

# Bylaws of the LIGO Scientific Collaboration

LIGO M050172-04

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## 1. Membership

- 1.1 The LIGO Scientific Collaboration (LSC) is comprised of *Groups*. Each Group has an institutional affiliation. The group's commitments are laid out in Memoranda of Understanding (MOU) and associated attachments between LIGO and the Group.
- 1.2 Group membership in the LSC entails an on-going commitment to the Collaboration in the form of presence at the Observatories for commissioning and observation, service work, and technical and/or analysis contributions.
- 1.3 A Group is made up of individuals, known as LSC members. An individual is an LSC member by virtue of being listed by an LSC Group in a current MOU. A Group MOU may list any person (student, postdoc, scientist, engineer) who will contribute substantially to the scientific commitments laid out in the MOU. All LSC members in a Group will have a relationship with the Group's parent institution. This relationship may be a visiting, non-paid, or non-resident position
- 1.4 All LSC Groups are led by a PI, or co-PIs, designated in the Group MOU with LIGO. The PI is the point of contact between the Group and LIGO for all official LIGO business with the Group, and is responsible for ensuring compliance of group members with the rules of the LSC.
- 1.5 Initiating a member group relationship with LIGO
  - 1.5.1 Groups are admitted to the LSC through a vote of the Collaboration Council. They remain members of the LSC until they withdraw or are expelled.
  - 1.5.2 Groups interested in joining the LSC will contact the Collaboration Spokesperson. They will develop a plan together with the Spokesperson and other members of the LIGO Directorate for how the Group will contribute to the LSC. This plan will be incorporated into a draft MOU with LIGO.
  - 1.5.3 When the candidate Group's plan is complete the Spokesperson will transmit the draft MOU and appropriate draft attachments to the Collaboration Council as a motion to admit the Group to membership. Following the motion the candidate Group will make a presentation to the Collaboration of their proposed collaborative program at one of the Collaboration's regularly scheduled full meetings, at least 7 days after the transmission of the motion by the Spokesperson to the Collaboration Council. Balloting for membership will take place at the Collaboration Council meeting where the presentation takes place. The motion for membership will be deemed to have passed if approved by 2/3 or more of the total ballots cast at the meeting.
  - 1.5.4 Elections for group membership will take place at full Collaboration meetings.
  - 1.5.5 Membership elections will be by secret ballot
  - 1.5.6 It is the responsibility of the Election and Membership Committee to oversee membership elections.
- 1.6 Termination of a group membership
  - 1.6.1 The membership of a group in the collaboration may be ended by either the group or the Collaboration, acting through the Collaboration Council.
  - 1.6.2 A member group will be dropped from the Collaboration if the Group PI notifies the Spokesperson in writing that they wish to be removed from the Collaboration.
  - 1.6.3 The MOU Review Panel of the LSC Executive Committee, or the Spokesperson, may recommend the expulsion of a group to the Executive Committee. If the Executive Committee concurs, the Collaboration Spokesperson will notify the Group PI in writing of the Executive Committee's decision, and the group may volunteer to

resign from the Collaboration with no further formal action. If the PI does not voluntarily withdraw, the recommendation for expulsion will be presented to the Collaboration Council no sooner than 30 days after notification of the PI, at a full Collaboration meeting. The motion will be accompanied by a description of the Group, its activities, and the reason for the Executive Committees recommendation for expulsion. The Council will vote (by email) no sooner than 30 days after the presentation of the motion to the Council. The motion will have passed and the relationship ended if a two-thirds majority of LSC Council members who cast a ballot approve the motion.

1.6.4 Non-participation for a period of two years in the Collaboration activities will normally be grounds for expulsion.

#### 1.7 Rights of Members

1.7.1 LSC Members who have made substantial contributions to MOU-sanctioned LSC efforts have the right to co-authorship on all LSC-wide publications. It is expected that authors will spend 50% or more of their available research time (after e.g., teaching duties are subtracted) on LSC-oriented work, and will do so for more than one year. All cases of less than a 25% commitment require discussion between the PI and the Spokesperson, and should be the exception rather than the rule.

1.7.2 LSC Members who leave or are associated with a Group whose membership in the Collaboration is terminated under normal circumstances retain the right to co-authorship on LSC-wide publications for one year after their departure. With agreement of the Spokesperson and the PI of the relevant group, an individual may co-author an LSC-wide publication at a later date if a significant contribution by the departing individual will first appear in that paper.

#### 2. Memoranda of Understanding

2.1 An MOU will be made between each LSC group and LIGO. The MOUs will carry the names of active members of the groups and describe the planned activities for the coming interval.

2.2 Those activities must include a significant service contribution to the LIGO effort, following guidelines for required service FTE effort, which may include stationing of group members at Observatories.

2.3 MOUs will be reviewed periodically, but at least on an annual basis, by the MOU Review Panel of the LSC Executive Committee.

2.4 Obligations to the collaboration (e.g., staffing science runs) are determined by the Group FTE commitment.

#### 3. The Collaboration Council

3.1 The Collaboration will be governed by the Collaboration (or LSC) Council. The Council has the responsibility to discuss scientific and procedural matters arising in the Collaboration, will be informed of all significant activities of committees of the LSC, and will vote on Collaboration policies and directions. In addition, the Council

3.1.1 Elects the Spokesperson

3.1.2 Votes on new group memberships

3.1.3 Approves and revises the Charter and its Bylaws

3.1.4 Approves appointments made by the Spokesperson

and carries out other responsibilities as indicated in the Charter and Bylaws. All votes are by simple majority unless otherwise indicated.

3.2 Members of the Collaboration Council are appointed by the LSC member Groups. Each Group will appoint a number of members equal to one plus one-fifth, truncated, of the number of full-time equivalent members in the Group's current MOU. Collaboration Council members represent their Group and have the responsibility to discuss Council

issues with those they represent. The Council membership will be updated with every update of LSC Group members, but in no case less often than once every 6 months. Each Council member is expected to attend most full LSC meetings; if this is not possible, a different delegate should be designated.

#### 4. Spokesperson for the Collaboration

- 4.1 The Spokesperson leads the LSC, and is empowered to represent the LSC to the outside world.
- 4.2 The Spokesperson is a member of the LIGO Directorate. The Spokesperson shares in developing strategies and resolving challenges faced by LIGO, and uses the forum of the Directorate to address LSC issues at the interface to the Laboratory. The Spokesperson is free to participate as a voting member in the activities of organizations of the LSC.
- 4.3 The Spokesperson is responsible for the proper functioning of the LSC, and is responsible and empowered to resolve differences and deadlocks in any issues arising in the LSC. In particular, the Spokesperson has the responsibility to give the final approval for publications and release of scientific results from the Collaboration. In exceptional cases, the Spokesperson may also (with the consent of the LSC Executive Committee) remove an elected leader of an LSC Working Group.
- 4.4 The Collaboration Council membership will elect a Spokesperson to serve for 2 years. Spokesperson elections will be by secret ballot. The Collaboration Council must approve the spokesperson by a majority vote. The Spokesperson may be removed by a two-thirds majority vote of the Collaboration Council.
- 4.5 The Spokesperson
  - 4.5.1 chairs the Council and Executive Committee
  - 4.5.2 organizes a minimum of two full meetings of the Collaboration each year, at which Council meetings will take place and major issues are discussed
  - 4.5.3 identifies key issues and opportunities and brings them to the attention of the Collaboration
  - 4.5.4 provides leadership regarding additions to the membership, for evolution and innovation in Collaboration activities, and for advances in external collaborative relationships
  - 4.5.5 provides a receptive ear for any member of the Collaboration who wishes to raise any issue of concern; resolves otherwise unsolved differences between individuals or committees in Collaboration issues
  - 4.5.6 represents the Collaboration to the LIGO External Oversight Committee and in formal presentations to the funding agencies.
  - 4.5.7 participates (as a member of the LIGO Directorate) in setting the charge for the Program Advisory Committee and receives advice from the PAC on behalf of the Collaboration

#### 5. Publications and Presentations Policy:

- 5.1 The LSC has the responsibility for:
  - 5.1.1 maintaining a publications and a presentation policy;
  - 5.1.2 maintaining processes which lead to appropriate presentations, publications and PhD thesis research involving LIGO data
  - 5.1.3 appointing a publications and presentation committee to foster the development as well as to maintain the scientific integrity of publications and presentations of results derived from the LIGO data
  - 5.1.4 providing the forum for the discussion, debate, and the resolution of the astrophysical findings of the project leading to the publication of the LIGO astrophysics results.

5.2 Astrophysical results, publications and presentations containing new results must be approved by the appropriate Review Committee, and subsequently approved by consensus of LSC members at an LSC meeting. Final approval is given by a consensus of the LSC Executive Committee.

## 6. Data

6.1 All members of the Collaboration will have free and equal access to any data taken by the Collaboration, but must abide by Collaboration rules for the use, distribution, and publication of results from the data. Members will inform the Spokesperson, in a manner to be determined by the Analysis Committee, of their plans to analyze data.

6.2 The Analysis Committee will maintain a list of all on-going analysis activities, which will include a description of the activity and the individual who serves as the point of contact for the activity. That list will be available to all members of the Collaboration.

6.3 The procedure to bring new results to public view is as follows:

6.3.1 Papers originate in an Analysis Group. When they are close to a result, they should inform the standing Review Committee attached to that Analysis Group, and review begins. This involves review of analysis codes as well as of all choices made in setting up a pipeline.

6.3.2 When a paper is close to ready, it should be presented to the LSC (groups are also encouraged to present work in progress.) The venue is the Data Analysis Session at an LSC meeting. The group is to post a draft of the paper one week in advance. Then, the result and the paper are presented, along with a recommendation from the Review Committee of that group. The paper is then discussed by the LSC members present, and a consensus is developed.

6.3.3 The paper will be brought to a subsequent meeting of the LSC Exec Comm for final approval. The intent there has been that the group and its reviewers say the paper is really ready. In a few cases, the LSC Exec Comm can ask that certain specific changes be made, and give the Group and its Reviewers the authority to decide that those changes have been made properly.

## 7. Standing Committees

### 7.1 Executive Committee

7.1.1 The Executive Committee is chaired by the Spokesperson and serves to provide a continuum of governance between the Collaboration meetings.

7.1.2 The Executive Committee (Exec Comm) is empowered to make key decisions (those normally requiring a Council vote) for the Council between Council meetings, and thus acts as a proxy for the Council. Issues decided by the Exec Comm will be reviewed by the Council at the next full meeting of the LSC. At the discretion of the Executive Committee or the Spokesperson, a telephone/viewgraph meeting of the Council will be called between regular Council meetings. Key decisions by the Executive Committee will be by vote, with the individual vote results given in the meeting minutes.

7.1.3 The Executive Committee is chaired by the Spokesperson, or the Spokesperson's delegate.

7.1.4 The Executive Committee will meet (by telephone or in person) nominally monthly, and the notes from the meeting will be made available to the LSC within two weeks of the meeting.

7.1.5 The Executive Committee consists of the

- Spokesperson (elected)
- Operations committee chair (appointed by Lab Directorate)
- Analysis committee chair (appointed by LSC Spokesperson)
- Detector Characterization committee chair (appointed by LSC Spokesperson)

- Advanced Detector committee Chair (appointed by LSC Spokesperson)
  - One representative from GEO, chosen by mutual agreement by the Spokesperson and the leadership of GEO.
  - 4 additional 'at large' members elected by the Council, with a spread of interests represented (with the election to be held after appointees to the Exec Comm are named)
- 7.1.6 The LIGO Lab Executive Director and Deputy Director will be voting members of the Collaboration Executive Committee. The Spokesperson will retain the right to invite other non-voting observing members from the members of the collaboration to specific meetings.
- 7.1.7 The elected members will serve for a term of 2 years, and may be re-elected; the appointed members serve for a term of 2 years, and may be re-appointed.

## 7.2 Operations Committee

- 7.2.1 The Operations Committee is responsible for making recommendations to the Collaboration and to the Laboratory on the commissioning and operational plan for the current instrument. In addition, the Operations Committee establishes and implements a plan for scientific monitoring of science runs.
- 7.2.2 The chair of the Operations committee is named by the LIGO Laboratory Directorate.
- 7.2.3 The LIGO Observatory Heads are members of the Operations Committee. In addition to the chair and the two Heads, the committee has 4 persons, appointed by the Spokesperson for 2 year periods.
- 7.2.4 The LIGO Directorate may appoint ex officio members to the Operations Committee.
- 7.2.5 The Operations Committee establishes needed contributions to the commissioning and operation of the Observatories from the LSC member groups, including presence at the Observatories for commissioning and observation.

## 7.3 Analysis Committee

- 7.3.1 The Analysis Committee is responsible for coordinating, overseeing, and reviewing analysis work.
- 7.3.2 The Analysis Committee is made up from the two co-chairs of each standing analysis group, elected by the members of the analysis group in question, for 2 year terms.
- 7.3.3 The Chair of the Analysis Committee is appointed by the LSC Spokesperson for a 2 year term.
- 7.3.4 New analysis groups are proposed to, and voted on by, the LSC Council, with the analyst and experimentalist representatives to the Analysis Committee named at the time of the vote. Only such approved analysis groups may bring an analysis (and publication) forward for review.
- 7.3.5 The Analysis Committee establishes Review Committees for analysis groups and is responsible to see that a thorough review is performed of analyses.
- 7.3.6 The Analysis Committee will prepare and maintain a White Paper relevant to the Collaboration's plans and activities for future analyses, with an up to date version to be available to the Collaboration one month before the due date for the yearly NSF proposals.

## 7.4 Detector Characterization Committee

- 7.4.1 The Detector Characterization (DetChar) Committee is responsible for organizing and documenting the Collaboration's efforts in detector characterization and the development of tools for that purpose.

- 7.4.2 The DetChar Committee is made up of the chairs of the DetChar Working Groups, and 3 members appointed by the Spokesperson for 2 year terms.
  - 7.4.3 The chair of the DetChar Committee is appointed by the LSC Spokesperson for a term of 2 years.
  - 7.4.4 The DetChar Committee will prepare and maintain White Papers relevant to the Collaboration's plans and activities for detector characterization, with an up-to-date version to be available one month before the due date for the yearly NSF proposals.
- 7.5 Advanced Detector Committee
- 7.5.1 The Advanced Detector Committee is responsible for organizing and documenting the Collaboration's plans for future detectors and the R&D leading to those detectors.
  - 7.5.2 The Adv Det Committee is made up of the chairs of the instrument Working Groups, and 3 members appointed by the Spokesperson for 2 year terms.
  - 7.5.3 The chair of the Adv Det Committee is appointed by the LSC Spokesperson for a term of two years
  - 7.5.4 The Adv Det Committee will prepare and maintain White Papers relevant to the Collaboration's plans and activities for future detectors, with an up to date version to be available one month before the due date for the yearly NSF proposals.
- 7.6 MOU Review Panel
- 7.6.1 The Executive Committee appoints an MOU Review Panel to make a periodic critical review of the Memoranda of Understanding between the LSC member institutions and LIGO. The Panel is to be balanced and broadly distributed in technical expertise and interest, and among LSC groups.
  - 7.6.2 This Panel makes recommendations to sign or not to sign MOUs, and also makes a technical assessment of the overall LSC program for feedback to the institutional groups and to the Working Groups of the LSC. The contributions to commissioning and operation of the Observatories, service work, and to the technical and/or analysis efforts of the LSC, are judged.
  - 7.6.3 The MOU Review Panel establishes guidelines for service work, to complement contributions to Observatories, and to the technical and/or analysis efforts
  - 7.6.4 The MOU committee will rotate in membership, with at least one-quarter of the committee to change at each meeting.
- 7.7 Publications and Presentations Committee
- 7.7.1 The Publications and Presentations (P&P) Committee is responsible for maintaining adherence to the Publications and Presentations policy. In broad strokes, this includes:
    - 7.7.1.1 Maintaining a full and complete list of all Collaboration Publications in any medium and making that list accessible to the Collaboration and to the general scientific community;
    - 7.7.1.2 Maintaining a full and complete archive of all Collaboration presentations to open meetings, whether scientific or managements.
    - 7.7.1.3 Managing the review of proposed technical publications.
    - 7.7.1.4 Reviewing proposed presentations and making recommendations to the collaboration.
    - 7.7.1.5 Maintaining a collection of "blessed" results/slides for presentations
    - 7.7.1.6 Maintaining a list of members nominated for speaking roles at major conferences and nominating speakers for conferences
  - 7.7.2 The P&P Committee will consist of 5 persons appointed by the Spokesperson for 2 year terms. They may call on all members of the LSC to help them in their tasks.

- 7.7.3 The chair of the P&P Committee is appointed by the Spokesperson for a 2 year term.
- 7.8 Election and Membership Committee
  - 7.8.1 The Election and Membership (E&M) Committee organizes and oversees all elections processes, including the nomination process. Any member of the collaboration (in the Council or otherwise) may be considered for election to a position for which they are technically qualified.
  - 7.8.2 The chair and the 4 regular members of the Election and Membership Committee are appointed by the Spokesperson in consultation with the LSC Executive Committee.
  - 7.8.3 The E&M Committee is responsible for maintaining the membership roster of the Collaboration, and the authorship list. This information is used to maintain lists of password access and mailing lists for the Collaboration.
  - 7.8.4 The E&M Committee is responsible for carrying out the election of groups to the Collaboration.
  - 7.8.5 The E&M Committee oversees the elections for chairs of working groups. The procedure for Working groups is intended to be flexible to account for the various sizes and styles of groups.
    - 7.8.5.1 Groups will vote by simple majority, before candidates are chosen, if they wish to have elected chair(s) or have chair(s) appointed by the Spokesperson.
    - 7.8.5.2 If an election is chosen, the E&M committee will solicit nominations and select nominees, and carry through with email balloting.
    - 7.8.5.3 Chair(s) are elected by simple majority for a term of 2 years; if there are multiple chairs, the elections are staggered to encourage continuity.
    - 7.8.5.4 The mailing list for the working group in question is used to establish those eligible to vote; the solicitation for votes will include a request to only vote if actively involved in the working group's activities.
- 7.9 Detection Committee
  - 7.9.1 The Detection Committee is responsible for advising the LSC and the Spokesperson on issues relating to making a claim that we have detected gravitational waves. It is a standing committee, committed to establishing our procedure, helping to ensure that the tools are in place, and then taking on the particular cases of potential discoveries.
  - 7.9.2 The chair of the Detection Committee is appointed by the LSC Spokesperson.
  - 7.9.3 There will be approximately 10 other members, appointed by the Spokesperson, in consultation with the Analysis Committee chair and Analysis Working Group Chairs; appointees serve a term of two years
  - 7.9.4 The Detection Committee will prepare and maintain a procedure to be followed, both in general, and for specific examples of anticipated kinds of detections. It will distribute the procedure to the Collaboration at least once per year in advance of LSC meetings, with comments invited at LSC Council meetings; revisions will be brought to the attention of the Collaboration.
- 7.10 Computing Committee
  - 7.10.1 The Computing Committee is responsible for organizing and documenting the Collaboration's computing hardware infrastructure and for formulating plans for its evolution.

- 7.10.2 The Computing Committee is made up of one representative from each major computing group in the LSC, appointed by the Spokesperson in consultation with the Group PIs and the Analysis Committee; appointees serve a term of two years.
  - 7.10.3 The chair of the Computing Committee is appointed by the LSC Spokesperson for a term of two years.
  - 7.10.4 The Computing Committee will prepare and maintain a description of the Collaboration computing resources and future plans for infrastructure. Revisions will be brought to the attention of the Collaboration.
  - 7.10.5 The Computing Committee will watch for opportunities for funding in computing, and will bring them to the attention of the LSC in a timely way, enabling input and new participants to join in proposals.
- 7.11 Data Analysis Software Committee
- 7.11.1 The Data Analysis Software Committee is responsible for organizing the development of data analysis software for the Collaboration.
  - 7.11.2 The membership of the Data Analysis Software Committee consists of the chairs of the Data Analysis Software Working Groups, and 3 members appointed by the Spokesperson for 2 year terms.
  - 7.11.3 The Chair of the Data Analysis Software Committee is appointed by the LSC Spokesperson for a term of 2 years.
  - 7.11.4 The Data Analysis Software Committee will prepare and maintain White Papers relevant to the Collaboration's plans and activities for data analysis software, with an up-to-date version to be available one month before the due date for the yearly NSF proposals
- 7.12 Calibration Committee
- 7.12.1 The Calibration Committee is responsible for organizing, delivering, and documenting the calibration information for the detectors in the Collaboration.
  - 7.12.2 The Calibration Committee is made up of a minimum of one representative from each of the standing analysis committees, and one representative from each of the detector sites, with additional expertise in analysis and instrument science as needed. The representatives are appointed by the Spokesperson in consultation with the Analysis Working group chairs and the site heads.
  - 7.12.3 A Calibration Review Subgroup is appointed by the Spokesperson to give guidance, support, and independent review of the Calibration Committee's efforts.
  - 7.12.4 The chair of the Calibration Committee is appointed by the LSC Spokesperson for a term of two years.
  - 7.12.5 The Calibration Committee will prepare and maintain documentation of the calibration, and inform the Collaboration of any planned changes in procedure or scope in advance.
8. Working Groups
- 8.1 Working groups are created as needed to bring collaboration members together to address specific needs and interests of the Collaboration. Each working group will establish a charter in collaboration with the Spokesperson.
  - 8.2 Each working group will maintain a list of active members, to be reviewed by the Election and Membership Committee before any vote by the group, or every 6 months, whichever comes first.
  - 8.3 The chair of a working group is elected through a simple majority by the members of the Working Group, or if preferred, appointed by the Spokesperson. Data Analysis groups will have two co-chairs; between them, they must have significant experience with instrument science and with data analysis.

- 8.4 Chairs of the Working Groups are members of the appropriate Committee:  
Operations, Detector Characterization, Analysis, or Advanced Detectors.
- 8.5 The working group will prepare an annual report of progress and plans (which in general will be made up of contributions to the relevant White Paper, and contributions to the annual report prepared by the Spokesperson.)
- 8.6 Apart from election of their Chair, Working Groups may determine their internal decision-making processes (elections, consensus, etc.)