

# RFQ for Lock-In Amplifier

This is an RFQ (Request for Quote) for procurement of laser modules as part of a tender for the Centre for Nano Science and Engineering (CeNSE) at IISc, Bangalore.

## 1 Procedure

1. Vendors will be required to submit a technical proposal and a commercial proposal in **two separate sealed envelopes**. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
2. **The deadline for submission of proposals is the December 29<sup>th</sup> 2020, 5:30 pm Indian Standard Time**. Proposals should arrive in hardcopy at the office of Dr. Sushobhan Avasthi, TF-06, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India, by the above deadline.
3. The technical proposal should contain a technical compliance table with 5 columns.
  - a. The first column must list the technical requirements, in the order that they are given in the technical requirement below.
  - b. The second column should provide specifications of the instrument against the requirement (please provide quantitative responses wherever possible).
  - c. The third column should describe your compliance with a “Yes” or “No” only. Ensure that the entries in column 2 and column 3 are consistent.
  - d. The fourth column should state the reasons/explanations/context for deviations, if any.
  - e. The fifth column can contain additional remarks from the OEM. You can use this opportunity to highlight technical features, qualify response of previous columns, or provide additional details.
4. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors
5. If multiple systems can fulfil the requirements, vendors can submit multiple bids.
6. In the commercial bid, please provide itemized cost of the system and required accessories, such as cables, power supply, etc.
7. As an option, please provide itemized cost for any suggested accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
8. The quotes should be CIF Bangalore, India. So please include cost of shipping. Customs can be extra.
9. Any questions can be directed to Dr. Sushobhan Avasthi, TF-06, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. ([savasthi@iisc.ac.in](mailto:savasthi@iisc.ac.in))

## 2 Terms and Conditions

1. The decision of purchase committee will be final
2. The lead-time for the delivery of the equipment should not be more than 3 months from the date of receipt of our purchase order.
3. The indenter reserves the right to withhold placement of final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all of the above conditions without assigning any reason.
4. Wherever requested in this specifications sheet, data must be supplied along with technical compliance documents. Technical bids without supporting data will be deemed as technically non-compliant.
5. All guaranteed specifications will have to be demonstrated, upon request, in an active installation. Failure to demonstrate any promised specifications will be deemed as technical non-compliance.
6. Printed literature and published papers in support of all compliance to the prescribed specifications may be provided.

7. Technical evaluation by the institute may include demonstration to verify functionalities and capabilities of the system quoted. Any discrepancy between the promised specifications and demonstrated specifications will be deemed as technical non-compliance. If need arises, the vendor must be ready to physically visit IISc for a techno commercial discussion.
8. The **validity of commercial quotation should be at least 60 days** from the last date for the submission of tender documents.
9. The bids must follow GFR 2017. The bids will be evaluated as per the latest GFR rules.

### 3 Technical Specifications

The required specifications of the dual-phase lock-in are:

1. Measurement parameters: X, Y, R,  $\theta$ , DC, Noise
2. Inputs: voltage, differential voltage, current
3. Detection at two frequencies (primary and secondary).
4. Frequency range 1 Hz to 1 MHz.
5. Dynamic reserve of > 100dB
6. Line filter: inbuilt rejection of 50Hz, 100 Hz from AC input.
7. Range
  - a. Voltage: 10mV to 1V
  - b. Current: upto 1 uA
8. Sensitivity:
  - a. Voltage: atleast 5 nV
  - b. Current: 100 fA at  $10^6$  V/A gain
  - c. Noise: 20 nV/√Hz to 1 V/√Hz & 1 pA/√Hz to 1 μA/√Hz
9. Accuracy:
  - a. Voltage: better than 1% in 1Hz-10kHz. Better than 3% from 10kHz-1MHz.
  - b. Current: better than 5% across the range.
10. Noise
  - a. Voltage: < 5nV/√Hz @ 1KHz.
  - b. Current: < 100 fA/√Hz @ 1kHz
11. Input impedance
  - a. Voltage: > 10MΩ, both AC and DC coupling.
  - b. Current: < 1kΩ at  $10^6$  V/A gain
12. Internal reference:
  - a. Frequency: 1Hz to 1 MHz, with with 0.1 mHz resolution
  - b. Phase adjustment: from -180 to 180 degree with 0.001 deg resolution.
13. External reference
  - a. Frequency measurement resolution: 0.1 mHz.
  - b. Frequency accuracy: better than 100 ppm.
14. For filtering 1 μs to 10s output time constants.
15. In-built FFT spectrum analyser with 1024 bins
16. Display:
  - a. Display of atleast 3 parameters in real time on display screen
  - b. Update rate of at least 1MSa/s
17. GPIB, RS-232, Ethernet or USB for computer connectivity with an API for remote control.
  - a. Baud rates of atleast 230400.
18. Data:
  - a. Capture buffer: 1M points
  - b. Real-time sampling rates: atleast 1MSa/s
19. Power: 220 V AC 50 Hz.