

# TATA INSTITUTE OF FUNDAMENTAL RESEARCH

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Date: 16-11-2021

## Notice Inviting Tender cum Tender Document (Two Part Global Tender) for the following items:

**Petawatt laser - Supply, Installation, and Commissioning at Tata Institute of Fundamental Research, Hyderabad.**

As per our technical specifications as per Annexure – A

Global Tender No.	<b>TFR/PD/GT/IC20-9/200483</b>
Published on	<b>17-11-2021</b>
Tender Fees	Rs. 00 (USD 00)
Earnest Money Deposit	EMD/Bid Security Declaration to be submitted along with Part A as per format in Annexure – B
Estimated Cost (Estimated cost upto TIFR, Hyderabad inclusive of all applicable charges)	<b>Rs. 7494 Lakhs</b>
Last Date for Submission of Bid	<b>17-01-2022 upto 13.00 Hrs.</b>
Date of Opening Bids(Part A)	<b>17-01-2022 at 15.00 Hrs.</b>

**Both Technical Bid (Part A) and Financial Bid (Part B)** to be submitted within the due date and time in separate envelopes and marked on top as Part A and Part B. These two sealed envelopes should be further put in one Master Envelope super scribed with the Tender No., Due Date in Bold Letters.

The Bids should be addressed to the Administrative Officer, Tata Institute of Fundamental Research, Hyderabad, Plot No.36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District. Hyderabad- 500 107, Telangana, India.

TIFR Hyderabad reserves the right to accept/ reject any or all tenders either in part or in full without assigning any reasons there for.

Please see attached sheet for conditions of tender.

Note: All future corrigendum/addendum will be published in CPPP/TIFR Hyderabad website only and no separate advertisement will be released for the same.

All prospective bidders are requested to visit our website regularly for any such updates/Corrigendum.

**ADMINISTRATIVE OFFICER  
(PURCHASE SECTION)  
TIFR, HYDERABAD**

**Peta-Watt Laser - Supply, Installation,  
Commissioning at TIFR, Hyderabad**

**Technical Specifications**

**Ti:Sapphire Laser System of Peta-Watt class power**

**A) Key specifications:**

The following are essential.

a) Two output beams should be delivered:

- I. A low powered beam of 50 TW at 5 Hz repetition rate. (referred to as LEB (low energy beam) in this document.
- II. A high energy output beam (referred to as HEB (high energy beam)).
  - a. The power of the HEB laser system should be 0.75 PW at 1 Hz and should have the ability of scale up the energy upto 1.0 PW at 1 Hz by the addition of the required pump lasers.
  - b. Optional quotation for the upgradation to 1.0 PW at 1 Hz should also be included.

b) The other important specifications of the both the output beams should be as per the table given below.

	<b>Parameters</b>	<b>Desired Nominal values that should delivered on day-to-day performance</b>
1	Pulse duration (FWHM) (LEB & HEB)	$\leq 25$ fs
2	Beam energy after pulse compressor	HEB $0.75 \text{ PW} \geq 18 \text{ J}$ LEB $\geq 1.25 \text{ J}$ per pulse (with 5 Hz rep rate)
3	Central lasing wavelength (LEB & HEB)	$800 \text{ nm} \pm 20 \text{ nm}$
4	Beam size after final amplifier	HEB greater than or equal to 100 mm (0.75 PW) LEB greater than or equal to 50 mm
5	Beam size after pulse compressor optics	LEB greater than or equal to 60 mm HEB greater than or equal to 240 mm
6	Repetition rate	LEB – 5 Hz HEB- 1 Hz Both LEB and HEB should be operable on single shot mode

7	Pump laser energy stability (LEB & HEB)	< 1.5 % on 100 shots (short term) < 2% on 500 shots (long term)
8	Pulse contrast (LEB & HEB)	
a	Replica pre-pulse	$\geq 10^8$
b	ASE @ 100 ps	$\geq 10^{10}$
c	ASE @ 10 ps	$\geq 10^7$
d	ASE @ 5 ps	$\geq 10^5$
9	Beam pointing stability (LEB & HEB) : over 500 shots	$\leq 5$ microrad(r.m.s.)
10	Beam energy stability : short term (LEB & HEB)	$\leq 1.5\%$ (r.m.s.) over 10 minutes
11	Beam energy stability : long term (LEB & HEB)	$\leq 3\%$ (r.m.s.) drift over 8 hours
12	Strehl ratio	$\geq 0.8$ (with deformable mirror for HEB) $\geq 0.6$ LEB standalone (without deformable mirror)
13	Beam profile(LEB & HEB)	Super Gaussian
14	Polarization(LEB & HEB)	Linear (Horizontal), Ellipticity $\leq 10^{-2}$
15	Beam attenuation a) LEB b) HEB	1% to 100%, continuous Fixed strong attenuation in 20 % steps

Other necessary features of the system:

- a) The architecture of the laser system should be such that the final amplifier optics, beam attenuation system and compressor optics should be designed for the HEB of 1.0 PW such that a future upgrade is possible only with the addition of more pump lasers.
- b) A quotation for getting the system operational for the upgradation to 1.0 PW at 1 Hz should be provided as an optional separately.
- c) The system should be designed to have XPW front end.
- d) The system electronics should be adequately designed for the necessary triggers of the possible upgrade and should have the triggers system synchronous with control of the additional pump lasers that can take system to 1.0 PW.
- e) It should be possible to run the LEB only system and LEB system with the HEB system so that two pulse are generated synchronously for simultaneous use.

- f) A deformable mirror with its allied optics at a suitable location for phase front correction of the beam, to provide the desired Strehl ratio ( $\geq 0.9$ ). The price of this system should be mentioned separately.
- g) A centralized PC-based control and command system that should have diagnostics to diagnose the system at several stages (from oscillator to the final amplifiers) and show laser energy, beam position, spectral measurement, imaging system for the big Ti:sapphire crystals, beam profile monitors at crucial points of the system. This should provide ample monitoring of the system for a smooth day-to-day operations, instant diagnosis of the problem and a quick trouble shooting. The system should be complete with all photo-diodes, CCD cameras, spectrometers, computers and computer accessories to integrate the full control and command system.
- h) The pulse electronics of the system should deliver at least six synchronous TTL compatible triggers available for synchronization with other instruments during experiments. The synchronous triggers should be available with a pre-trigger up to 1 ms and post-trigger of greater than 1 ms with respect to the arrival of laser pulse. The delay should be adjustable in steps of ns and the timing jitter with the laser pulse should be less than 200 ps.
- i) The laser system should be supplied as an integrated system, not in parts. All the boxes containing various sub-systems, components should be shipped together.
- j) The system should have emergency safety features to shut down the critical components of the system in case of major failure of any sub-component or mains failure, to prevent any damage to the optical components of the system as well as to the control electronics and power supplies of the complete laser system.
- k) The site preparation conditions for the necessary water cooling system, additional air conditioning and air handling system, clean air filter should be mentioned so that they are arranged before the system arrives for installation.
- l) The vacuum chambers will be procured independently and should not be included in the quotation. However all the other parts (like optics, opto-mechanics, and vacuum motors, manipulator electronics, feed-throughs should be included in the quotation. The full design of the optical table mounting system for the LEB and HEB compressors should be provided. Also the design of the desired vacuum chambers for the LEB and HEB system should be provided. The desired pump system, pressure monitoring systems, residual gas analyser and other control system should be indicated so that they may be procured independently from other vendors. This should be done once the company is short listed for ordering for the procurement.
- m) The full layout of the optical table system should be provided so that the necessary tables may be procured independently from other vendors.

B) Essential accessories / Operational requirements:

Please provide a separate quote for these items as an option to choose for purchase

- a) Quotation should be submitted for a second order auto-correlator system for routine optimization of laser pulse duration.
- b) Quotation should be submitted for a third auto-correlator system to measure a contrast ratio of greater than  $10^{12}$ , up to about 400 ps from the pulse peak.
- c) A spectral phase measurement device like FROG or SPIDER that is necessary for operations.

C) Very Important notes on specifications/operational requirements

- a. The values of various parameters listed in the table in b) above should be delivered everyday. If there are deviations in day-to-day operation, the quotation should clearly mention what is achievable every day and what would be the best achievable parameters.
- b. A list of all the detectors connected to the supervising control module should be provided.
- c. The final output beam diameter after the laser pulse compressor should be stated (at  $1/e^2$  value).
- d. Apart from the normal 1 Hz operation, it should be possible to use the laser systems (both LEB and HEB) in single shot mode.
- e. The system should run on 230VAC  $\pm$  10%, 50 Hz supply.
- f. The electrical power (voltage/current) requirements for all the electrical power supplies should be mentioned in the offer.
- g. Requirement of three-phase supply and uninterrupted power supply (UPS), if any, should also be stated along with their electrical specifications.
- h. The requirement of water cooling for the offered system must be stated.
- i. The operating temperature and the desirable limits on the humidity level in the laser hall (if any) should be specified in the quotation.

- j. Separate air conditioning will be provided to the service corridor to cool the power supplies kept there. For this purpose, please mention in your offer the total heat load of the equipment to be kept in the service corridor.
- k. A list of instruments/equipments, manipulation tools etc. required from the user side for day-to-day operation of the laser system must be provided along with the quotation.
- l. User manuals (in English) containing all technical details of the system (optical layouts, electrical circuit diagrams, optical component details and operation/ servicing instructions, should be supplied with the system free of cost.

**D) Criteria for the bidder qualification:**

Only those laser manufacturers who have demonstrated capability to design, manufacture and test /characterize a PW class laser system are eligible to bid. The bidder should meet the following criteria to qualify to bid.

- ✓ The bidder should have at least 5 years of experience and capability in the field of design, manufacturing, characterization, installation, and commissioning of PW class laser systems.
- ✓ The bidder should have supplied at least one laser system with an output  $\geq 1$  PW, with technical specifications similar to those of the present specifications, to reputed research institutes / universities /laboratories across the world during last five years. Bidder must submit documents in support of this, along with the technical bid and provide contact details (including email addresses) of the purchasers of reputed research institutes / universities /laboratories of those systems across the world. Poor performance reports of the systems previously supplied to others may constitute reason sufficient enough for the bid not to be considered.
- ✓ The bidder should allow the purchaser to send one or two technical experts from TIFR to the factory for being fully embedded with the staff of the manufacturing unit during the building the system at the factory so that they acquire the expertise to completely service most of the system and have a smooth operation after installation. The travel costs and cost of living of purchaser's representatives will be borne by the purchaser.

- ✓ The bidder must undertake to provide spares, maintenance, and after sales service of the complete laser system after installation and commissioning, during and after the warranty period, either directly or through their authorized service representative in India.
- ✓ The bid can be submitted against the tender directly or through an authorized representative in India. Original documents, duly signed by the supplier/OEM (not by the representative in India), should be submitted against the tender directly or through the Indian agent. Please note that TIFR do not accept digital/ scanned/ photocopied/ faxed signature or quotations.
- ✓ The authorized Indian representative must send details of their technical staff (trained / to be trained on the system to be supplied) for giving technical support after the commissioning of the laser system at the purchaser's laboratory. The Authorized Indian Representative must submit the authorization letter from the OEM/Supplier/Bidder.
- ✓ The vendor is strongly encouraged to set up an Indian office of the company or locate factory experts (at least one at any time) permanently in the Indian agent's office. The 'factory expert' here refers to a technically qualified engineer trained completely at the factory on petawatt scale lasers in the manufacture/maintenance of the entire laser system.
- ✓ The vendor must guarantee that our service requests will get satisfactory technical response within 72 hours from the time of the request.
- ✓ The vendor should provide list of all the necessary spares and indicate which spares will be stocked in India. TIFR prefers that the maximum number of the listed spares should be located in India to avoid delays in import, transit time, clearance etc.
- ✓ The vendor should allow 5% of the price of the laser system to be retained by TIFR for a period of one year, post-final acceptance of the system at the installation site and to collect the 5% of the price of the laser system only after a one year of performance of the system to the specifications. Accidental conditions and/or other conditions that the vendor would like to add to ensure such compliance may be specified in the offer document.

- ✓ Please note that this is a two-part tender, wherein the Technical bid (Part A) and the corresponding Financial bid (Part B) are to be submitted within the due date and time, in separate sealed envelopes and marked on top as Technical bid (Part A) and Financial bid (Part B). These two sealed envelopes should be further put in one Master Envelope superscribed with the Tender No., Due Date in bold letters.

During evaluation of Part A, bidders may be contacted to get clarifications on the technical specifications of the bids offered by them. The bids of only those bidders qualifying in the technical part will be opened in Part B.

## **E) Miscellaneous Points**

### **i) Inspection and Training**

- The demonstration of system performance as per P/O specifications shall be done at Supplier's factory site in presence of Purchaser's representatives.
- The shipping release will be signed by Purchaser's representatives after this demonstration of acceptance test criteria (listed in Section H) of the system performance.
- Training (operation and routine maintenance) for up to four persons should be provided at the Purchaser's laboratory during the installation of the system, and for one week after the completion of the installation.

### **ii) Shipment**

- The full system should be shipped by air.
- There will be no part-shipment or trans-shipment.
- The system should be dispatched only after the shipping release is signed by the Purchaser's representatives.
- The packing and forwarding charges will be borne by the Supplier.
- All applicable charges outside India to be paid by supplier.
- The customs duty and local taxes in India will be borne by the Purchaser.
- The bidder should quote Ex-work cost (Duly packed Airworthy), FOB/FCA Cost (Name of the Airport) , CIP/CIF Cost ( Up to Hyderabad Airport, all inclusive (ie) Cost of Goods, Packing, Insurance, Inland, transportation, freight etc.) as per the attached price bid format Annexure E.

### **iii) Installation and Commissioning**

- Installation and commissioning should be carried out by the Supplier's trained engineers at the Purchaser's laboratory. The system performance as per P/O specifications should be demonstrated after installation at the Purchaser's site.
- A tentative schedule of installation, starting from the date of receipt of the full consignment at the Purchaser's laboratory should be supplied by the Supplier.

### **iv) Warranty**

- At least one-year onsite free/ unconditional warranty on the complete system (except consumable and optics) from the date of installation at the Purchaser's laboratory provided that the system is used according to the user manual. During the warranty period if any part or the complete system requires repair or replacement, the same shall be carried out free of cost at the purchaser's site including the cost of to and fro shipment charges (inclusive of packing), customs duty between Purchaser's laboratory and the Supplier's factory site will be borne by the Supplier. The replacement part should be shipped to India first and only after that the replacement is made on the system, the faulty component can be removed and sent to the vendor's factory for the repair.
- During the warranty period, if there is a system fault and the supplier/ his Indian agent should not take more than 15 days to rectify the problem. The down period will be added to the system warranty period. Delays due to export/import procedures will be excluded from this period.
- All pump lasers must be covered with at least one-year warranty including their optics, the only exception being for consumables- 'consumables' implying flash lamps and water filters.
- All the optical components in the amplifier systems must be warranted for at least three months.
- All the diode pump lasers should be warranted for 10,000hrs or a duration of 2 years (whichever is later) from the date of completion of installation at the Purchaser's site.

**v) Spares**

- A price list of the spare components that may be required for smooth operation of the complete laser system over a period of 2years should be supplied with the quotation.
- A separate price list of the spare parts that may be required after 2 years of installation over the next three years should also be supplied with the quotation.

**vi) After-Sales Service/ Maintenance Contract**

- During the warranty period, the laser system will be serviced and maintained by the Supplier's or their Indian agent's trained engineers, free of cost.
- The offer should state provisions of after-sales service by the Supplier or their trained Indian representative after the warranty period is over.
- The cost and conditions of laser maintenance contract (if available) should be stated separately.

## F) Compliance table on the HEB laser specifications:

(To be filled in by the Supplier and sent with the offer)

**Note : Please write your actual values, instead of simply writing "Complied"**

Sr. No.	Parameters	Nominal values	Supplier's values
i	Laser power [Energy per pulse / pulse duration (FWHM)]	$\geq$ HEB of 0.75 PW	
ii	Pulse duration (FWHM)	$\leq$ 25 fs	
iii	Beam energy	HEB $\geq$ 18J	
iv	Central lasing wavelength	800 nm $\pm$ 20 nm	
v	Beam size after final amplifier	HEB greater than or equal to 100 mm	
vi	Beam size after pulse compressor optics	HEB greater than or equal to 240 mm	
vii	Repetition rate	1Hz , with single shot operation	
viii	Pump laser energy stability	< 1.5% rms on 100 shots (long term) < 2% rms on 500 shots (long term)	
ix	Pulse contrast		
a	Replica pre-pulse	$\geq 10^8$	
b	ASE @ 100 ps	$\geq 10^{10}$	
c	ASE @ 10 ps	$\geq 10^7$	
d	ASE @ 5 ps	$\geq 10^5$	
x	Beam Pointing stability : over 500 shots	$\leq$ 5 micro-rad (r.m.s.)	
xi	Beam energy stability : short term	$\leq$ 1.5% (r.m.s.) over 10 minutes	
xii	Beam energy stability : long term	$\leq$ 3% (r.m.s.) drift over 8 hours	
xiii	Strehl ratio	$\geq$ 0.8 (with deformable mirror)	
xiv	Beam Profile	Super Gaussian	
xv	Polarization	Linear (Horizontal), Ellipticity $\leq 10^{-2}$	
xvi	Beam attenuation	Fixed strong attenuation in 20% steps	

**Compliance table on the LEB laser specifications:**

**(To be filled in by the Supplier and sent with the offer)**

**Note: Please write your actual values, instead of simply writing "Complied"**

Sr. No.	Parameters	Nominal values	Supplier's values
i	Laser power [Energy per pulse / pulse duration (FWHM)]	$\geq 50\text{TW}$	
ii	Pulse duration (FWHM)	$\leq 25\text{ fs}$	
iii	Beam energy	$\geq 1.25\text{J}$	
iv	Central lasing wavelength	$800\text{ nm} \pm 20\text{ nm}$	
v	Beam size after final amplifier	Greater than or equal to 50 mm	
vi	Beam size after pulse compressor optics	Greater than or equal to 60 mm	
vii	Repetition rate	5 Hz, with provision for single shot operation	
viii	Pump laser energy stability	< 1.5% rms on 100 shots (long term) < 2% rms on 500 shots (long term)	
ix	Pulse contrast		
a	Replica pre-pulse	$\geq 10^8$	
b	ASE @ 100 ps	$\geq 10^{10}$	
c	ASE @ 10 ps	$\geq 10^7$	
d	ASE @ 5 ps	$\geq 10^5$	
x	Beam Pointing stability : over 500 shots	$\leq 5\text{ micro-rad (r.m.s.)}$	
xi	Beam energy stability : short term	$\leq 1.5\% \text{ (r.m.s.)}$ over 10 minutes	
xii	Beam energy stability : long term	$\leq 3\% \text{ (r.m.s.) drift}$ over 8 hours	
xiii	Strehl ratio	$\geq 0.8$ (with deformable mirror)	
xiv	Beam Profile	Super Gaussian, $G \geq 8$	
xv	Polarization	Linear (Horizontal), Ellipticity $\leq 10^{-2}$	
xvi	Beam attenuation	1% to 100%, continuous	

## G) Compliance on other requirements:

(To be filled in by the Supplier and sent with the offer)

Sr. No.	Other operational requirements	Purchaser's expectation	Supplier's response
1.	The system should have a deformable mirror with its allied optics at a suitable location for phase front correction of the beam, to provide the desired Strehl ratio ( $\geq 0.8$ ).	Required	
2.	The laser system should have a centralized PC-based control and command system. It should have a supervising control module for on-line monitoring of the diagnostic information (such as laser energy, pulse duration, beam position, laser spectrum and other important laser parameters) at different locations, for day-to-day smooth operation, trouble-shooting and routine maintenance.	Required	
3.	All the diagnostics systems required for the above, like CCD cameras for beam profile, photo-diodes for energy monitoring, diagnostics bench etc. should be supplied with the system.	Required	
4.	It should have emergency safety features to shut down the critical components of the system in case of major failure of any sub-component of the system or mains failure to stop any damage on the optical components of the system as well as to the control electronics and power supplies of the complete laser system	Required	
5.	The system should have at least three synchronous TTL compatible triggers available for synchronization with other instruments during experiments. The synchronous triggers should be available with a pre-trigger of $\geq 1$ ms and post-trigger of $\geq 1$ ms with respect to the arrival of laser	Required	

	pulse. The delay should be adjustable in steps of ns w. r. t the laser pulse, with a timing jitter of $\leq 200$ ps.		
6.	The compressor should be for a 1.0 PW laser system so that the system can be upgraded to 1.0 PW in future without necessity of changing the compressor.	Required	
7.	Please quote the current price for all the pump lasers, mirrors and mounts required to upgrade the offered base system (0.75PW) to 1.0 PW level. A block diagram of the 1.0 PW laser system, highlighting the extra needed components, should also be supplied along with the quotation.	Required	
8.	The laser system should be supplied as an integrated system, not in parts. All the boxes containing various sub-systems, components should be shipped together.	Required	
9.	The offer must include full layout of the offered system indicating all the important sub-systems and optical components.	Required	
10.	The system layout with the full possible upgraded 1.0 PW power should be given (inclusive of the pulse compressor). It should also show the positions of the pump lasers required from (0.75 PW) to the fully upgradable system of 1.0 PW power.	Required	
11.	The Dimensions and other important specifications of all the mounting tables required for the system should be stated in the offer.	Required	
12.	All the mechanical mounts and the motors used in the pulse compressor stage should be vacuum compatible ( $<10^{-6}$ torr), and should be provided with their driver control units.	Required	
13.	The Supplier should provide broad specifications and the typical dimensions of their standard	Required	

	vacuum chamber and related pumping system for the pulse compressor. Price for this unit should be stated as an <i>optional item separately</i> in the quotation.		
14.	The minimum dimensions of the vacuum chamber (rectangular) required to house the pulse compressor should also be stated in the offer.	Required	
15.	The specified output laser power after the compressor should be achieved in a regular operation of the pump lasers within 90% of their rated values. The energy of the pump lasers and diode currents for this should be stated along with their maximum rated values.	Required	
16.	A list of all the detectors connected to the supervising control module should be provided.	Required	
17.	The final output beam diameter after the laser pulse compressor should be stated (at $1/e^2$ value).	Required	
18.	It should be possible to use the laser system in single shot mode also.	Required	
19.	The system should run on 230VAC $\pm 10\%$ , 50Hz supply. Voltage regulation/current requirement relevant to the operation of the laser system should be stated. Requirement of three-phase supply and UPS if any, should also be stated along with their electrical specifications.	Required	
20.	The electrical power requirement for all the electrical power supplies should be mentioned in the offer.	Required	
21.	The requirement of water cooling for the offered system must also be stated.	Required	
22.	The operating temperature and the desirable limit on humidity level should be specified in the quotation.	Required	

23.	A list of instruments/equipment required from the user side for day-to-day operation of the laser system must be provided in the offer.	Required	
24.	User manuals (in English) containing all technical details of the system (optical layouts, electrical circuit diagrams, optical component details) and operation/ servicing instructions should be supplied with the system free of cost.	Required	
25.	Demonstration of system parameters at the factory site before dispatch of the system	Required	
26.	Training to be provided to three persons during installation and for one week after completion of installation.	Required	
27.	The full system should be shipped by air. There will be no part-shipment or trans- shipment. The packing and forwarding charges will be borne by the Supplier.	Required	
28.	The system performance as per P/O specifications should be demonstrated after installation at the Purchaser's site.	Required	
29.	A tentative schedule of installation, starting from the date of receipt of the full consignment at the Purchaser's laboratory should be supplied by the Supplier.	Required	
30.	Warranty as per clauses in section (E iv)	Required	
31.	List of spares recommended for the <i>first two years</i> , with their price list should be attached	Required	
32.	List of spares recommended for the <i>next three years</i> , with their price list should be attached	Required	
33.	During the warranty period, the laser system will be serviced and maintained by the Supplier's trained engineers or Indian agent's trained engineers, free of cost.	Required	
34.	Maximum rated energies of various pump lasers	Required	

35.	Details of maintenance contract after the warranty period may be supplied.	Desirable	
36.	A second order auto-correlator system for day-to-day measurement of laser pulse duration after the pulse compressor. Price for this unit should be stated as an <i>optional</i> item <i>separately</i> in the quotation.	Required	
37.	A Spectral Phase measurement device like SPIDER/FROG necessary for the laser should be indicated. Price for this unit should be stated as an <i>optional</i> item <i>separately</i> in the quotation.	Required	
38.	A third order auto-correlator system with a capability to measure a contrast ratio of greater than $10^{12}$ , up to about 400 ps from the pulse peak, should be supplied with the system. Price for this unit should be stated as an <i>optional</i> item <i>separately</i> in the quotation.	Required	
39.	The system should have a beam attenuator for LEB to change the laser energy of the final beam before laser pulse compressor from 1 to 100 % of its maximum energy value. Price for this unit should be stated as an <i>optional</i> item, <i>separately</i> in the quotation.	Required	

## H) Acceptance tests / criteria for the HEB/LEB laser System:

Following tests will be carried out at Supplier's factory site during pre-dispatch inspection and as well as at Purchaser's laboratory for the final acceptance of the supplied system:

Sr.#	Parameters	Specification value as per the indent	To be measured and demonstrated
<b>I</b>	Laser power [Energy per pulse/ pulse duration (FWHM)]	as mentioned for HEB and LEB	At factory as well as at Purchaser's lab
<b>ii</b>	Pulse duration (FWHM)	$\leq 25$ fs	At factory as well as at Purchaser's lab
<b>iii</b>	Beam energy	As per LEB and HEB stated above	At factory as well as at Purchaser's lab
<b>iv</b>	Central lasing wavelength	$800 \text{ nm} \pm 20 \text{ nm}$	At factory as well as at Purchaser's lab
<b>v</b>	Beam size after final amplifiers, before compressor	As per LEB and HEB stated above	At factory as well as at Purchaser's lab
<b>vi</b>	Beam size after pulse compressor optics	$\geq$ As per LEB and HEB stated above	At factory as well as at Purchaser's lab
<b>vii</b>	Repetition rate	1 Hz (HEB) and 5 Hz (LEB), - both with single shot operation also	At factory as well as at Purchaser's lab
<b>viii</b>	Pump laser energy stability	< 1.5% rms on 100 shots (long term) < 2% rms on 500 shots (long term)	At factory as well as at Purchaser's lab Long term stability at factory only.
<b>ix</b> a b c d	Pulse contrast Replica pre-pulse ASE @ 100 ps ASE @ 10 ps ASE @ 5 ps	$\geq 10^8$ $\geq 10^{10}$ $\geq 10^7$ $\geq 10^5$	At factory as well as at Purchaser's lab
<b>x</b>	Beam Pointing stability : over 500 shots	$\leq 5$ micro-rad rms	At factory as well as at Purchaser's lab
<b>xi</b>	Beam energy stability : short term	$\leq 1.5\%$ (rms) over 10 minutes	At factory as well as at Purchaser's lab
<b>xii</b>	Beam energy stability : long term	$\leq 3\%$ (rms) drift over 8 hours	At factory as well as at Purchaser's lab
<b>xiii</b>	Strehl ratio	$\geq 0.8$ (with deformable mirror)	At factory as well as at Purchaser's lab
<b>xiv</b>	Beam Profile	Super Gaussian	At factory as well as at Purchaser's lab
<b>xv</b>	Polarization	Linear (Horizontal), Ellipticity $\leq 10^{-2}$	At factory as well as at Purchaser's lab
<b>xvi</b>	Maximum rated pump laser energies	As stated in the offer	At factory as well as at Purchaser's lab
<b>xvii</b>	Beam attenuation	As per LEB and HEB stated above	At factory as well as at Purchaser's lab

**NOTE:**

\* The bidder should ensure to submit the following along with Technical Bid (Part I)

1. The bidder should attach the point-by-point technical specification provided in the tender in a tabulation format and fill the technical compliance (with additional remarks if any) along with the Technical Bid.
2. Bid Security / EMD (Earnest Money Deposit): The bidder should provide the bid security declaration in the letterhead duly signed and stamped by officer authorized to submit the bid, accepting the statement as per the format in Annexure - B.
3. Audited Annual Turnover Certified by CA - Attachment of Annexure - C
4. Supplier Purchase Order details with copy document along with the bid Attachment of Annexure - D.

\* Price Bid/Finance Bid (Part II) - As per Annexure – E.

**Annexure - B**

**Bid Security Declaration**

**(To be submitted on company's Letter Head)**

"I/We the undersigned hereby declare that if we withdraw or modify the bids during the period of its validity, or if we are awarded the contract and fail to sign the contract, or to submit a performance security before the deadline defined in the request for bids document or fail to execute the contract, we will be suspended for the period of time specified in the request for bids document from being eligible to submit bids for contracts with the entity that invited the bids."

**Name and Signature  
Of Authorized Signatory  
And Company Seal**

**Annexure - C**

**Audited Annual Turnover**

<b>S.No.</b>	<b>Financial/ Accounting Year</b>	<b>Profit (Rs.)</b>	<b>Loss (Rs.)</b>	<b>Annual Turnover  (in INR)</b>
1.				
2.				
3.				

**Authorized Signatory with Seal**

**Note:**

**This Audited Annual Turnover (Annexure - C) for the last 3 years should be certified by Chartered Accountant (CA) as per the format given above duly signed and stamped by the CA on their letterhead.**

**Annexure - D**

**Petawatt laser - Supply Order details to other Firms.**

<b>S.No.</b>	<b>Name of the company with full address</b>	<b>Name of the Project</b>	<b>Purchase Order No. &amp; Date</b>	<b>Brief Item Description with Model No.</b>	<b>Item Value in Currency</b>
<b>Signature</b>					
<b>Name</b>					
<b>Designation</b>					
<b>Name of the Company</b>					
<b>Date</b>					
<b>Seal of the Company</b>					

**NOTE: Please attach the copy documents / purchase order copy for the above mentioned details.**

**TATA INSTITUTE OF FUNDAMENTAL RESEARCH**  
Plot No.36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District.  
Hyderabad - 500 107, Telangana, India.  
**(PURCHASE SECTION)**

1. **PART “A” (Technical Bid) consisting of Technical Bid with Commercial Terms and PART “B” (Financial Bid) consisting of only Price** shall be submitted in **separate** sealed envelopes duly superscribed with the tender enquiry number, and the due date in bold letters, addressed to the Administrative Officer, Tata Institute of Fundamental Research, Plot No.36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District. Hyderabad-500 107, Telangana, India. The envelopes should be clearly marked on top as either PART “A” or PART “B”.

The two sealed covers should be further put in a master cover superscribed with the Tender Enquiry No., Due Date in bold letters, addressed to the Purchase Officer, Tata Institute of Fundamental Research, Plot No.36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District. Hyderabad-500 107, Telangana, India. The sealed master envelop has to be delivered by hand/courier at the security Gate Office of TIFR on or before 13.00 hrs. on the due date specified. The technical bid will be opened at 15.00 hrs. on the due date at Purchase Section, TIFR, Hyderabad. Tenders submitted after 13.00 hrs. on due date will not be considered.

2. **In case the PART “A” and Part “B” bids are not sealed in separate envelopes the bid will be rejected.**
3. The technical bid should not contain any indication of the price. The bidder should take special care not to mention anything related to pricing and costing aspect of whatsoever nature. The technical bid should include/contain only technical specifications, technical literature, drawing, quantity, manufacturing and delivery schedule, mode and terms of payment, mode of dispatch, the quantum and percentage of statutory levies payable by the purchaser as extra and all related commercial terms and conditions for the supply and for the services like erection and commissioning to be rendered by the tenderer. The details of the validity of the tender should also be indicated along with the commercial details.
4. After scrutiny of Technical Bids, Financial bids of only those bidders who are shortlisted on technical basis will be opened at on later date. The opening date, time and venue will be intimated to the technically successful bidders.
5. All the bidders/contractors should provide Company Authorization Letter duly signed and stamped by Competent Authority to participate in the tender related meetings at TIFR Hyderabad.

**6. Tender Document Fee:**

Tender fee of Rs. 00 (USD 00)

**7. Bid Security / EMD (Earnest Money Deposit):**

Bid Security / EMD (Earnest Money Deposit): The bidder should provide the bid security declaration in the letterhead duly signed and stamped by officer authorized to submit the bid accepting the statement as follows:

"I/We the undersigned hereby declare that if we withdraw or modify the bids during the period of its validity, or if we are awarded the contract and fail to sign the contract, or to submit a performance security before the deadline defined in the request for bids document or fail to execute the contract, we will be suspended for the period of time specified in the request for bids document from being eligible to submit bids for contracts with the entity that invited the bids." (Annexure B)

This will be applicable as per the procedure / rule amended from time to time. The bidder should submit the above mentioned Bid Security Declaration along with the Technical Bid (Part I) instead of EMD (Earnest Money Deposit).

8. After downloading the documents please inform your company details such as name, address, telephone nos., contact person and email address etc. by email to us ([purchasegroup@tifr.res.in](mailto:purchasegroup@tifr.res.in)) to enable us to inform prospective bidder for any corrigendum/changes if any; in the Tender document before due date. Bidders Please visit the TIFR Website, Tender page for any corrigendum/changes if any; in the Tender document before due date
9. Quotations must be valid for a period of 180 days from the due date.
10. Tenders containing correction, overwriting will not be considered. Late or delayed/Unsolicited quotations/offers shall not be considered at all. These will be returned to the firms as it is. Post tender revisions/corrections shall also not be considered.
11. Tenderer should sign on all the pages of the technical bid and the price bid.
12. Requirement from Bidders: Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority as per order issued by the Government of India (Order No. F.No.6/18/2019-PPD) dated 23rd July, 2020.

Necessary certificate/undertaking to be submitted.

13. Domestic Bidders are encouraged to participate in the tender.
14. Insurance: The Goods supplied under the Contract shall be fully insured against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery.

For delivery of goods at the purchaser's premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from "Warehouse to warehouse" (Final destinations) on " All Risks" The Insurance shall be valid for a period of not less three months after installation and commissioning. However, in case of orders placed on EX-Works/FOB/FCA basis, the purchaser shall arrange insurance.

15. Contacting the Purchaser: Any attempt by any Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the bid.
16. Supplier Integrity: The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.
17. The price quoted for Import item must be on following basis:
- Ex-Work/factory duly packed airworthy/seaworthy and of international standard
  - FOB/FCA
  - CIF Hyderabad, Airport Port (all-inclusive i.e. Cost of Goods, Packing, Insurance, Inland transportation, freight etc.)

For local item /supply, offer should be on FOR basis (i.e. total landed cost for delivery at TIFR, Hyderabad).

Packing: The packing dimension of the item (viz. H, W, L, weight etc.) shall be specifically stated / marked as per packing standards and also mention whether the mode of shipping the item is Airworthiness / Seaworthiness or both, to prevent damage or deterioration during transit to the final destination as indicated in the tender. Accordingly, the mode of shipment will be decided by TIFR Hyderabad.

**Price must be quoted in the Price Bid Format attached herewith as "Part -B" (Financial Bid).**

18. If equipment offered is to be imported, arrangements for import will be made by us.
19. Tenders who do not comply with any of the condition are liable to be rejected.
20. The Institute shall be under no obligation to accept the lowest or any other tender received in response to this tender notice and shall be entitled to reject any tender without assigning any reason whatsoever.

21. TIFR reserves the right to place the order for part/reduced quantity than what is specified in the tender.

22. **Performance Security:** The Successful bidders should deposit @ 3% of Purchase Order value as Performance Security against issue of order/contract to be submitted within 15 days against issue of order/contract. The performance security shall be in the form of Demand Draft in favour of “Tata Institute of Fundamental Research, Hyderabad” payable at Hyderabad (or) Bank Guarantee from State Bank of India & Associates (or) any one of the Nationalized Banks.

The Performance Security will be returned back to the successful supplier on receipt of the Performance Bank Guarantee (or) The 3% Performance Security Deposit may be extended as Performance Bank Guarantee valid for 60 days beyond the date of completion of all contractual obligations of the supplier including warranty period. Vendor should clearly mention their acceptance to this effect in their quote.

**Performance Bank Guarantee:** Performance Bank Guarantee for 3% of the value of supply should be provided and it should be valid for 60 days beyond the date of completion of all contractual obligations of the supplier including warranty period. Performance Bank Guarantee should be from Nationalized Bank in India. In case Performance Bank Guarantee is not provided, 97% payment only would be released and balance after 60 days beyond the date of completion of all contractual obligations of the supplier including warranty period. Vendor should clearly mention their acceptance to this effect in their quote.

**23. PAYMENT TERMS:**

**Payments will be made at well-defined intervals as stipulated below.**

All payments will be made through Wire transfer ((or) Irrevocable Letter of credit)) as per the following stages of payment against clear submission of documents at each stage and acceptance of documents against certification by TIFR Hyderabad officials.

**The following will be the stages of payment:**

<b>Time</b>	<b>Milestone</b>	<b>Payment terms</b>
<b>T0:</b>	Coming into force of the contract	20 % of the Total Contract Price against submission of Bank Guarantee @20%
<b>T0+6Months :</b>	Detailed Design Review + Finalization of Interface Control Document (ICD)	20 % of the Total Contract Price
<b>T0+12Months :</b>	Factory Acceptance Test of front end (oscillator and first two stages of amplification)	20 % of the Total Contract Price
<b>T0+20Months</b>	Factory Acceptance Test of the full system with compression under air	20 % of the Contract Total Price
<b>T0+24Months :</b>	Site Acceptance Test	15 % of the Contract Total Price
<b>T0+36 Months :</b>	Satisfactory performance of the laser for 12 months.	5 % of the Contract Total Price

24. Pre Inspection Report: The successful bidder should submit the Pre Inspection Report to TIFR Hyderabad before dispatch of the material (if required).

25. Repair / replacement if required any during the warranty period, necessary customs clearance charges / customs duty charges, freight charges for sending back the repair material to supplier and import freight charges of replacement should be borne by the supplier.

26. For Import cases: No Agency commission will be paid as per Govt. of India rules.

27. All bank charges outside India to supplier's account only.

28. TIFR is exempted from paying of Custom Duty under the notification No.51/96 dated 23.07.1996, Excise Duty under the notification No.10/97 dated 01.03.1997, for all procurements/supply meant exclusively for Educational, scientific and research purpose. Whenever the exemption certificate not honored by the authorities, the applicable duty will have to be paid. Hence Excise & Custom duties, if any, should be shown separately.

TIFR is a public funded research institute and is entitled to concessional rate of GST @ 5% for certain items supplied for research purpose vide notification no. 45/2017 (CGST) and 45/2017 (IGST) dated 14<sup>th</sup> Nov, 2017. The offer should be submitted after fully considering the above notification.

29. TAXES: Deduction of Indian Income Tax Deduction at Source: The Deduction of Indian Income Tax Deduction at source (TDS) will be deducted as per IT Act. The taxes at the time of actual utilization of service etc. will be deducted if applicable any.

GST rule will be applicable with effect from 01.07.2017. The applicable TDS /other charges if any as per GST rule will be deducted as per new GST regime.

TIFR-Hyderabad GST NO: 36AAATT3951F2ZG.

30. Bidders, please provide the PAN No., Bank Details, email ID, Contact person details, GST No etc.

31. The Supplier shall arrange to meet milestones and ship the ordered materials within the mutually agreed delivery period as mentioned in the above table/order unless extended with/without penalty. Please mention the Delivery Period/ milestone time period mentioned in the above table Clearly in the Bid, however effort to be taken to deliver the materials at the earliest. In case the supplier fails to deliver the material as per the schedule/milestone time period accepted, TIFR reserves the right to take any decision in interest of TIFR.

32. **COMMENCEMENT OF WARRANTY PERIOD**: The warranty period of the system shall start from the date of satisfactory installation/commissioning/demonstration at the project site of TIFR Hyderabad.

33. **ANNUAL MAINTENANCE CHARGES**: The bidder must mention in the quotation, the rate/amount of annual maintenance charges, if we opt for maintenance contract after expiry of the warranty period.

34. Specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that merely copying our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with the printed technical leaflet/literature of the quoted model of the item by the quoting party/manufacturer.

35. **OBSERVANCE OF LOCAL LAWS:** Wherever applicable bidder / vendor / contractor shall comply with all law, statutory rules & regulations etc. The bidder / vendor/ contractor shall obtain all necessary permits / approval from the local Governing Body, Police, and other concerned Authorities as may be required under law. The bidder / vendor /contractor shall pay all types of taxes, fees, license charges, deposits, duties, tolls, royalty or other charges that may be leviable account of any of the operations connected with the execution of this work/ contract.
36. In case of any interpretational issues arises in this tender, the interpretation/decision of TIFR Hyderabad shall be final and binding on the bidder in resolution of disputes.
37. It is the responsibility of the vendor to make sure that the system being proposed can be exported to India with TIFR Hyderabad as the end user. All clarifying documentation must be submitted with the Bid.
38. TIFR, Hyderabad reserves the right to ask for or to provide any clarification, changes after the release of this tender. Any changes or clarifications provided by TIFR, Hyderabad may be checked at TIFR Hyderabad website tender page <https://www.tifrh.res.in/index.php/commercial-tenders>.

**ADMINISTRATIVE OFFICER  
(PURCHASE SECTION)  
TIFR, HYDERABAD**

## Financial Bid for Petawatt laser - Supply, Installation, and Commissioning at TIFR, Hyderabad (Part - B)

### Annexure - E

TIFR Hyderabad Enquiry No & Date: \_\_\_\_\_

Due date: \_\_\_\_\_

Bidder's Quotation Ref No. & Date: \_\_\_\_\_

Financial Bid (Bidders must quote their rates using this Format)

S.No.	Item Description as per tender	Make/Brand/ Type	Qty.	Rate per unit (Currency)	Basic Cost of main item (In Currency)
A	<p><b><u>Ti : Sapphire Laser System of Peta-Watt class power</u></b></p> <p>I. A low powered beam of 50 TW at 5Hz repetition rate.  (referred to as LEB (low energy beam) in this document.</p>				
	<p>II. A high energy output beam (referred to as HEB (high energy beam)). The power of the HEB laser system should be 0.75 PW at 1 Hz.</p>				
B.	Ex-Works cost (Duly packed Airworthy/Seaworthy of international standard)				
C.	FOB /FCA Cost (Name of Airport_____)				
D.	CIP/CIF Cost (Upto Hyderabad Airport)(all inclusive i.e. Cost of Goods, Packing, Insurance, Inland transportation, freight etc.)				

## **Note:**

1. All the column should be appropriately filled and not left blank.
2. Do not include any other charges, taxes, duties etc. in the Basic Cost of the item. The other charges, taxes, duties etc. to be shown separately.
3. Any accessories, optional items should be shown separately using above format.
4. Use separate sheet for detail description, specification of the item, Price breakup for the item(s) mentioned in technical specification but prices should be quoted in the same format.
5. Prices quoted in Indian Currency should be on F.O.R. basis and mention separately using different table format showing all the applicable taxes/Duties like GST, Freight & Transportation charges and installation charges etc.  
Use separate sheet for detail description, specification of the item, Price breakup for the item(s) mentioned in technical specification but prices should be quoted in the same format.
6. TIFR Hyderabad being educational & research institute, discounted price shall be offered.

**Signature of the Bidder**

Name, Address contact no

& email id of the bidder/

Company with company's Stamp or Seal

Date: \_\_\_\_\_

# Financial Bid for Annual Maintenance Contract for Petawatt laser at TIFR, Hyderabad.

## Annexure - F

TIFR Hyderabad Enquiry No & Date: \_\_\_\_\_

Due date: \_\_\_\_\_

Bidder's Quotation Ref No. & Date: \_\_\_\_\_

Financial Bid (Bidders must quote their rates using this Format)

**Note: The bidder must mention in the quotation, the rate/amount of annual maintenance charges, if we opt for maintenance contract after expiry of the warranty period.**

S.No.	AMC (for item Description as per Tender) after Warranty Period	Rate / Year In INR	Tax (%) or Amount in INR	Total Amount in INR
1.	1 <sup>st</sup> Year			
2.	2 <sup>nd</sup> Year			
3.	3 <sup>rd</sup> Year			

**Note:**

1. All the column should be appropriately filled and not left blank.
2. Do not include any other charges, taxes, duties etc. in the Basic Cost of the item.
3. Prices should be quoted in same format.
4. TIFR Hyderabad being educational & research institute, discounted price shall be offered.

**Signature of the Bidder**

**Name, Address contact no** \_\_\_\_\_

**& email id of the bidder/** \_\_\_\_\_

**Company with company's Stamp or Seal** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Place:** \_\_\_\_\_