

CMB-S4 Science Collaboration Bylaws

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1 Preamble

The purpose of the CMB-S4 Science Collaboration (hereafter the Collaboration) is to conduct a science program centered on the future Stage-4 ground-based cosmic microwave background (CMB) experiment, CMB-S4. The Collaboration activities include advocating for, and advancing the design of, CMB-S4. The Collaboration is expected to play a major role in the establishment of the CMB-S4 Construction Project (hereafter the Project) and in its operations, and the Collaboration is expected to lead the scientific analysis. CMB-S4 will deliver a highly constraining data set with which any model for the origin of the primordial fluctuations—be it inflation or an alternative theory—and their evolution to the structure seen in the Universe today must be consistent. This document outlines the Collaboration governance and organization of scientific activities.

1.1 Collaboration Governance Objectives

The structure of the Collaboration was designed to adhere to the following principles:

- The Collaboration organization will be based on models used in other successful large DOE- and NSF-supported experiments.
- The Collaboration will strive to maximize the scientific return of the experiment, producing high-quality science in a timely manner and promoting full utilization of the data through public data releases after a suitable proprietary period.
- The organizational structure of the Collaboration will enable broad representation of its Members, and encourage consensus in decision making.
- All Members of the Collaboration will be expected to contribute to the success of the Collaboration and the Project through work on one or more areas of necessary infrastructure. The organizational structure should incentivize Collaboration Members to contribute to the advancement of CMB-S4 including work on hardware, software, testing, commissioning, operations, common science infrastructure, documentation, publications, management tasks and serving in leadership roles.
- Towards this end, the Collaboration should provide appropriate credit to data analysts and builders of hardware and/or software; provide leadership opportunities and other opportunities to promote career advancement; motivate people to work

together towards common goals; and provide a healthy collaboration culture that establishes standards for behavior consistent with high ethical standards.

1.2 Definitions

The CMB-S4 Construction Project (the Project) is distinct from the CMB-S4 Science Collaboration (the Collaboration). The Project will be responsible for final design and construction of CMB-S4, which by necessity will have strong oversight and report directly to the associated funding agencies and other sources of funding. The Collaboration and Project must work closely together; many Collaboration Members are expected to have important roles within the Project. The Project ends when construction is completed and operations begin. Operations may be the responsibility of the Collaboration, or may be conducted by a distinct entity working closely with the Collaboration. These Bylaws pertain only to the Science Collaboration and do not specify the structure of, or relationship to, the Project or Operations.

Throughout this document, a “supermajority vote” is defined as a result with more than two-thirds of the votes received in favor of the motion. **“Supermajority votes” require approval by two-thirds of the entire voting body.** A “majority vote” requires that more than half the votes received are in favor of the motion. A “quorum” for a meeting is defined as the presence of a majority of a body’s members. For collaboration-wide votes, a “Voting Member” is defined as a Senior Member or a Postdoctoral Member (see §8.2). “Ex officio” Members of a governance body are those whose membership is owing to their roles elsewhere in the Collaboration. For example, the Science Council Chairs (§7.1) are ex officio Members of the Executive Team (§5). In these bylaws, “Working Groups” are open to all Collaboration Members, and “Councils” have multiple Working Groups reporting to them, while “Committees” do not.

2 Overall Structure

The governance structure of the CMB-S4 Collaboration is illustrated in Figure 1. The Governing Board (GB) provides oversight to an Executive Team (ET) led by two equal co-Spokespersons. A number of Councils, Committees and Working Groups carry out necessary work to enable the overall science objectives of the Collaboration. The overall scope, selection of, and interplay among these governance entities is described in the

remainder of this document.

CMB-S4 Collaboration Organization Chart

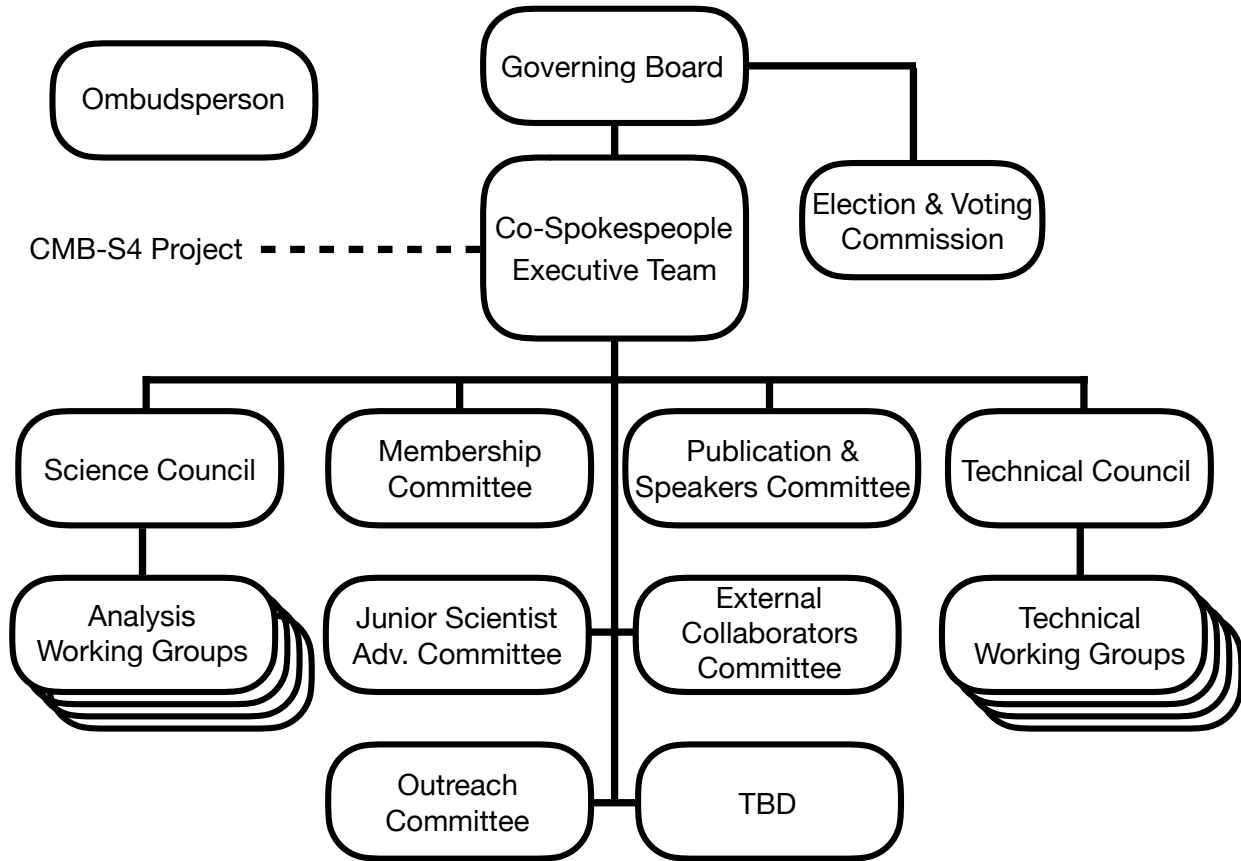


Figure 1: CMB-S4 Collaboration Organizational Chart

3 Governing Board

The Governing Board (GB), a body whose composition is designed to be representative of the membership of the Collaboration as a whole, is the policy forming body of the

Collaboration. Its other key role is oversight of the Spokespersons and the Executive Team.

3.1 Scope

Any powers not explicitly assigned to a different governing body in these Bylaws reside in the Governing Board. Governing Board responsibilities include, but are not limited to:

- Oversight of the overall progress, status and functioning of the Collaboration.
- Oversight of the Spokespersons and their activities. The GB charges the Spokespersons to prepare a yearly plan for the Collaboration. The plan must be ratified by a supermajority vote of the GB. The GB charges the Spokespersons to carry out specific duties for the Collaboration, including, but not limited to, Collaboration reviews, and reviews of the Councils and Committees operating under the auspices of the Spokespersons and the Executive Team. The GB may require a detailed verbal, or written report from the Spokespersons on any action. The GB may remove a Spokesperson by a supermajority vote if their performance is insufficient.
- Approval and revision of Collaboration Bylaws, including the Membership and Publication and Speakers policies. Amendment of the Bylaws requires a supermajority of the GB. Major changes (see §3.7) must be ratified by the Voting Members of the Collaboration.
- Formal acceptance of new Collaboration Members, and resolution of membership conflicts/issues, such as the removal of Members from the Collaboration. The change in status of a Member (including acceptance or removal) requires approval by a supermajority of the GB.
- Organization of elections for Spokespersons, GB Members, and other elected Collaboration officials (see §6).
- Removal of any Collaboration Member from an elected or appointed leadership role in the event of major failings of professional conduct, or gross insufficiency of performance. Removal requires a supermajority vote of the GB. Leadership roles include, but are not limited to, the Spokespersons, GB Members, ET Members, and Council and Committee Members and Chairs.

- Approval of additional long-standing sub-committees. This may include promotion of short term sub-committees established by the Spokespersons to long-term status.

3.2 Board Representation

The GB is composed of 19 Members, 18 drawn from the Senior Members of the Collaboration and one drawn from the Postdoctoral Members (see §8.1). The Spokespersons and other Members of the Executive Team may not serve on the GB. The length of a term of service for a Governing Board Member is two years for Senior Members and one year for the Postdoctoral Member; Members are allowed to serve at most two terms consecutively. To ensure that the board is truly representative of the Collaboration, prior to each GB election, the GB and the Spokespersons (or the ICCC for the first election) will particularly encourage suitable candidates from a broad range of backgrounds to self-nominate for GB membership. Further details on the election of GB Members is provided in §6.3.

3.3 Governing Board Chair, Vice Chair and Secretary

The GB Chair is responsible for scheduling GB meetings, coordinating requests for reporting from the Spokespersons, distributing the agendas, and chairing the meetings. The GB Chair only votes on matters before the GB if their vote is needed to break a stalemate. The GB Vice Chair will preside if the Chair is absent. A GB secretary will be delegated to take and distribute the minutes to the GB, and provide summaries of the meetings to the Collaboration.

Every year, starting with the inception of the GB, the Chair and Vice Chair of the GB are elected from the GB membership to serve one-year terms. The secretary of the GB is chosen informally by the GB Chair to serve during their term.

3.4 Governing Board Meetings

The first Governing Board will establish rules for its meetings after electing its Chair. This first meeting will be held no later than two months after the selection of the board. Agendas for scheduled meetings will be available to the full Collaboration in advance. It is expected that the board will meet no less than quarterly to ensure adequate attention to its duties. **Such meetings will occur approximately twice per year in closed session at every Collaboration meeting and additional meetings will be held by telephone or video**

conference. Special meetings can be called on the initiative of the GB chair or at the request of another GB Member. The Spokespersons are typically asked to attend GB meetings, with the exception of any Closed Executive Sessions during the meetings. The GB Chair can invite other observers at their discretion. Each meeting requires a quorum to conduct official GB business. Two-thirds of the GB Members must cast votes directly or through proxies (including abstentions) for a vote to be valid. GB votes can be held by email or other online method. Summaries of the GB meetings are distributed to the full Collaboration by the GB Chair or GB secretary. These summaries must include meeting attendance and the results of any votes taken. It is the expectation that GB Members participate in the majority of meetings. If a GB Member fails to participate in $\geq 50\%$ of GB meetings in a year, their seat will be open to election during the following cycle and they will be barred from the board for a two-year term.

3.5 Election and Voting Commission

The GB appoints the Chair and two additional Members of the Election and Voting Commission (EVC). The EVC is charged with conducting elections as spelled out in §6. The EVC acts independently of the GB, but any points of substantive disagreement amongst the Members should be referred back to the GB. Commission Members serve two-year terms ordinarily. However, the GB may choose to extend the first term of the Chair to three years, to allow staggering of the membership for improved continuity between commissions. Commission Members may be removed with a supermajority vote of the GB.

3.6 Removal of Members from Leadership Roles

The GB must inform the Collaboration of its decision to remove a Member from a leadership role within one working week after the vote to remove. In the event of a removal of someone from an elected or appointed position, the GB may make an off cycle appointment or hold a special election to fill the open position quickly, or wait until the next election cycle.

3.7 Amendments to the Bylaws

The GB may make minor amendments to the Bylaws as needed. The GB must include a tracking cover page with the Bylaws that notes the document version history, including

dates of amendments with short synopses of which sections were impacted. The currently ratified version of the Bylaws must be available on a public website. Each revised version must be made available to the Collaboration for review and comment for at least one month before the GB can move to ratify the amended Bylaws. Ratification requires a supermajority of the GB.

Major amendments to the Bylaws, including amendments pertaining to the election and scope of the GB itself, must be ratified by the Collaboration. The proposed amendments must be approved by a supermajority vote of the GB, and made available to the Collaboration for review and comment for at least one month. After the review period, the Voting Members of the Collaboration can ratify the amended Bylaws with a majority vote.

4 Co-Spokespersons

4.1 Scope

The leadership of the Collaboration resides with two equal co-Spokespersons. Each Spokeperson participates actively in the management of all aspects of the Collaboration and, as the executive officials of the Collaboration, both are responsible for its day-to-day management. To carry out their duties, the Spokepersons are expected to solicit advice from the Executive Team, the GB and the Collaboration at large.

The Spokespersons may appoint up to two Members of the Executive Team. This appointment flexibility will enable the Spokepersons to obtain expert advice on an as-needed, short-term basis for matters including (but not limited to) technical and managerial topics. Such appointees require approval by the GB, and may be removed from the Executive Team at the Spokespersons' discretion. Appointments are limited to two years, but may be renewed with approval of the GB.

Spokesperson responsibilities include, but are not limited to the following:

- Submitting a yearly plan for the Collaboration to the GB for approval.
- Serving as the primary interface of the Collaboration with the Project (once established), partnering institutions, the government agencies, private and public funding institutions, scientific organizations, and the media. Reports on such activities will be provided on a semi-annual basis or by request to the GB.
- Assuring public dissemination of scientific results.

- Creation of short-term ad hoc committees for the purpose of such tasks as creation of review materials, white papers, exploration of new partnerships, etc.
- Organizing and running Collaboration meetings.
- Assuring the Collaboration public and private websites are maintained, including the posting of all governance roles and responsibilities, and Collaboration documents.
- Carrying out other duties as charged to them by the GB.

Spokespersons are elected to two-year terms. The election process is detailed below in §6. To facilitate interactions of the Collaboration with the agencies and national laboratories, term limits will not be required prior to the establishment of the Project. Two term limits are expected to be imposed by the GB amendment of the Bylaws after the CMB-S4 Construction Project is firmly established with the Project leadership team in place.

5 Executive Team

5.1 Scope

The Executive Team (ET) is an elected and appointed board led by the Spokespersons. It consists of up to 10 Members: the Spokespersons, the two elected co-Chairs of the Science Council, the two co-Chairs of the Technical Council, the Chair of the Membership Committee, the Chair of the Publication and Speakers Committee, and up to two Members appointed by the Spokespersons. The ET is the agile decision-making body in the Collaboration with the ability to address the day-to-day collaboration issues. The structure of the ET is to facilitate the flow of information to the Spokepersons from the Collaboration and vice versa, as well as to provide a sounding board for the Spokepersons.

The Executive Team has three main roles:

- to provide leadership on scientific, membership, financial, and organizational decisions and issues. The decisions will ultimately be made by the Spokepersons, but will be discussed and reasoned through the Executive Team. In the event that the Spokepersons do not agree on a particular topic, the ET will hold a vote requiring only a majority.

- to ensure spokespersons decisions are made in the best interests of the Collaboration. Any two ET Members may call for a vote on any topic, and if $\geq 50\%$ of the ET is in disagreement with proposed activities of the spokespersons, the issue is referred to the Governing Board for further discussion.
- to aid the Spokepersons in being the Collaboration liaison to the Project, both in the pre-Project development phase and after it is officially established.

5.2 Executive Team Meetings

The Spokespersons will chair the meetings, provide the agendas, and establish rules for these meetings. The first meeting will be held no later than two weeks after the election of the Spokespersons and the Council and Committee Chairs. It is expected that the board will meet no less than twice a month to ensure adequate attention to its duties. Meetings can be called on the initiative of a Spokesperson or at the request of an ET Member provided that a Spokesperson agrees. Minutes that summarize the ET meetings will be distributed to the Collaboration. Each meeting requires a quorum to conduct official ET business. It is the expectation that ET Members participate in the majority of meetings; ET Members who fail to participate in a majority of meetings over a one year period will be replaced in the nearest election cycle and barred from the ET for a two year term.

6 Elections

All elected positions of the major bodies in the CMB S4 Collaboration serve two-year terms (with the exception of the Postdoctoral Member on the GB, who serves a one-year term). Most positions have term limits. Elections for leadership roles are arranged so that $\sim 50\%$ of the members in each body will be up for election each year. As described in Appendix A, roughly half the initial terms will be for three years to allow for staggered terms to improve continuity. Figure 2 displays the staggered terms schematically. New appointments take office on July 1 in the year of their election.

As there are restrictions on the overlap of elected officials between various governing bodies, elections are timed to provide Collaboration Members multiple opportunities to participate in Collaboration governance. In a given election year the ordering proceeds as follows: elections are held first for the co-Spokespersons. Next, elections are held for the Science Council co-Chairs, Membership Committee Chair and the Publication

and Speakers Committee Chair, as needed. A third election is held for the Governing Board Members. Elections for positions outside the top levels of major bodies occur when required as such officials are not prohibited from serving other elected roles.

Each candidate provides a Candidate Statement to the EVC, which makes them available to the Collaboration via the CMB-S4 internal web page prior to the balloting. Votes are cast anonymously online by Voting Members, with the elections managed by the EVC, and timed to permit adequate time to evaluate the slates of nominees for each election and still assure the new appointments are able to take office on July 1. The EVC, in consultation with the GB, determines the detailed timing of the balloting and determines procedures for dealing with any election situations not anticipated in the Bylaws.

The procedures for conducting the initial elections of the Collaboration are given in Appendix A.

CMB S4 Election and Appointment Cycles

2018	2019	2020	2021	2022	2023	2023	2024
Election		Election		Election		Election	
Election			Election		Election		Election
Appointment		Appointment		Appointment		Appointment	
Appointment			Appointment		Appointment		Appointment

Figure 2: CMB-S4 Election and appointment cycles. For the first election, $\sim 50\%$ of the terms are for three years rather than the nominal two, to enable staggered elections/appointments going forward.

6.1 Elections of a Co-Spokesperson

Co-Spokespersons are elected to two-year terms. All Senior Members (see §8.1) may run for these positions. If a Voting Member of the GB is elected as a co-Spokesperson, they must resign their GB seat prior to the start of the co-Spokesperson term and this vacancy will be filled in the next GB election.

Prior to the election, Voting Members are asked to nominate individuals for Spokesperson to the Election and Voting Commission. Each voter may nominate one candidate

and self-nominations are accepted. After a nomination period, the EVC will consult with the nominees to ascertain their willingness to stand for the election. Each Voting Member votes for a single candidate for each open Spokesperson position. In the event of a tie, a runoff election will be held between the two candidates that have the same number of votes.

If no candidate agrees to stand for election, the terminating co-Spokesperson will continue to serve for six months, after which a special election will be held. The term of the individual elected in a special election will be reduced by the amount needed to cause the sum of their term and the additional months served by the terminating Spokeperson to equal two years.

6.2 Council and Committee Chairs

The co-Chairs of the Science Council, and the Chairs of the Membership Committee and the Publication and Speakers Committee are elected to two-year terms. All Senior Members (see §8.1) may run for these positions. If a Voting Member of the GB is elected to one of these positions, they must resign their GB seat prior to taking office as Chair, and this vacancy will be filled in the next GB election.

Prior to the election, Voting Members are asked to nominate individuals for the Chair positions to the EVC. Self-nominations are accepted. After a nomination period, the EVC will consult with the nominees to ascertain their willingness to stand for the election. Candidates are only allowed to stand for one open position. Each Voting Member votes for a single candidate for each open Chair position. In the event of a tie, a runoff election will be held between the two candidates that have the same number of votes.

If no candidate agrees to stand for election, the terminating Chair will continue to serve for six months, after which a special election will be held. The term of the individual elected in a special election will be reduced by the amount needed to cause the sum of their term and the additional months served by the terminating Chair to equal two years.

6.3 Governing Board Elections

The 18 GB Members drawn Senior Members of the Collaboration are elected to two-year terms. All Senior Members may run for these positions. The one GB Member drawn from the Postdoctoral Members of the Collaboration is elected for a one-year term.

The election for the Senior Members on the GB proceeds as follows. Prior to the election, Voting Members are asked to nominate individuals for the GB to the EVC. Self-nominations are accepted. After a nomination period, the EVC will consult with the nominees to ascertain their willingness to stand for the election. Each Voting Member votes for a single candidate for each vacant GB position.

The election for the Postdoctoral Member of the GB follows the same procedure, with the exception that only **Postdoctoral Members are eligible to both nominate and vote for candidates for this position.**

After the initial GB is established, it is to amend these bylaws to establish whether to have separate votes different categories of representation on the GB or to continue with a mixed election/appointed governing board model as described in Appendix A. It is the expectation that the GB be evolve to a fully elected body as the Collaboration matures.

6.4 All Other Elected Positions

For other elected Collaboration roles, the EVC is charged with establishing election rules and conducting these elections. Note that the EVC cannot make voting requirements more restrictive than those for the main body elections. Terms of elected positions are limited to durations of at most two years.

7 Councils and Committees

Four of the organizational structures overseen by the Spokespersons have representatives on the Executive Team as described in §5. These are the Science Council, the Technical Council, the Membership Committee and the Publications and Speakers Committee. Their composition and charges are described in this section. Three other standing committees for the Collaboration have been defined at this time and are described below.

7.1 Science Council and Analysis Working Groups

The Science Council works closely with the Spokespersons to coordinate the key scientific objectives of the Collaboration. The Science Council is led by two co-Chairs elected by the Voting Members of the Collaboration, who also serve as Members of the Executive Team. **The Science Council chairs serve with two-year terms and are**

limited to two consecutive terms with one year off required before standing again. The remaining Members of the Science Council are the co-coordinators of the various Analysis Working Groups. These Working Groups are open to all Collaboration Members, and will be formally established by the Spokespersons.

The Science Council approves the projects that lead to publications and is responsible for maintaining a list of Key Science topics (§9.3). It is charged to work closely with the Co-Spokespersons and the Executive Team to ensure that the key science goals of the Collaboration are achieved.

Each Analysis Working Group will have two co-coordinators who serve for two-year terms with the exception of one initial coordinator who will serve for a three-year term to enable staggered appointments in the future. The Science Council Chairs will solicit self-nominations for these co-coordinator positions. The Spokespersons will appoint coordinators with the advice of the Science Council Chairs, and will consider the distribution of early and late career Members when making these appointments. Coordinators will ordinarily not serve back-to-back terms.

7.2 Technical Council and Technical Working Group

The Technical Council works closely with the Spokespersons to coordinate the technical aspects needed to meet the scientific objectives of the Collaboration. The Technical Council is led by two co-Chairs appointed by the Spokespersons. The two Chairs serve as Members of the Executive Team. The co-coordinators of the various Technical Working Groups are all Members of the TC. These Working Groups are open to all Collaboration Members, and will be formally established by the Spokespersons.

Each Technical Working Group will have two co-coordinators who serve for two-year terms with the exception of one initial coordinator who will serve for a three-year term to enable staggered appointments in the future, as needed. The Technical Council Chairs will solicit self-nominations for these co-coordinator positions. The Co-spokespersons will appoint coordinators with the advice of the Technical Council Chairs, and will consider the distribution of early and late career Members when making these appointments.

We anticipate the role of and/or the need for the Technical Council will be readdressed in these Bylaws when a Project is formed.

7.3 Membership Committee

The Membership Committee (MC) consists of seven people including a Chair. The Chair is elected following the election cycle of the Collaboration with two-year terms, and is limited to two consecutive terms with one year off required before standing again. **The six remaining members are appointed by the ET following approval of the slate of proposed members by the Governing Board. These members have the same term limits as the elected chair.** If a MC Member leaves before their term is complete, the ET will appoint—**with Governing Board approval**— a replacement to finish out their term. MC Members can be removed by a supermajority of the GB at any time.

The appointed Members of the MC should represent the overall Collaboration, and there should be at least two Members from the Technical Working Groups and two Members from the Analysis Working Groups on the MC. This balance may be amended as the scientific needs of the Collaboration evolve.

The duties of the MC are to review and evaluate membership applications, review annual activity reports, and recommend changes in membership status. The MC maintains an up-to-date list of all Members, available on a public website. The MC in consultation with the ET will work with applicants and continuing Members to identify roles and infrastructure tasks that add value, avoid redundancy, and make the Collaboration as efficient as possible.

7.4 Publication and Speakers Committee

The Publication and Speakers Committee (PSC) consists of thirteen people including a Chair. The Chair is elected following the election cycle of the Collaboration with two-year terms, and is limited to two consecutive terms with one year off required before standing again. There are two sub-committees which together comprise the PSC: the Publications Board with eight Collaboration Members and the Speakers Bureau with four Collaboration Members. **The Chair of the PSC chairs both of the subcommittees. The twelve non-elected committee members are appointed by the ET following approval of the slate of proposed members by the Governing Board.** The twelve appointed members serve with the same term limits as the elected Chair. Roughly half of each group should be pre-tenure. If a PSC Member leaves before their term is complete, the ET will appoint—**with Governing Board Approval**—a replacement to finish out their term. PSC members can be removed by a supermajority of the GB at any time.

7.5 Junior Scientist Advancement Committee

The role of the Junior Scientist Advancement Committee (JSAC) is to ensure that junior members (defined as students and postdoctoral researchers) within the Collaboration are represented, assisted, and supported throughout the tenure of the Collaboration. This will include arranging mentors for junior members who desire mentorship, and facilitating junior member career advancement through relevant workshops and other activities. The JSAC Chair and deputy Chair are appointed by the ET after the elections and serve 2 year terms that parallel the Collaboration's elections. Membership on the JSAC is open to volunteers from the Collaboration, with the approval of the JSAC Chair.

7.6 External Collaborators Committee

The role of the External Collaborators Committee (ECC) is to provide the necessary link to external follow-up observations or survey data that required to maximize the science return from CMB-S4. The ECC Chair and deputy Chair are appointed by the ET after the elections and serve terms that parallel those of the elected Collaboration positions. The Chair will appoint additional members as required to ensure adequate knowledge of the collaborations being pursued resides in the ECC. Self nominations for consideration of ECC are expected.

The committee will draft all the necessary documents for external collaboration agreements and memorandums of understanding (MOUs). These will be presented to the Spokespersons and the ET who have the ability to amend and alter these agreements and MOUs as they choose. Such agreements are then brought forward by the Spokespersons to the GB for final approval.

7.7 Education and Outreach Committee

The Education and Public Outreach (EPO) Committee is responsible for initiating, overseeing, and recording the Collaboration's efforts in the areas of public outreach and education. Its mission is to disseminate Collaboration results to the public and increase general scientific literacy. The committee is overseen by the Executive Team and members are appointed by the ET after solicitation of nominations from the full Collaboration. The Chair is appointed by the Spokespersons. Terms on the EPO Committee are for two years, with some initial three-year terms to allow staggered appointments. A presentation of EPO efforts and written documentation of activities must be provided to

the ET at each Collaboration meeting or when requested by the ET.

8 Membership Policy

The Collaboration consists of Ph.D. scientists, engineers, Ph.D. thesis students and others who contribute significantly to the CMB-S4 program. Membership conveys certain rights as described below, but comes with the obligation of an ongoing commitment of a substantial fraction of members' research time to the CMB-S4 program.

8.1 Membership Types

Five types of members are defined here.

- **Senior Member:** A Senior Member of the Collaboration is a member who has a permanent appointment or an appointment, that under normal circumstances can be expected to be renewed indefinitely. This includes tenure-track appointments at universities and their equivalents elsewhere.
- **Postdoctoral Member:** A postdoc working with a Senior Member at their institution can be designated as a Postdoctoral Member by that Senior Member. Postdocs that reside at an institution where there is no Senior Member can apply to become a Postdoctoral Member and have their application evaluated by the Membership Committee on a case-by-case basis.
- **Student Member:** A graduate student working with a Senior Member at their institution can be designated as a Student Member by that Senior Member. We do not anticipate granting membership to students who are not supervised by a Senior Member.
- **Provisional Member:** A provisional member is someone who has not yet been approved for regular (Senior, Postdoctoral or Student) member status. This status applies to all new Student and Postdoctoral members (including, for example, those in an existing Senior Member's group) as well as potential Senior Members and potential independent Postdoctoral Members. This is intended to be a temporary status, typically a year, allowing the member to demonstrate sufficient constructive engagement with the Collaboration.

- **Legacy Member:** A Legacy Member is a former member who contributed in a key manner to the Project or analysis infrastructure, but is no longer engaged with the Collaboration and is therefore no longer a member. This status is intended to convey authorship rights to such former members, and to bypass the normal membership procedures should they wish to re-engage with the Collaboration.

8.2 Membership Rights

Herein, “Members” refers to Senior, Postdoctoral, Student and Provisional Members (but not Legacy Members) unless otherwise qualified.

- Senior and Postdoctoral Members are Voting Members. Voting Members have the right to vote to ratify Bylaws and amendments to Bylaws, and vote in elections for Spokespersons, Governance Board representatives, and the elected positions including the Chairs of the Science Council, and the Membership and Publication and Speakers Committees.
- Members have full data access, including during the proprietary period for data that are eventually released.
- Members (including Legacy Members) have the right to be listed as a co-author on CMB-S4 publications as specified in the Publication Policy.
- Members have access to computational resources designated for CMB-S4, according to the policies of the relevant Computational Resources Working Group.

8.3 Membership Requirements

Members must commit effort to approved infrastructure tasks. The Membership Committee will work with the Executive Team to define and recommend infrastructure tasks that need filling, **and to define and communicate with members the level of expected effort**. Tasks can include, for example, designing, building, and testing software, hardware, or simulations; contributing to commissioning and observations; and management tasks. Just as for the hardware, we anticipate having a collaboration-wide architecture for the software. Thus, members will be expected to comply with interface, documentation and code review requirements in support of the goals of the Collaboration. Other ways of contributing include taking on roles in the governance, including membership on the GB, EVC, ET, or the Councils and Committees described in §7.

8.4 Membership Application and Approval Process

After the Collaboration is formed with a first set of initial members (see §8.5), the process for membership to CMB-S4 will be as specified below.

- Potential Senior Members will apply for Provisional Membership via a written application where they specify their proposed work on CMB-S4.
- Independent postdocs not co-located with a Senior Member can apply for Postdoctoral Membership and have their application reviewed on a case-by-case basis.
- Postdoctoral members can apply for “Intended Senior Membership Status”, which would convey that the postdoc will have Senior Membership status when preparing to move to a specified permanent appointment or an appointment that, under normal circumstances, can be expected to be renewed indefinitely. The Membership Committee will decide the requirements for achieving this status, the achievement of which grants Senior Membership at the new institution.
- Applications are reviewed by the Membership Committee. The Membership Committee recommends membership to the Governing Board. The Governing Board approves membership.

8.5 Initial Membership

The Collaboration will initially consist of members that were eligible to vote on these governance bylaws (by virtue of attendance at two or more Collaboration meetings, or a successful petition for eligibility), and cast a vote on them.

Within the first year of the Collaboration’s establishment, prospective members can be granted membership by successfully petitioning the Membership Committee despite not satisfying the above criteria. The Membership Committee may approve such applications during the first year without action by the Governing Board.

The Collaboration will initially consist of members that were eligible to vote on these governance bylaws (by virtue of attendance at two or more Collaboration meetings, or a successful petition for eligibility), and cast a vote on them.

8.6 Membership Review and Changes in Status

The membership status of each member will be reviewed by the Membership Committee each year.

- Each Senior Member, and each independent postdoc not co-located with a Senior Member, will submit an annual activity report to the Membership Committee. Reports of the Senior Members should include discussion of the activities of their supervisees (e.g., postdocs and students) in their report. The Membership Committee will review those reports, consulting with Collaboration members and Working Group leaders as appropriate.
- Provisional Members will submit a annual activity report to the Membership Committee, which will review the report and determine whether the Provisional Member should be promoted to a Senior Member status, continue as a Provisional Member, or have their membership revoked. Provisional Membership is intended to be a temporary status.
- Members leaving the Collaboration may be granted Legacy Membership upon review by the Membership Committee and approval by the GB.
- If the effort of any member over the previous year seems lacking, the Membership Committee will bring this to the attention of the Spokepersons and the GB. This can also be done at any time, should the Membership Committee deem the actions of a member to have been egregious and detrimental to CMB-S4.
- The Governing Board has the authority to grant or terminate all forms of membership.
- When a person's membership in the Collaboration ends, they will no longer have access to the CMB-S4 document and database repository, internal forums, computing resources and data. Authorship rights will continue, or not, as prescribed in the Publication Policy bylaws.

9 Publication and Speakers Policy

9.1 Principles

This policy seeks to ensure an equitable distribution of credit for work in the CMB-S4 Collaboration, to encourage and incentivize active work by Collaboration members, and to ensure the resulting publications are of high quality. The authorship policy of the American Physical Society (2002) states: “*Authorship should be limited to those who have made a significant contribution to the concept, design, execution or interpretation of the research study. All those who have made significant contributions should be offered the opportunity to be listed as authors.*”¹

The Publication Policy will apply to all projects and publications that employ Collaboration resources, including unreleased data, simulation codes and products, hardware and software engineering designs, and analysis pipelines. All Collaboration members agree to the publication policy upon joining, and to be bound by it for two years after leaving the Collaboration.

The Publication and Speakers Committee will continue to refine the policy, and present a revision one year after the establishment of the collaboration for ratification by the voting members.

9.2 Organization

The execution of the policy shall be overseen by the Publication and Speakers Committee and its sub-committees (§7.4). The Science Council approves all projects that lead to publications. The Science Council in addition establishes the slate of projects that advance the Collaboration’s key science goals and it solicits the Working Groups for detailed proposals for carrying out these projects. This is done in consultation with the ET and in accordance with the Spokepersons’ yearly plan. The Spokespersons will help to navigate and resolve potential conflicts. The Membership Committee will keep track of active Collaboration members and Legacy Members for the purposes of establishing author lists for papers.

¹https://www.aps.org/policy/statements/02_2.cfm

9.3 Project Proposal Process

Any Collaboration member may propose a Collaboration research project to an appropriate Analysis Working Group or Technical Working Group. Such a project is work that is intended to result in a journal publication after a fixed term, or a small set of related publications. There are three categories for projects:

1. Projects that are designated as “Key Projects” represent the main science goals of the Collaboration (or forecasts for what we will achieve), where the Collaboration must speak with a single voice.
2. “Non-key” analysis projects represent other science goals and use Collaboration science data.
3. Other forecasts and technical reports are Collaboration-vetted projects that do not require Collaboration science data and may lead to a publication or conference proceeding.

The Science Council will maintain the list of Key Science topics, to be established prior to any projects being initiated. Topics can be added to the Key Science paper list and reviewed in coordination with the Publication Board.

The Publication Board will establish the template for project submission. The project proposal document will designate a project leader and team, and describe the project, its estimated completion date, and final products. Projects led by thesis students will be given special consideration to protect them from competition within the Collaboration. Projects that require joint work with an external collaboration will require a memorandum of understanding set up by the External Collaborators Committee that specifies authorship and publication policies for that work. These should be as compatible as possible with the respective Collaboration policies. Provisional Members and individual external collaborators may be suggested as team members. The External Collaborators Committee must be consulted in the latter case, to determine if MOUs are required.

Work on Collaboration data should apply toward a Collaboration project: failure to submit a project at its initiation, or writing a paper on internal Collaboration data for submission when the data become public, will be considered a violation of the policy. The same general type of analysis on subsequent observing seasons or data releases will be considered separate projects.

After discussion, resolution of conflicts, and consensus within the Working Group, the Working Group coordinators will submit the project to the Science Council with a

project category recommendation as a Key Project, non-key project, or theory forecast / technical report. At this time the Working Group coordinators will announce the proposal to the Collaboration for a two-week consideration period, for discussion and further resolution of conflicts. Addressing overlap among projects may require revision of the proposed project, and will be negotiated by the Working Group coordinators, publication-project leaders, and Spokespersons. Any Collaboration Members that wish to make defined and useful contributions to the project are welcome to join the team. Disputes will be settled by the Working Group coordinators and Spokespersons as needed.

The Science Council may then approve the project or send it back to the Working Group for further revision. In the event of a tie vote in the Science Council, the project is sent back. When approved, the Publication Board will record the proposal in its project database, including its project category. If there is any substantial change in the scope of a project as it matures, the Project Leader should adjust the project description accordingly, which will result in a new announcement and opportunity for Collaboration review. After the definition of a project, its category can be reclassified only by unanimous written agreement of the project team and a supermajority vote of the Publication Board, or by a supermajority vote of the GB.

Project teams have the responsibility to carry projects to completion and publication. The Publication Board will query the Working Group coordinators twice yearly for progress reports on all projects, and forward the results to the Science Council. Any projects without progress for one year will be noted as “inactive” and will be dropped from the database if there is still no progress at the next review.

9.4 Authorship

For the purposes of authorship, “Active Members” consist of Senior, Postdoctoral, and Student Members of the Collaboration as defined in §8.1. Provisional Members and external collaborators may appear as authors on papers when they are part of the project team.

1. For Key Project papers, all Active Members of the Collaboration and all Legacy Members will automatically be placed on the author list. The author list will start with “The CMB-S4 Collaboration” and otherwise be alphabetical, unless the Publication Board agrees that the paper should be submitted to a journal which requires the first author to be an individual. In that case, the author list will be alphabetical. ~~The project team will designate a small number of corresponding~~

~~authors to signify those most involved with the work.~~ The Membership Board will provide the current list of eligible Active and Legacy Members to the Publication Board. ~~Anyone who chooses to opt out of authorship for a given Key Project paper must notify the Publication Board.~~ In an email notification, these members will be encouraged to join the author list by confirming their acceptance of authorship online.

2. For non-key project papers, the author list will be two-tiered. Project teams may organize the first author tier as appropriate for the paper, and although not required, conventionally the tenured members of the project team will appear in the second, alphabetical tier of authors. The second tier will consist of all active members and legacy members that choose to opt in online after an email notification. The final line of the author list will be “The CMB-S4 Collaboration.”
3. For other forecasts and technical reports, the author list will consist of the project team only, plus any Collaboration members that contributed to the study, as determined by the project team and appropriate Working Group coordinators, unless those authors opt out. The author list should be ordered according to the preference of the project team, followed by “for the CMB-S4 Collaboration.” For conference proceedings, the author list may be the single person who presented.

In rare cases, a Senior Member may recommend authorship for an undergraduate student, graduate student, engineer or technician who is not a Collaboration member. The Senior Member must petition the project team and the appropriate Working Group coordinators with a written description of the critical work done by the suggested author. Any disputes regarding authorship will be resolved by the Publication Board with the Spokespersons providing tie-breaking votes if necessary. If an eligible member is unable to opt in, due to an unforeseen circumstance, the Publication Board may add them to the author list.

9.5 Collaboration Review and Paper Submission Process

The project leader and the project team have the responsibility to draft the publication based on their research. All Collaboration papers will have a title following the template, “CMB-S4: *results of amazing research.*” These papers will be developed in coordination with the relevant Working Groups, and kept in a repository that is visible to the whole Collaboration. Any Collaboration member may comment on the project at any time.

When the paper matures to an advanced draft, the Working Group coordinators will request that the Publication Board form an internal review committee.

This internal review committee consists of a primary and a secondary reviewer who have the responsibility that the Collaboration's publications are of uniform and high quality. The reviewers are not current members of the Publication Board, but the Publication Board assigns one of its members to oversee the review of the paper as a rapporteur. At least one of the reviewers or rapporteur should be a senior scientist who can insulate junior participants (whether authors, reviewers, or rapporteurs) from unfair criticism, if it occurs.

The Publication Board will notify the full Collaboration that the internal review committee has formed. Collaboration members may comment on the draft at any time, but when the authors are ready, the Publication board will send an announcement of a formal three-week comment period. After the this comment period, the reviewers will provide a written report on the paper to the authors and Publication Board.

All public comments, from Collaboration members and from reviewers, are to be posted to a centralized location maintained by the Publication Board, along with the authors' responses. All Collaboration members have access to these previously asked questions and responses.

The Working Group coordinators and rapporteur oversee iterations on the draft. When the reviewers, Working Group coordinators, and rapporteur are satisfied that comments have been appropriately addressed, they present the paper to the Publication Board, who gives final permission and sets the date for paper submission. The submission date is announced to the Collaboration with a notice for final reading.

In total, all projects/papers will have four formal public announcements to the Collaboration: (1) when proposed, (2) when the review committee forms, (3) when the formal comment period begins, and (4) when the call goes out for final reading before submission. Projects will also naturally be discussed in plenary teleconference calls, progress reviews, and Working Group reports.

All CMB-S4 publications, including proceedings and theses, must include a standard acknowledgment, agreed to and updated by the Governing Board, and made available by the Publication Board. The CMB-S4 Collaboration will pay the page charges for Key Project papers. For all other papers, the page charges are the responsibility of the authors.

Any disputes regarding the review process will be resolved by the Publication Board with the Spokespersons providing tie-breaking votes if necessary. In the case of a time-sensitive discovery, the review period may be shortened by unanimous consent of the

Publication Board.

Graduate thesis and dissertation documents are exempted from Collaboration review, but related publications (e.g. developed from an individual chapter) are subject to review.

9.6 Talks and Public communications

The role of the Speakers Bureau is to help Collaboration members give more and better talks in support of the Collaboration. The duties of the Speakers Bureau are to:

- Solicit invitations to conferences and identify good venues for contributed talks.
- Actively solicit speakers for invitations or notable conferences with no volunteer speakers. Priority and consideration should be given to the teams from projects where alphabetical author lists may obscure their role.
- Promptly respond to requests for speakers from conference organizers and act as a point-of-contact for people who want some CMB-S4 speaker but do not have specific ideas.
- Curate a library of standard plots and slides for speakers to use in talks.
- Maintain a library of past CMB-S4 talks.
- Address overlap from multiple requests to give talks on the same subject at the same conference, ideally by suggesting focus changes to make them on different topics. Talk prioritization will be at the committee's best judgment, but should reflect contributions to the topic in question, career status, whether the speaker was invited, and other similar factors.

To give a talk, a Collaboration member must notify the Speakers Bureau. This ensures that the Speakers Bureau has a chance to address overlapping talk requests or locate another appropriate speaker in the case of declined invitations. The talks policy applies to all workshops, meetings, colloquia, public lectures, and seminars. The Speakers Bureau need not be informed of talks on other subjects that contain brief advertisements for CMB-S4 or of invited presentations that must remain confidential for programmatic reasons (e.g. certain agency reviews or presentations to private foundations or donors).

Collaboration members must send abstracts and titles to the Speakers Bureau at least three days prior to submission, or as soon as possible in the event of last-minute

invitations. Slides must be sent to the Collaboration at least one week before being presented and should include “for the CMB-S4 Collaboration” on the title slide.

All talks must maintain confidentiality for the project’s results. Any unpublished results shown in talks must be approved for public release by the Science Council before being shown. Such results should be marked “CMB-S4 PRELIMINARY” on slides until publication. Talks showing only pre-approved results do not require separate approval from the collaboration, but the Speakers Bureau should be informed about the talk.

The Speakers Bureau will maintain records of all presentations given in the name of the Collaboration, and serve as a clearinghouse for talk invitations forwarded from any member.

9.7 Violations of the Policy and Remedies

Violations of the policy will be addressed by the Publication Board, which will forward violations and recommend a remedy to the Executive Team. Minor infractions will receive a warning, while repeated or severe infractions may warrant suspension from project teams or Working Group activities, removal from such groups, or expulsion from the Collaboration as determined by the Governance Board.

10 Ombudspersons

This section is drawn from the LSST DESC Code of Conduct which is licensed under Creative Commons CC0 1.0 <https://creativecommons.org/publicdomain/zero/1.0/>

CMB-S4 has two Ombudspersons who are available to members of the Collaboration. The role of the Ombudspersons is to provide informal, confidential, nonjudgmental, impartial, and independent advice and arrange mediation for CMB-S4 members for the purposes of dispute resolution. Confidentiality is a privilege of the Ombudspersons and the only circumstances that there may be an exception to confidentiality is if the Ombudsperson is concerned by an imminent risk of serious harm, or if required by law in the applicable jurisdiction to anonymously report credible evidence of fraud, waste, or abuse concerning the use of government funds. As such, communications with an Ombudsperson do not constitute formal notice to the Collaboration or the individual’s institute. If the individual would like to start formal proceedings, the Ombudsperson can provide guidance on the CMB-S4 process and referrals for institutional processes. The CMB-S4

process for formal complaints is **to be outlined in a CMB-S4 Code of Conduct which will be determined following the formation of the Collaboration**. There are two CMB-S4 Ombudspersons to provide a choice of whom to speak with, and to ensure that there is at least one Ombudsperson available at Collaboration meetings. The Ombudspersons are available to CMB-S4 members who are experiencing conflicts or disputes as part of their CMB-S4 activities. The Ombudspersons will work together with the members who consult them to identify options for managing and resolving disputes and conflicts. This includes providing advice and support, referring individuals to appropriate resources, organizing informal mediation, and ensuring that the CMB-S4 Spokesperson is made aware of any systemic issues in the Collaboration. The Ombudspersons term of 2 years, with the option of renewal. Due consideration will be given to the diversity of the candidates when the Ombudspersons are selected. The Ombudspersons will be full members of CMB-S4, with a strong understanding of the organizational structure of the Collaboration. **They will not hold any other leadership positions within the Collaboration and will report only to the ET.** They must become members of the International Ombudsman Association and familiarize themselves with the extensive materials available on their website. <https://www.ombudsassociation.org>

CMB-S4 has chosen to adopt the role and function of the Ombudsperson as expressed by the International Ombudsman Association (with some additions and edits for gender neutrality):<https://www.ombudsassociation.org/Resources/Frequently-Asked-Questions/What-is-anOrganizational-Ombudsman>

10.1 Role

The primary duties of an organizational ombudsperson are (1) to work with individuals and groups in an organization to explore and assist them in determining options to help resolve conflicts, problematic issues or concerns, and (2) to bring systemic concerns to the attention of the organization for resolution. An organizational ombudsperson operates in a manner to preserve the confidentiality of those seeking services, maintains a neutral/impartial position with respect to the concerns raised, works at an informal level of the organizational system, and is independent of formal organizational structures. Successfully fulfilling that primary function in a manner consistent with the IOA Standards of Practice requires a number of activities on the part of the ombudsperson while precluding others.

Activities and functions most frequently undertaken by an ombudsperson include, but are not limited to:

- Listens and understands issues while remaining neutral with respect to the facts. The ombudsperson does not listen to judge or to decide who is right or wrong. The ombudsperson listens to understand the issue from the perspective of the individual. This is a critical step in developing options for resolution.
- Assists in reframing issues and developing and helping individuals evaluate options. This helps individuals identify the interests of various parties to the issues and helps focus efforts on potential options to meet those interests.
- Guides or coaches individuals to deal directly with other parties, including the use of formal resolution resources of the organization. An ombudsperson often seeks to help individuals improve their skill and their confidence in giving voice to their concerns directly.
- Refers individuals to appropriate resolution resources. An ombudsperson may refer individuals to one or more formal organizational resources that can potentially resolve the issue.
- Assists in surfacing issues to formal resolution channels. When an individual is unable or unwilling to surface a concern directly, the ombudsperson can assist by helping give voice to the concern and/or creating an awareness of the issue among appropriate decision-makers in the organization.
- Facilitates informal resolution processes. An ombudsperson may help to resolve issues between parties through various types of informal mediation.
- Identifies new issues and opportunities for systemic change for the organization. The unique positioning of the ombudsperson serves to provide unfiltered information that can produce insight to issues and resolutions. The ombudsperson is a source of detection and early warning of new issues and a source of suggestions of systemic change to improve existing processes.

What an ombudsperson does not do: Because of the informal, neutral, confidential and independent positioning of an ombudsperson in an organization, they typically do not undertake the following roles or activities:

- Participate in formal investigations or play any role in a formal issue resolution process

- Serve in any other organizational role that would compromise the neutrality of the ombudsperson role
- Receive notice for the organization
- Make binding decisions or mandate policies
- Create or maintain records or reports for the organization
- Provide representation or legal advice

10.2 Selection

Ombudsperson candidates will be self-nominated, the ombudsperson will be selected by the Spokepersons and ratified by the GB.

11 Amendments to Bylaws

These bylaws may be amended by the GB. A new bylaw or an amendment may be presented to the GB at one of its regularly scheduled meetings for consideration. Amendments may be introduced by any GB member or by a spokesperson. Proposed amendments will be distributed by email to the entire Collaboration for their comments following this meeting. The GB will then consider the amendment for adoption at the next scheduled GB meeting. Approval of an amendment requires a super-majority vote of the GB members present. Additionally, approval of bylaws pertaining to the governance of the Governing Board also require approval of *a majority of voting eligible Collaboration members*.

Appendices

A First Election and Voting Procedures

For the initial election procedures the ICCC replaces the role of the GB, and an Interim Election and Voting Commission (IEVC) appointed by the ICCC conducts the elections and voting.

The elected candidates begin to serve immediately after the elections are completed. The end of their terms is determined by adding the length of the nominal term for their positions (one, two or three years) to June 30, 2018. **As is directed for elections once the Collaboration is established, the initial elections are timed to provide Collaboration Members multiple opportunities to participate in Collaboration governance.**

A.0.1 First Election of Co-spokespersons

The IEVC follows the election process as described in §6 of the Bylaws. Collaboration members may vote for two candidates. The two candidates with the most votes will be elected Spokesperson, with the candidate with the highest vote total selected for a three-year term to enable staggered terms for the co-Spokespersons as illustrated in Figure 2.

A.1 First Election Council and Committee Chairs

The co-Chairs of the Science Council, and the Chairs of the Membership Committee and the Publication and Speakers Committee are elected to two-year terms. All Senior Members (see §8.1) may run for these positions. Prior to the election, Voting Members are asked to nominate individuals for the Chair positions to the EVC. Self-nominations are accepted. After a nomination period, the IEVC will consult with the nominees to ascertain their willingness to stand for the election. Candidates are only allowed to stand for one open position. Each Voting Member votes for a single candidate for each open Chair position. In the event of a tie, a runoff election will be held between the two candidates that have the same number of votes.

A.1.1 First Election of the Governing Board

The IEVC follows the election process as described in §6 of the Bylaws. Prior to the first election, the ICCC will define various categories of representation it deems important to include on the GB (possibly including, e.g., tenure-track and early career scientists, historically underrepresented groups, members from partner countries with significant membership, members of small institutions, representatives of existing CMB programs, etc.). For the first election, the top 10 vote-receiving candidates are automatically selected for the GB. If the representation requirements outlined above are unfulfilled by the elected candidates, the remaining open seats are filled via total votes cast until seats

are needed to ensure representation requirements are met. At this juncture the ICCC is empowered to make appoint the remaining seats to meet these requirements, drawing from the list of nominated candidates. To enable offset elections (to ensure an element of continuity in the GB), 50% of the first GB members will serve 3 year terms as determined by random draw.

After the GB is established, it is to amend these bylaws to establish whether to have separate votes for each category of representation or to continue with a mixed election/appointed governing board model. It is the expectation that the GB will evolve to a fully elected body as the Collaboration matures.

After the GB is established and its Chair selected, the ICCC is terminated.

B Abbreviations

CMB	Cosmic Microwave Background
Collaboration	CMB-S4 Science Collaboration
DOE	Department of Energy
ECC	External Collaborators Committee
EVC	Election and Voting Commission
ET	Executive Team
GB	Governing Board
ICCC	Interim Collaboration Coordination Committee
IEVC	Interim Election and Voting Commission
MC	Membership Committee
NSF	National Science Foundation
PSC	Publication and Speakers Committee
Project	CMB-S4 Construction Project
WG	Working Group