



**Department of Aerospace  
Engineering,  
Indian Institute of Science,  
Bangalore – 560 012,  
India.**

**Ref. No.: IISc/AE/Tender/2019**

**Date: 26-November-2019**

**NOTICE INVITING TENDER FOR SUPPLY AND INSTALLATION OF  
High-Energy pulsed Nd: YAG Laser System**

**(Last date for submission of tenders: 20-Dec-2019)**

**Indian Institute of Science, Bangalore invites sealed quotations under two-bid system for a high-energy pulsed Nd: YAG laser system that meets the following technical specifications and terms & conditions: -**

**(a) Technical specifications and components required for the high-energy pulsed Nd: YAG-laser system:**

1. Flashlamp pumped, Q-switched laser system with an optional capability of single longitudinal mode operation with injection seeder
2. Output power :  $\geq 2000$  mJ@1064 nm,  $\geq 1000$  mJ@532 nm (without injection seeder),  $\geq 900$  mJ/pulse laser energy in the injection seeded mode (optional requirement)
3. Repetition rate : 10Hz
4. Pulse duration :  $< 10$  ns @ 1064nm
5. Beam divergence :  $< 0.5$  mrad
6. Timing jitter :  $< 0.5$  ns
7. Laser Triggering : Advanced sync pulse generator to provide pre- or post-
  - i. trigger pulse with respect to the Q-switch in the range +500 ns to -500 ns

8. Linewidth :  $< 1\text{cm}^{-1}$  (without Injection Seeding option)
  - i.  $< 0.003\text{cm}^{-1}$  with Seeder
9. Energy stability : rms better than  $\pm 2\%$  @ 1064 nm, measured over 1 hr period
  - i. rms better than  $\pm 3\%$  @ 532 nm, measured over 1 hr period
  - ii. rms better than  $5\%$  @ 532 nm, measured over 8 hr period
10. Beam diameter :  $\leq 10$  mm
11. Beam spatial profile (fit to Gaussian) :
  - i. Near field ( $< 1$  m) fit :  $> 70\%$
  - ii. Far Field ( $\infty$ ) :  $> 95\%$

**(Note: An image and intensity distribution plot of the near-field and far-field beam should be included, indicating the gaussian fits)**

12. Flashlamp lifetime :  $> 30$  million pulses
13. Pump chamber : Highly reflective and efficient pumping chamber that should yield superior laser mode quality.
14. Optical design : Dual rod Oscillators with amplifier stages
15. SHG unit for generating 532 nm, should have provision to add additional Harmonics in the future in the same housing.
16. The laser will be used in various combustion experiments, therefore, the laser should have a sealed laser cavity and amplifier stages along with the optics, to avoid dust settling on the optics, minimize optical alignment and for long term performance, and lower costs of ownership.
17. The laser head, power unit, and the external chiller should have metal enclosures for proper shielding of the electronic circuits and to avoid any potential external interferences.
18. External chiller unit should be included in the quotation. The water flowrate and power requirement for the chiller must be specified.
19. Installation and Warranty
  - Installation and integration of all supplied hardware and software shall be done by the vendor.
  - Minimum warranty period for all the parts should be 12 months
  - Laser should be upgradable to other harmonic wavelengths for 355 and 266nm in future
  - Operating voltage: 220 VAC, 50 Hz.

**(b) Optional Requirements:**

1. The vendors are requested to provide a separate quotation of an Injection Seeder unit with the following technical specifications:
  - a. Compatible with above mentioned Nd YAG laser system
  - b. Linewidth  $< 0.003\text{cm}^{-1}$ , single longitudinal mode operation
  - c. Energy in the injection seeded mode,  $\geq 900$  mJ/pulse, energy loss in the seeded mode less than 10%
2. The vendors are requested to include the cost of extended warranty and an annual maintenance contract for the laser separately from the quoted price of the laser system.
3. The vendors can include the quoted price of the online UPS systems required to support the laser and chiller units.
4. The vendors may also list any other add-on features of the laser such as dual-pulse option from a single cavity, simultaneous emission of either (1064 nm+ 532 nm or 532 nm + 355 nm, etc.).
5. The vendors can include laser safety glasses with OD $>7$  (Qty : 4) in the wavelength range of 532 nm – 1064 nm in the quotation.

**(c) Terms and conditions:**

1. This tender follows a two-bid system, seeking separate technical and commercial (or financial) bids. Both the technical bid (cover-1) and financial bid (cover-2) should be sealed separately and kept in another bigger cover (cover-3). Once bids submitted, it cannot be changed / altered or withdrawn.
2. (i) If the offer is from an Indian Bidder as Indigenous item, then price should be on FOR IISc Bangalore basis. (ii) If the offer is from a foreign (either directly or through its authorized Indian agent) as Import, then price should be preferably on DDP- Delivered Duty Paid-IISc Bangalore basis, however IISc may consider the offer on CIP-Bangalore basis also. (iii) The offer price in the commercial bid should include the laser, and additional accessories, laboratory installation and demonstration at IISc, and a comprehensive warranty period of no less than one year from the date of satisfactory installation and acceptance by the user department of IISc.
3. (i) For Indigenous item, IISc will release 100% payment after complete supply, satisfactory installation and its acceptance by the user department of IISc. (ii) For import, IISc may consider for payment through Letter of Credit (LC) with condition that 80% of the payment of equipment cost will be released on receiving of all dispatch documents and rest of the of the payment will released only after successful installation and its acceptance by the user department of IISc.
4. The technical bid should contain the full technical specifications of the high energy laser on offer, along with a product brochure if available.

5. The technical bid should also contain laser warranty details and terms. Further, any periodic maintenance requirements for regular operation of the laser should be specified in detail, along with the extent of overage under warranty for such maintenance activity.
6. The technical bid should also contain terms and conditions for future purchase of extended warranty on the laser, should IISc decide to do so. The commercial bid should include a separate price quotation for the extended warranty or comprehensive annual maintenance cost (CAMC) on site as per terms outlined by the vendor in the technical bid.
7. The vendor should have an office in India (preferably in Bangalore) that can provide in-person technical support at IISc if needed during the warranty and / or CAMC period and should have a laser maintenance and repair facility.
8. The vendor should have supplied no less than 10 high-energy laser systems (**Pulse energy > 800 mJ/pulse @ 1064 nm**) in the last five years to Government of India organizations of national importance, including but not limited to CFTIs (IISc/IITs/NITs *etc*), DRDO laboratories, ISRO centers, and CSIR laboratories. The vendor should include upto 5 testimonials from existing users of high energy laser systems (**pulse energy > 800 mJ/pulse @ 1064 nm**) indicating the performance of the laser and maintenance satisfaction.
9. The laser will be transported from one laboratory to another laboratory for various experiments, the vendor should provide support for the packaging and transport of the laser when needed.
10. The vendor should be of international repute with laser maintenance and repair facilities in India.
11. The laser system should be delivered within 16-20 weeks from the date of order.
12. The vendor should provide information on the total power requirement and type of electrical connection for the laser unit and the external chiller along with a list of online UPS models that will support the laser system in case of power outage. The UPS model should be capable of supporting the laser for at least 30 mins to ensure a safe shut down procedure.
13. IISc has absolute right to accept or reject any bid/tender wholly or partly without assigning any reason at any stage of tendering process or procurement process.
14. IISc shall have the absolute right to verify the particulars, furnished by the bidders or/and to take opinion of other department/institute for their opinion/experience about the bidder's services/sales. Based on such input, IISc may decide about rejection of a bid of such bidder(s).
15. Firstly, the technical bids will be opened and evaluated. Financial Bids will be opened for those bidders only, whose technical bids will be declared qualified. With regards to the evaluation of bids, decision of IISc will be final and binding.
16. IISc reserves right to award the tender to a bidder, even not participated in the bidding process.

17. IISc reserve right to accept or reject any bid at any stage of the tendering process without assigning any reason thereof.
18. IISc reserves right to cancel the tendering process at any stage without assigning any reason thereof.
19. These items are required for research purpose. IISc is registered with DSIR (Department of Scientific and Industrial Research), Govt. of India for availing concessional GST and Custom Duty exemption. For Indigenous item, IISc pays 5% GST, for which relevant DSIR certificate will be provided subject to acceptance of the order and proforma invoice. For Import items, IISc will provide DSIR Custom Duty Exemption certificate subject to providing Airway Bill, Packing List, Invoice etc. For the items, for which the vendor is charging GST, IISc will not provide custom duty exemption certificate. While calculating the financial bid, bidders should consider the DSIR registration status of IISc.

**Vendors should strictly adhere to the following instructions in preparing their bids.**

**Instructions:**

1. The quotation should clearly indicate the terms of delivery and delivery schedule.
2. The tender should be submitted in two separate sealed envelopes – one containing the technical bid and the other containing the commercial bid, both of which, duly signed, should reach IISc (at the address provided below) before 17:30 hours of 2<sup>nd</sup> Jan. 2020. Unsealed quotation covers will be rejected. The two sealed envelopes can be sent together inside a single larger envelope.
3. Mailing address:  
**The Chairman**  
**Department of Aerospace Engineering**  
**(Attention: Dr. Pratikash Panda)**  
**Indian Institute of Science**  
**Bangalore 560012, India.**
4. A compliance certificate should be enclosed along with the technical bid. This certificate should have a table that describes your compliance in a “Yes” or “No” response against each of the items listed under Technical Specifications above.
5. Items in addition to that listed in the Technical Specifications that vendors would like to bring to the attention of the IISc Technical Committee for this procurement can be listed at the end of the compliance table.
6. The technical bid should also explicitly address compliance and / or acceptance to each of the points listed under Terms and Conditions above, and any information requested therein should be furnished in detail.
7. Vendors offering international laser (OEM based outside India) should provide the price quotation in suitable foreign currency.
8. In case of an international laser system, IISc will provide the end-user certificate and necessary supporting documents for the import of items into India to facilitate necessary Customs Duty exemptions.

Vendors should utilize the following checklist to ensure that their submissions are complete and contain all the required information.

**Checklist:**

1. The technical bid should contain:
  - a. Technical compliance certificate as per item 4 of the above instructions;
  - b. Full technical specifications of the high energy laser systems on offer along with any available product brochure as per item 4 of the above terms and conditions;
  - c. High energy laser system warranty details with terms, and any periodic maintenance requirements as per item 5 of the above terms and conditions;
  - d. Extended warranty details with terms as per item 6 of the above terms and conditions;
  - e. Acceptance of all terms and conditions listed above as per item 6 of instructions;
  - f. A list of high-energy laser systems supplied to Government of India organizations and performance testimonials as per item 8 of terms and conditions.
2. The commercial bid should contain:
  - a. A price quotation for the laser system on offer as per item 2 of the above terms and conditions;
  - b. A separate price quotation for extended warranty as per item 6 of the above terms and conditions;
  - c. Separate price quotations as per items 1-5 of the above optional requirements.

All enquiries and clarification requests should be directed to:

**Dr. Pratikash Panda**  
**Assistant Professor**  
**Department of Aerospace Engineering**  
**Indian Institute of Science, Bangalore 560012, India**  
**Email: pratikashp[at]iisc[dot]ac[dot]in**

**Schedule of events:**

<b>Tender Publishing date</b>	<b>26<sup>th</sup> November 2019</b>
<b>Bid Submission Deadline</b>	<b>20<sup>th</sup> December 2019, 05:30 p.m.</b>
<b>Mode of tender</b>	<b>Offline – Sealed Tenders under Two-Bid cover system</b>
<b>Technical Bid Opening date</b>	
<b>Financial Bid Opening date</b>	<b>Will be intimated later to the technically qualified bidders</b>

-----**End of document**-----