO LAT with a LATR provided solely by SO (ASO)
* SO data management infrastructure and data (with or without ASO)
* SO site infrastructure (with or without ASO)

The focus of the workshop is on identifying interfaces between SO/ASO and S4 for these scenarios and a framework for cost and schedule evaluation, not on defining the managerial processes for implementing possible scenarios.

**Charge**:

Participants from each project will form four working groups (WGs) to address topics in four areas, all in the context of possible contributions to CMB-S4 from SO/ASO:

1. Meeting Science Requirements for CMB-S4
2. LAT and LATR and DAQ Critical Interface Requirements
3. Site Critical Interface Requirements
4. Data Management Critical Interfaces

Each WG will have two co-chairs, one from each project. Representative charge questions for each WG are given below. The WG are encouraged to develop (and answer) additional questions. Working groups will exchange information and may meet prior to the workshop. Each WG is asked to collaboratively produce a short ~ 2-page summary document, with links to background and contextual information as needed.

# Working Group Charges

## Measurement Goals and Science Requirements

* *Compare the use of SO and ASO with the CMB-S4 baseline to meet science requirements*
* *Are the current estimates of using ASO to replace a CMB-S4 CHLAT/LATR good enough or is more simulation/estimation needed to show scientific performance?*
	+ *Compare the map depth estimates from the two projects from their currently planned surveys.*
	+ *Also provide a simplified analysis based on comparing estimates of target sensitivities for single detectors in each band for the SO LATR versus the CMB-S4 LATR, combined with adjustments for survey sizes and durations.*
* *. Are the scan strategies for the two projects (for LATs in Chile) aligned, regarding cadences for time domain targets?*
* *Describe the benefits to CMB-S4, and particularly to the time domain community, for continued operation of SO between the start of SO operations and the start of CMB-S4 operations, if the ASO MSRI-2 proposal is not funded.*

## LAT and LATR and DAQ WG Charge

* *Is CMB-S4’s current observatory control plan capable of controlling the SO LAT and monitoring its environmental sensors or is additional work needed?*
* *Is CMB-S4’s current observatory control plan capable of controlling and monitoring the SO LATR? Is it capable of controlling and monitoring SO SATs?*
* *Is the SO LAT totally compatible with the S4 LATR or are changes needed?*
* *Provide a ROM estimate of the time and cost to switch from the SO LATR to the S4 LATR.*
* *Describe any existing coordination activities between the projects related to the LAT and LATR? Are there additional areas where additional early coordination between the projects would be mutually beneficial? Do any of these impact CMB-S4 design decisions?*

## Site WG Charge

* *Are there site or infrastructure modifications that would be needed to enable use of the SO LAT, with or without its LATR, by CMB-S4?*
* *What steps are needed to enable use of the ASO PVA by CMB-S4?*
* *Are there areas where additional early coordination between the projects would be mutually beneficial?*
* *Are there conflicts between CMB-S4 planned site operations and SO/ASO operations?.*

## Data Management WG Charge

* *Are the requirements for time domain / transient data products aligned? Suggest steps to coordinate time domain DM efforts.*
* *Are existing DM frameworks generalized enough to accommodate each other? Outline where the interfaces would lie between the two projects that would enable their disparate raw data to be handled in the DM pipelines.*
* *Are there major systems or requirements that differ significantly, and/or are in conflict between the two projects? (E.g., file formats, data registration system, site computing, requirements on how soon data are made public).*
* *Is CMB-S4’s site computing and data transport plan consistent with use of the SO LATR? With the use of the SO SATs?*

**Schedule: (all plenary)**

07:00 Welcome, introductions, goals, charge Suzanne & John

07:15 Measurement Goals and Science Requirements

08:00 LAT/LATR/DAQ

08:45 Break

09:00 Site

09:45 Data Management

10:30 Next Steps

11:00 Adjourn

**Participants**:

 CMB-S4

John Carlstrom – Measurement/Science p.o.c.

John Corlett – interim Project Director

Gil Gilchriese – interim Deputy Project Director

Laura Newburgh – DAQ co-lead

Julian Borrill – DM co-lead

John Ruhl – Measurement/Science

Mike Niemack – LAT co-lead (also SO co-lead)

Nick Emerson - LAT

Kam Arnold – Chile Site co-lead (also SO co-lead)

Mauricio Pilleux – Chile Site

Brad Benson – LATR co-lead

Kevin Huffenberger –  Collaboration Science Council Chair

Joel Meyers –  Collaboration Science Council Chair

Matthaeus Leitner – Project Manager

Jeff Zivick – Project Manager

Bobby Besuner – Project Engineer

Brenna Flaugher – Technical Integration Scientist

SO (only Planning Committee members have been contacted)

Simone Aiola (SO DM L2)

Kam Arnold (SO Site L2)

Andrew Bazarko (SO and ASO PM)

Erminia Calabrese (SO Theory and Analysis Committee Chair)

Susan Clark (ASO Project Scientist)

Mark Devlin (SO LATR L2 and ASO PI / Director)

Jo Dunkley (ASO Deputy Director and ASO L2 lead for DM)

Colin Hill (ASO Project Scientist)

Brian Keating (SO Project Office Director and SO SATP L2)

Adrian Lee (SO SAT L2)

Michele Limon (SO LAT L2)

Jeff McMahon (SO Integration L2 and ASO Instrument Scientist)

Mike Niemack (LAT expert)

Laura Newburgh (SO DAQ L3)

Gary Sanders (SO and ASO EPM)

Suzanne Staggs (SO Spokesperson, SO Detectors L2, ASO OT L2)

**Website and Zoom information:**

Indico webpage link: [https://indico.cmb-s4.org/event/31/](https://www.google.com/url?q=https://indico.cmb-s4.org/event/31/&sa=D&source=calendar&ust=1646054241037587&usg=AOvVaw11voS8QYc7yEnMt-PxvlzO)

Indico registration link: [https://indico.cmb-s4.org/register](https://www.google.com/url?q=https://indico.cmb-s4.org/register&sa=D&source=calendar&ust=1646054241037587&usg=AOvVaw1wd0OCl1ctqObZd4cNMFA0)

Workshop Zoom Connection: [https://lbnl.zoom.us/j/96875310096?pwd=WUNqdnUweTZ4ajR4SDIxeE1hdkxvUT09](https://www.google.com/url?q=https://lbnl.zoom.us/j/96875310096?pwd%3DWUNqdnUweTZ4ajR4SDIxeE1hdkxvUT09&sa=D&source=calendar&ust=1646054241037587&usg=AOvVaw2NobMk47UVKsqd85gtEtZt)