

## **JMU Call for Proposals for the Liverpool Telescope**

### **Semester 2020A**

The Liverpool Telescope is a 2.0 metre fully robotic facility sited at Observatorio del Roque de Los Muchachos, La Palma, Canary Islands. The Liverpool Telescope Time Allocation Committee is now accepting proposals for JMU time for observations in Semester 2020A (1<sup>st</sup> Jan 2020 – 31<sup>st</sup> Aug 2020). **Full details of the telescope, instrumentation and proposal submission process (Phase 1) are available from:**

<http://telescope.livjm.ac.uk/>

You may also apply for **Reactive Time** and **PriorityZ Time** at any time throughout the year as described at the end of this call.

**THE LATEST VERSION (V0.7) OF THE APPLICATION FORM MUST BE USED. APPLICATIONS USING OLDER FORMS WILL BE REJECTED.**

#### **Time available and deadline**

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*The deadline for submission of proposals is*

**23:59 GMT on Monday, 7<sup>th</sup> Oct 2019**

The total available time for JMU users in 2020A will be 300 hours. 20 hours have been pre-allocated in previous rounds, and 9 hours have been set aside for Reactive Time proposals, leaving **271 hours available to be allocated**. Time is allocated approximately in the ratio 1:1 between Priority A and B. In addition **90 hours** will be available as Priority C (backup). Applications are particularly encouraged for brighter sky conditions, which are typically less subscribed.

In an effort to reduce problems with under-filled observation queues at the start and end of each semester, the LT observes proposals throughout two “8 month semesters” a year. This means that there is a two-month overlap period at the start and end of each semester when proposals from *both* semesters may be observed. “A” semesters run from 1<sup>st</sup> January – 31<sup>st</sup> August and “B” semesters from 1<sup>st</sup> July to 28/29<sup>th</sup> February.

JMU accepts proposals from Principal Investigators (PIs) based at Liverpool John Moores University. See the LT proposal instructions webpage (Phase 1) for details on how non-JMU PIs may apply for telescope time.

<http://telescope.livjm.ac.uk/PropInst/Phase1/>

JMU proposals are evaluated by a joint JMU/PATT Time Allocation Committee (TAC). PATT do not make selections nor allocate telescope time; rather, they advise the ARI board on the merits or failings of each proposal, rank them in order, and advise on potential conflicts with PATT proposals. All JMU allocations are ultimately approved by the ARI board. Dan Perley currently represents the ARI on the TAC.

## **Instrument availability**

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The following instruments will be available in semester 20A:

- **IO:O** – IO:O is the primary imaging CCD camera available this semester. IO:O has a field-of-view of 10 arcmin, Sloan u'g'r'i'z' filters, Bessell B and V filters, a rest wavelength H $\alpha$  filter and four red-shifted H $\alpha$  filters.
- **SPRAT** – SPRAT provides high-throughput, low-resolution (R=350), long-slit optical spectroscopy at the LT. The slit width is  $\sim$ 1.5 arcsec. A single spectrum spanning roughly 400-800 nm is obtained, optimized for improved sensitivity in either the red and blue portion of the spectrum by tilting the grism assembly.
- **FRODOSpec** – FRODOSpec is an integral-field optical spectrograph providing observations from 380 to 1000 nm in either low ( $\sim$ 2400) or high ( $\sim$ 5400) resolution mode. The IFU provides a 12x12 lenslet array over a total field-of-view of  $\sim$ 10 arcsec.
- **RINGO3** – RINGO3 provides imaging polarimetry over a  $\sim$ 4 arcmin diameter circular field-of-view simultaneously in three optical wavebands (350-640 nm, 650-760 nm, 770-1000 nm). Polarization accuracies of  $\sim$ 1% are typically obtained with this instrument.
- **RISE** – RISE is a fast-readout frame-transfer CCD optical imager and provides a cycle time of less than 1 second. Since 26th July 2017 RISE uses a fixed 720nm longpass filter, which approximates 'I+Z' in wavelength coverage. This replaces the 'V+R' filter used previously. RISE uses re-imaging optics giving a 7x7 arcmin field-of-view.
- **IO:I** – IO:I uses a 2048x2048 pixel Hawaii 2RG detector with a 1.7 micron cutoff. Field of view is 6x6 arcmin at pixel scale of 0.18 arcsec, with a fixed H-band filter.
- **MOPTOP** – MOPTOP is the fourth-generation fast polarimeter for the LT and is currently undergoing commissioning. We anticipate that it will be available for robotic operations at some point within the 2020A semester. Proposers wishing to take polarimetric observations with the LT should apply for RINGO3, and we will discuss the potential use of MOPTOP once the instrument is available and we have performance information to share.

For further information on any LT instrumentation please refer to the LT website (<http://telescope.livjm.ac.uk/TellInst/Inst/>) or contact the LT support team ([ltphase1@ljmu.ac.uk](mailto:ltphase1@ljmu.ac.uk)) **well before** submitting an observing proposal.

### **Calibrations and Standards**

The telescope routinely observes standard stars with **IO:O** and **RINGO3**. These are acquired in all of the broad-band filters. A spectrophotometric standard is obtained on photometric nights with **SPRAT** and **FRODOSpec**. No standards will be taken for the other instruments. Observers who wish to obtain standards in addition to those that are routinely observed, must include

these in their proposal (and include the time needed to acquire these observations in their observing time request). Flat-field observations are routinely obtained for all instruments, as and when required: these should not be included in a phase 1 time request.

## **Proposal process**

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### ***Phase 1 – the science definition phase:***

All phase 1 proposals are evaluated by a joint PATT+JMU Time Allocation Committee (TAC). Submitted proposals must contain a one-page science case, a one-page technical case, and should describe why the proposed observations are best conducted on a robotic telescope.

- See <http://telescope.livjm.ac.uk/PropInst/> for instructions on how to **prepare and submit** a Phase 1 proposal.
- There is no official limit to the length of an observing group. However, proposals that request very long groups (more than a few hours in a single contiguous block), especially groups that need repeating on consecutive nights, must include an explanation as to why the observations require a robotic telescope (i.e. why they should not be conducted on a classically scheduled telescope).
- **FIXED groups** are extremely intrusive in terms of telescope scheduling. FIXED group status will ONLY be awarded to observations that specifically require this mode of operation. Furthermore FIXED status requires a high ranking from the TAG: this status would not be permitted for proposals allocated time at Priority C, for example. See the phase 1 website for further details.
- Please be sure to **review instrument web pages** prior to preparing your proposal (<http://telescope.livjm.ac.uk/TellInst/Inst/>), since some contain specific guidance and/or unique constraints, for example: limits on source brightness, or minimum recommended exposure times.
- A new field has been added to the proposal submission form for JMU users. This is to allow you to briefly discuss any wider issues a proposal may have of strategic or operational significance for the ARI and LJMU. Factors you could discuss include: (a) whether this proposal is part of a long term programme, (b) the involvement of any ARI PhD students, (c) the importance of this proposal to your research, in particular compared to other proposals you may have submitted in this round and (d) the fraction of work associated with this proposal which will be done at the ARI, rather than by collaborators at other institutions.

### ***Phase 2 – the observation specification phase:***

Shortly after the ARI board has made its selections, allocations will be posted on the LT website, and proposal PIs will be informed by email.

A few weeks before the start of the semester the LT staff will create proposal accounts in the Phase 2 system. Proposal PIs will be informed (by email) when these are ready. Users may then enter observing groups using the Phase 2 User Interface, an online Java tool used to programme observations and transmit them directly to the telescope. For details and a tutorial please visit the Phase 2 website: <http://telescope.livjm.ac.uk/PropInst/Phase2/>.

**IMPORTANT:** Note that once groups have been prepared they are immediately “live”. This means that, provided an observing sequence is valid, enabled, and the semester has begun, the telescope could at any time acquire data for your programme. Users are therefore encouraged to contact the LT group should they have any questions at all regarding their observations ([LTsupport\\_astronomer@ljmu.ac.uk](mailto:LTsupport_astronomer@ljmu.ac.uk)). *Note that the LT staff do not routinely check submitted groups, though we are happy to do this if requested.*

### ***Priority Definition***

Successful proposals are entered into the observing queue with one of three rankings:

- A. High priority programmes. The TAC would like to see **100% completion**.
- B. Medium priority programmes. The TAC would like to see **at least the Minimum Usable Fraction (MUF) of the time requested** observed, provided this does not impact on priority A completion.
- C. Low priority programmes. These programmes are used to over-subscribe the observing queue so that the telescope is never left idle. There is no guarantee that any observations will be obtained, though in our experience groups with relaxed observing constraints have a good chance of being executed.

### ***Minimum Usable Fraction***

The Minimum Usable Fraction (MUF) helps the LT technical team schedule observations effectively. It allows us to better understand your requirements rather than being used directly by the scheduler. Please specify the MUF for your programme on the cover page and in the technical case of your proposal. For example, the MUF can be used to specify that “any observations would be usable” (MUF= a few %), or “a complete or nearly complete sample is essential to achieve the science goals” (MUF=90%). The ARI board reserves the right to revise the MUF of any successful LT proposal.

### ***Exposure Time Calculator***

LT users are encouraged to use the LT’s Exposure Time Calculator (see the link on the sidebar of the LT homepage: <http://telescope.livjm.ac.uk/TellInst/calculator/>) when preparing their proposals.

### **Telescope performance**

The pointing accuracy of the telescope for semester 20A is expected to be ~7 arcsec RMS. The current tracking performance provides seeing-limited images (FWHM < 2.0 arcsec) for exposures up to 1 minute without the auto-guider (open loop) and up to 30 minutes with the auto-guider (closed loop). However, note that absolute seeing of less than 1.0 arcsec is rare at the LT. Those requiring excellent image quality are encouraged to always use guide stars.

### **Observing conditions**

The LT welcomes applications for all available observing modes, conditions, and RA ranges, particularly those that take advantage of the robotic nature of the LT and its strengths in rapid response and long-term monitoring. Applicants do not need to break down time by seeing and sky brightness categories. Instead,

please simply list the worst acceptable sky brightness and seeing that is applicable for the majority of the observations in your proposal.

## **Reactive time proposals**

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In addition to applying for telescope time through the JMU twice-yearly process, observers may apply for Reactive time via:

<http://telescope.livjm.ac.uk/PropInst/Reactive>

JMU Reactive Time is open to all ARI staff, regardless of their prior use of the LT or any time they may already have allocated. It is intended to allow **observations of unforeseen or rare phenomena** such as targets-of-opportunity, or **test observations** prior to a full proposal. We define rare phenomena loosely as events that likely have a rate of less than one trigger per year. Reactive Time is *not* to be used to apply for time denied in the normal round or for target-of-opportunity observations of targets/phenomena with a higher rate of occurrence (e.g. novae, GRBs). The LT management aim to make a decision within 48 hours of receipt of Reactive proposals, and will generally respond more rapidly. Proposers should take account of the information on instrumentation etc. as per the standard application round and must demonstrate the feasibility of their proposal.

Reactive time proposals that clearly should have been submitted as part of a JMU call will be rejected. Reactive proposals should include a brief summary as to why the proposed observations were not submitted to a normal JMU call.

## **PriorityZ time proposals**

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In addition to applying for telescope time through the JMU twice-yearly process, we now also allow observers to apply for PriorityZ time via:

<http://telescope.livjm.ac.uk/PropInst/PriorityZ>

We define PriorityZ time as time when there is no A, B or C-ranked science group available for the scheduling software to pick, and so the telescope would otherwise sit idle. This can occur during periods of poor seeing during full moon, or during times of instrument failure. We estimate approximately 10-15 hours of such time are available per month, although this can of course vary significantly.

PriorityZ time is well-suited to long-term proposals of bright targets with no significant time constraints. We would typically expect to approve a PriorityZ proposal for a period of two years. Observers can apply via the web form available at the above link, and proposals will be assessed internally by LT staff. Proposals can be submitted at any time.

## **Targets of Opportunity and Rapid Response**

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The LT receives many proposals requesting Target of Opportunity status. Most PIs are happy to submit their observations using the Phase 2 GUI, shortly (a day or two) after the ToO is discovered. However, LT users should be aware that the LT is able to respond to ToOs within hours or even minutes of their discovery. PIs requiring rapid response to alerts are welcome to contact the LT support staff ([ltphase1@lmu.ac.uk](mailto:ltphase1@lmu.ac.uk)) to discuss this unique service further.

## **LT Data Access Policy**

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The LT policy on data access is available here:

<http://telescope.livjm.ac.uk/DataProd/>

Data remain proprietary to the PI for **one year after the end of the semester within which the data were acquired**. An additional year may be granted by the LT Director, though a clear scientific need must be presented in the proposal.

## **LT Privacy Policy**

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The LT policy regarding the collection, use and disclosure of your personal information is available here:

<http://telescope.livjm.ac.uk/Privacy/>