LARGE BINOCULAR TELESCOPE OBSERVATORY

July 08, 2024

LBT Observatory Call for New Instrument Concepts

The Large Binocular Telescope Observatory is inviting proposals for new instrument concepts that will increase the Observatory's capabilities for scientific discovery and technical innovation.

Letter of Intent Deadline: December 15, 2024

Proposal Submission Deadline: May 30, 2025

Background. The LBT remains a robust platform for development of new observing technologies and instruments, based on its light-collecting power equivalent to a single 11.8m aperture, edge-to-edge baseline of 22.8m, and high-altitude location (3200 m). The telescope is optimally designed for rapid reconfiguration between prime focus, Gregorian, and bent-Gregorian focal stations, and offers routine access to adaptive secondary mirrors for AO correction.

The current solicitation coincides with the arrival and commissioning of a suite of 2nd generation instruments at the telescope – the SHARK-NIR and SHARK-VIS instruments for high angular resolution, high contrast imaging and spectroscopy (with SHARK-NIR); and the iLocater diffraction-limited spectrograph for extreme high precision radial velocity measurements. As these initiatives reach fruition, the Observatory is looking to define the next phase for the advancement of its capabilities and impact.

Eligibility. Proposals are invited from teams representing the existing LBT Corporation Members as well as other institutions with potential interest in developing and executing new instrumentation at the LBT. In parallel with this solicitation, the LBT Corporation is currently inviting inquiries from institutions with potential interest in securing access to the telescope through membership in the Corporation or purchase of observing time. The combination provides an attractive option for entry to an 8-10m class telescope linked to an instrument development opportunity. However, the purchase of observing time is not required to participate in the current opportunity. Non-Member institutions' contributions will be considered an "in-kind" contribution to the Observatory and rewarded with observing time, following approval of the LBT Board of Directors.

Scope. Information on existing instruments is available on the LBTO website at this link. New concepts can be proposed for:

- Full instruments, potentially replacing existing ones, or
- Modification/upgrades of existing instruments.

A new instrument can potentially be installed at any of the current focal stations, either on a rotating or long-term basis, based on its use case in relation to existing instruments.

The new instrument development and subsequent operation is expected to be executed as a P.I. project with limited support provided by the Observatory to enable installation and scheduling. The project team is expected to secure funding for the instrument to support costs through all phases of development, from internal resources or external awards. Instrument teams should not submit proposals for external grant funding prior to securing approval via a positive review by LBTO/LBTC of the submitted concept proposal.

Procedure. Teams considering submission of a proposal should submit a **Letter of Intent** with a proposal abstract to director@lbto.org by **December 15, 2024**, to facilitate early feedback. The LoI is expected to be a succinct (max 2 page long) description of the main features of the instrument, the main scientific application, and the proposing team. It is understood that the scope of the instrument and the team composition may be subject to changes at the time of the final proposal. Teams wishing to enter the process after that date can submit an abstract for possible consideration.

Proposals should be submitted via email to director@lbto.org by **May 30, 2025**. Announcement of review outcomes is anticipated at the latest by November 01, 2025.

Proposals will be reviewed by the LBT Science Advisory Committee, augmented by additional reviewers as needed, with recommendations forwarded to the LBT Board for a decision. Submitted proposals will be evaluated based on the following criteria:

- Potential for enabling new science and/or demonstrating high-impact technical innovation
- Design feasibility
- Compatibility with LBT physical/optical/AO systems
- Relevant qualifications/experience of team
- Potential for securing funding
- Overall probability of successful execution

Depending on the number and quality of submissions, one, multiple, or zero proposals may receive authorization to progress in development.

Proposal preparation and submission

Instrument concept proposals should include the following written elements:

1. High-level description of the science the instrument will support

2.High-level description of performance attributes: bandpass/FOV/angular resolution/spectral resolution/time resolution/multiplexing capability, as appropriate; and sensitivity goals

3. Explanation of how this project extends the capability of the LBT

4. Discussion of how the proposed instrument capability compares to that of instruments at other 8-10m-class telescopes

5. A description of the design concept including baseline attributes of

- Optical design
- Detectors
- Mechanical components
- Focal station for installation and envelope fit
- Electric power and cooling requirements
- AO requirements for operation
- Software requirements/plan for operation
- Expected data volume and data management plan
- Data reduction plan
- Initial cost estimate

6. A summary to the degree to which the instrument leverages established or new technology. If the project would depend on or would demonstrate new technology, the proposal should address the availability and technical readiness of these elements.

7. Summary of any modifications required at the LBT in order to install and operate the instrument.

8. Name and affiliation of the Principal Investigator and list of instrument development team members, brief description of their relevant experience, and statement of each member's contribution/responsibility for the project. Additionally describe infrastructure/instrument facility to be used for integration and testing.

9. High level Project Management plan and timeline for execution.

10. Statement of plans for securing funding for project costs, and probability of success.

Proposals should be a maximum of 12 pages (12 point font, single spaced) with supporting appendices included as needed.

Questions regarding the proposal process, or technical aspects of the telescope and current instruments, can be sent to LBTO Director Joe Shields, jshields@lbto.org. Early communication is encouraged to facilitate feedback and connection with potential collaborators.